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DEVELOPING TERMINOLOGY MANAGEMENT AT A GLOBAL TECHNOLOGY AND MANUFACTURING COMPANY

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ABSTRACT

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The topic of this study is the development of terminology management at a case company. The study was conducted as a commission for a Finnish company specialized in weather, environmental, and industrial measurements. The study examines the current state of terminology management at the case company, how it can be improved, and how employees from different departments within the company can participate in terminology management. The main aims of the study are to improve terminology management in a comprehensive manner and to discover how to involve employees from multiple departments in terminology management. A further aim of the study is to examine how well theoretical models on terminology can be adapted to practice, and more specifically, to a company context.

The study was conducted by using an action research approach, which enabled close collaboration between the researcher and the employees of the company to establish new solutions and practices. Participant observation and semi-structured interview were used as the research methods of the study, and they yielded the following research materials: field notes, field diary, and interviews. In addition, three types of documents were used as data for the study: the old terminology process drafts, the project plan for the development project carried out at the company, and the finalized terminology process descriptions produced during the project.

The theoretical framework of the study consists of earlier research and theoretical literature from the field of terminology. A process maturity model for the field of terminology by Hanne Thomsen (2005) and a framework of the dimensions of terminology work by Anita Nuopponen (2018) were used for the analysis of the research materials. As its theoretical background, in addition to presenting the above models, the study introduces central aspects of the theory of terminology, the phases of terminology creation projects and processes, and the characteristics of terminology management in a corporate setting.

The study indicates that terminology management at the beginning of the research was in a state of disorganization and inactivity. However, based on some elements of terminology management, the company was already quite advanced. As the main outcome of the study, five processes for terminology management were created for the company. The responsibility for doing terminology work was appointed to documentation specialists. In addition, a terminology group, which had been formed prior to the research, became established in its practices and developed into a governing group in issues related to terminology management. However, the study could not determine how different departments could be involved in terminology management mainly due to the underestimation of the resources that developing the processes would require.

The study also produced several recommendations for the future development of terminology management at the case company. For example, the content of the company's termbase should be developed, and the company should consider acquiring a new tool for terminology management, so that the needs of users could be acknowledged better. Terminology management should also be communicated about more, so that more employees could become involved in it and term use would become more consistent within the company. While the results of the study mainly profit the case company, this study provides information on terminology management and how it can be improved for other companies, too. The study also offers an idea how to develop Nuopponen's (2018) terminology work framework that was used for the analysis of the data.

Keywords: terminology management, terminology work, terminology, terminology process, action research

TIIVISTELMÄ

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Tämän tutkimuksen aiheena on terminhallinnan kehittäminen kohdeyrityksessä. Tutkimus on tehty toimeksiantona suomalaiselle sää-, ympäristö- ja teollisuusmittauksiin erikoistuneelle yritykselle. Tutkimuksessa tarkastellaan, millainen on terminhallinnan nykytilanne yrityksessä, miten sitä voi kehittää ja miten työntekijät yrityksen eri osastoilta voivat osallistua terminhallintaan. Tutkimuksen päätavoitteina on kehittää yrityksen terminhallintaa kokonaisvaltaisesti ja selvittää, miten eri osastojen työntekijöitä saadaan osallistumaan terminhallintaan. Tutkimuksen yhtenä tavoitteena on myös tutkia, miten terminologian alan teoreettisia malleja voi soveltaa käytäntöön ja yrityskontekstiin.

Tutkimus toteutettiin toimintatutkimuksena, mikä mahdollisti tiiviin yhteistyön tutkijan ja yrityksen työntekijöiden välillä uusien ratkaisujen ja käytäntöjen luomiseksi. Tutkimusmetodeina käytettiin osallistuvaa havainnointia ja puolistrukturoitua haastattelua. Näiden metodien avulla kerätty tutkimusaineisto koostui kenttämuistiinpanoista, kenttäpäiväkirjasta ja haastatteluista. Lisäksi tutkimusaineistona käytettiin kolmea dokumenttityyppiä: yrityksen vanhoja terminologiaprosessiluonnoksia, yrityksessä toteutetun kehitysprojektin projektisuunnitelmaa sekä tutkimuksen aikana tuotettuja viimeisteltyjä prosessikuvauksia.

Tutkimuksen teoreettinen viitekehys pohjautuu terminologian alan tutkimus- ja teoriakirjallisuuteen. Aineiston analysoimisessa käytettiin Hanne Thomsenin (2005) terminologian alalle suunnattua prosessikypsyysmallia sekä Anita Nuopposen (2018) luomaa viitekehystä termityön eri osa-alueista. Tutkimuksen teoriaosassa esitellään edellä mainittujen teoreettisten mallien lisäksi terminologian teorian pääkohtia, termien luomiseen suunnattujen terminologiaprojektien ja -prosessien vaiheita sekä terminhallinnan ominaispiirteitä yrityskontekstissa.

Tutkimus osoittaa, että kohdeyrityksen terminhallinta oli tutkimuksen alkuvaiheessa järjestäytymätöntä ja epäaktiivista. Tästä huolimatta jotkin terminhallinnan osatekijät olivat melko edistyneellä tasolla jo tutkimuksen alussa. Tutkimuksen tärkeimpänä lopputuloksena kohdeyritykselle kehitettiin viisi prosessia terminhallintaa varten. Dokumentointiasiantuntijoille annettiin vastuu termityön tekemisestä, ja lisäksi erillinen terminologiaryhmä, joka oli perustettu ennen tutkimuksen alkua, vakiintui työtavoissaan ja muotoutui johtoryhmäksi terminhallintaan liittyvissä asioissa. Tutkimuksessa ei kuitenkaan onnistuttu määrittämään, miten yrityksen eri osastot voisivat olla osallisina terminhallinnassa. Tämä johtui pääasiassa prosessien kehitystyön vaatimien resurssien aliarvioimisesta.

Tutkimus tuotti myös useita ehdotuksia kohdeyrityksen terminhallinnan kehittämiseksi tulevaisuudessa. Yrityksen termitietokannan sisältöä tulisi kehittää ja yrityksen olisi kannattavaa harkita uuden työkalun hankkimista terminhallintaa varten, jotta käyttäjien tarpeet tulisivat paremmin huomioiduiksi. Terminhallinta tulisi myös tehdä tunnetummaksi yrityksen sisällä, jotta terminhallintaan saataisiin osallistumaan enemmän työntekijöitä ja jotta termien käyttö tulisi yhtenäisemmäksi yrityksen sisällä. Vaikka tutkimuksen tulokset hyödyttävät erityisesti kohdeyritystä, tarjoaa tutkimus tietoa terminhallinnasta ja sen kehittämisestä myös muille yrityksille. Tutkimus tarjoaa myös kehitysidean Nuopposen (2018) termityön viitekehykseen, jota käytettiin tutkimuksen aineiston analysoimisessa.

Avainsanat: terminhallinta, termityö, terminologia, terminologiaprosessi, toimintatutkimus

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1 Introduction

Terminology plays an important role in enabling professional communication (Picht and Draskau 1985, 23). To be able to communicate professionally and make progress in both academic and practical environments, specialized linguistic signs, terms, have to be created and delimited to express the concepts of a given subject (ibid.). If this were not the case, it would be increasingly difficult for people to understand each other and for developments in science and society to take place (ibid.). For example, unsuccessful or nonexistent terminology management can create communication barriers within a company, so that different groups will take form, each of which then creates and uses their own terminology (Fähndrich 2005, 239). Successful and professional terminology management, on the other hand, "promotes enterprise language and makes for unequivocal communication between the organization and its staff, partners and stakeholders" (Bauer 2015, 324).

This study focuses on terminology management and its development in a company setting. It has been commissioned by a Finnish technology and manufacturing company, Vaisala. Founded in 1936 and headquartered in Vantaa, Vaisala maintains a global leadership in weather, environmental, and industrial measurements (Vaisala 2020). Vaisala develops and produces a wide collection of products and services related to observation and measurement for a plethora of industries and applications, including meteorology, aviation, agriculture, and renewable energy (ibid.). Approximately 1,800 employees work at Vaisala throughout the globe (ibid.). According to the wish of the company, for the rest of this thesis, the company will be referred to as *the case company* or *the company*.

In this study, I will examine the current state of terminology management at the case company, seek to improve it, and look into how different departments within the company can participate in terminology management. I have three research questions to guide my research:

- How is terminology management currently organized at the case company?
- How can terminology management be improved at the case company?
- How can employees from different departments within the case company be involved in terminology management?

The motivation for the study originated during my internship at the company in the summer of 2019. During that time, I worked in the customer documentation team, practiced terminology work, and compiled the company's termbase. Terminology work had been initiated at the company shortly prior to my internship, but no routines for its practice had yet been formed. Two terminology processes, defined as processes related to terminology management, had also been created, but they were still in a draft state and had not been taken into active use by the employees. An abundance of details, practices, and responsibilities remained to be discussed and decided on, and there seemed to be a threat that terminology management would be abandoned before it had even properly been established. Hence, there was a real need to improve terminology management at the company.

The main aims of this study are to develop the practices and the overall organization of terminology management at the case company and to find ways to engage more people in new and shared practices. To achieve these aims, an action research approach is used in the study. Action research enables both the researcher and the people within the research setting to work together to improve a current situation, which fits the study well. A further aim of the study is to examine how theoretical models from the field of terminology can be adapted to practice, namely to a company context. I use two research methods, participant observation and semi-structured interview, to gather research materials for the study. The research materials consist of field notes and a field diary, interviews, and the following documents: the old terminology process drafts, the project plan for the project aiming at developing terminology management at the company, and the finalized terminology process descriptions produced during this development project.

The research materials are analyzed using two theoretical models. A maturity model for assessing processes related to terminology by Hanne Thomsen (2005) is used to analyze the state of terminology management both at the beginning and at the end of the research. A framework for analyzing the aspects and characteristics of terminology work by Anita Nuopponen (2018) is used to examine how terminology management was developed during the research. In addition to these models, the theoretical framework of the study consists of literature and research from the field of

terminology, such as handbooks of terminology and terminology management, theoretical models for terminology projects and processes, and case studies on terminology management in companies.

While the results of the study will primarily profit the case company, this study will also provide information on terminology management and ways to improve it for other companies. It is also of interest to the field of terminology in general, as case studies on terminology management with a focus on processes at companies in Finland or abroad are not abundant. Moreover, many project or process models from literature concentrate on introducing or implementing terminology management into an organization (e.g. Bauer 2015) and creating new terminology or a terminology resource (e.g. Suonuuti 1997; Nykänen 1999; Dobrina 2015), while this study has a wider perspective on processes related to terminology management: it recognizes that other types of processes are needed for terminology management, too. This study also exemplifies how a theoretical model from the field of terminology can be developed with empirical data.

Furthermore, the results of this study are likely to contribute to the field of technical communication. Terminology work is closely related to the field of technical communication, especially technical documentation. Practitioners of technical documentation, known by many different titles, such as technical writers or documentation specialists, have a particular skill

> …to enable, through an appropriate strategy of information design, the quick retrieval of relevant data in a given situation. This task requires an optimal match between, on the one hand, the reader's expectations and previous knowledge and, on the other, the document's content and its organization. (Wettengel and Van de Weyer 2001, 445)

Concise, clear, and descriptive terms and the consistent use of these terms can work as real assets for technical writers whose one important task, as discussed in the above quotation, is to help the readers find relevant information efficiently. Therefore, terminology management is likely to have special relevance for companies which produce technical documentation, such as the case company.

As concerns the structure of this thesis, there are six main chapters. After the introduction to the study in this first chapter, I will define and discuss the central terms used in this study, introduce central theoretical aspects of terminology, and explain terminology management in detail in chapter 2. In chapter 3, I will focus on terminology management and its organization in companies and present

the maturity model for terminology processes. In chapter 4, I will present the research methods and materials of the study. In addition, in this chapter, I will also explain the structure of the action research process as it was realized in the study. In chapter 5, I will present and discuss the results of the study, including recommendations for future development of terminology management at the company. Finally, chapter 6 concludes the study with final conclusions, reflections, and suggestions for future research.

2 Terminology

In this chapter, the key concepts that set the background for the thesis are defined and discussed. The term *terminology* and its meanings are discussed first, followed by an overview of some theoretical aspects of terminology. After these, terminology management is examined in detail, including a closer look into terminology projects and processes.

2.1 Defining *terminology*

The term *terminology* has several meanings. It can be approached from three different perspectives: *terminology* can be defined as a field of study, an activity, or a result of terminological activities (Sager 1990, 2–3). To begin with, as a field of study, *terminology* "is an interdisciplinary field of enquiry whose prime object of study are the specialized words occurring in natural language which belong to specific domains of usage" (Cabré 1999, 32). These "specialized words" belonging to specialized subject and usage areas are known as *terms*. Terminology shares characteristics with subject and study fields such as information science, computer science, cognitive science, linguistics, and other communication studies (ibid., 25). However, terminology has its own theory and objectives that separate it from related fields, such as lexicology (ibid., 32). The theoretical aspects of terminology are further discussed in section 2.2.

As an activity, *terminology* refers to "the set of practices and methods used for the collection, description and presentation of terms" (Sager 1990, 3). This set of practices includes analyzing the relations between concepts, defining concepts, assigning terms to concepts, and storing the resulting terminological data (Tekniikan Sanastokeskus 1988, 13). At least three alternative terms have also been used by scholars and practitioners to denote this practical approach of terminology: *terminography*, *terminology work*, and *terminology management*. Even though the term used for this concept varies, these practical activities are "governed by a series of technical, formal, and procedural recommendations that have been internationally agreed" (Cabré 1999, 115). For example, ISO, the International Organization for Standardization, has created a variety of standards related to different aspects of terminology. When browsing the ISO store for standards, a quick search with the search

word *terminology* summons 654 standards (ISO 2020). The number includes standards that are currently in use, under development, withdrawn, or deleted (ibid.). The topics of these standards range from the principles and methods of terminology work to vocabularies of specific subject areas (ibid.).

In its third meaning, *terminology* is a "set of terms of a particular special subject" (Cabré 1999, 32). Sager (1990, 3) has further specified that this set of terms should be both coherent and consistent within itself and result from terminological activities. In other words, a terminology in this sense is a product of the practical terminology work discussed above.

In this study, I will use *terminology* as a non-countable noun when referring to the field of study, and as a countable noun when referring to the product of terminology work, such as a terminology of industrial measurement. To refer to the practical activities of terminology, then, I will use the term *terminology work*. The term *terminology management*, which is another key term in this thesis, is defined and discussed in detail in section 2.3.

2.2 Theory of terminology

Terminology is based on theoretical principles, which it has borrowed and applied from fields such as linguistics, information science, logic, and ontology (Cabré 1999, 32). There are a few schools of thought with slightly different approaches to terminology, but one of them, namely the Vienna school, remains the best known (ibid., 12–13). A significant amount of theoretical work and modern practices in terminology work are based on its approaches (ibid.). The Vienna school itself is based on the work of Eugen Wüster, who was the first scholar to present the theory of terminology in his doctoral dissertation in 1931 (Picht and Draskau 1985, 27). Cabré (1999, 7) further observes that the theory of terminology has been influenced by practical experiences and needs from the start: according to Cabré (ibid.), Wüster's initial interest in terminology lay in "methods of compilation and standardization of terms". Moreover, solving language-related issues in communication has been and still is the motivation for the emergence of terminological practices, which in turn have shaped the theory of terminology (ibid.).

A general theory of terminology, which is largely based on the Vienna school, views terminology as an interdisciplinary yet independent subject utilized in scientific and technical disciplines (Cabré 1999, 7). It mainly focuses on concepts, relationships between terms and concepts, and selecting terms to represent concepts (ibid.). Indeed, concept and concept analysis are the basic elements of terminology as well as terminology work (Tekniikan Sanastokeskus 1988, 25). Moreover, Sager (1990, 14) has recognized that "[a] theory of terminology is … primarily concerned with a referential system which relates knowledge structures to lexical structure and defines the constituent elements of each type of structure." This sentence refers to the relationships between the terms *object*, *concept*, *term*, and *definition*, which together form a basis for the general theory of terminology. Figure 1 illustrates these relations:

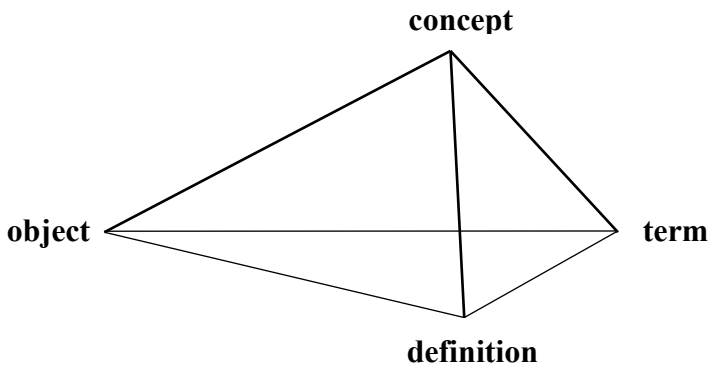

Figure 1. The relations between *object*, *concept*, *term*, and *definition* (reproduction from Tekniikan Sanastokeskus 1988, 24 and Suonuuti 1997, 10).

This tetrahedron model is based on Ogden and Richards' (1923) triangle of reference, which has been later modified to the uses of terminology. In the following, I will explain the model in more detail.

To begin with, *objects* are either concrete (such as books, paper, or computers) or abstract (such as sounds, atmospheres, or processes) entities that can be observed in the world or imagined in our minds (Suonuuti 1997, 9). While thinking about objects, we mentally link a set of characteristics to specific objects in order to analyze and categorize them (ibid.). This way, a *concept*, a "unit of knowledge created by a unique combination of characteristics" (ISO 1087 2019, n.p.), is formed. Concepts are entirely mental constructs, and so to be able to communicate about them, two further elements are needed: a term and a definition (Suonuuti 1997, 9).

A *term* is an established verbal expression of a concept (Suonuuti 1997, 9). Terms may consist of only one word (such as *manual*) or multiple words (such as *subject matter expert*), or they can be compounds (such as *network*) (ibid., 25). Other requirements, which terms are typically expected to fulfill, include the following: terms should 1) be transparent in the sense that their meanings or the concepts behind them could be concluded just from the term itself (Großjean 2009, 32), 2) be traceable to a concept system (ibid.), 3) be short in length (Suonuuti 1997, 25; Großjean 2009, 32), and 4) enable derivatives to be formed (ibid.).

A *definition* is a verbal description of a concept (Tekniikan Sanastokeskus 1988, 41). According to ISO 1087 (2019, n.p.), a definition has two aims: to describe the concept and to distinguish it from other related concepts. There are several methods to formulate definitions, but analyzing the relations between concepts and formulating a concept system to illustrate these relations should be the starting point (Suonuuti 1997, 11). However, presenting the definition formation techniques, the practice of concept analysis, and the creation of concept systems falls outside the scope of this thesis.

Warburton (2014, 36) has noted that the general theory of terminology has had a major influence in the field of terminology, and it still is the dominating theory used in educational settings and in settings aiming at language normalization, for example language planning and standard-developing settings. Nonetheless, the general theory of terminology has received a fair amount of criticism over the years, and alternative theories of terminology have been formed. The alternative theories, such as socio-cognitive and communicative theories, challenge the traditional requirement that the concept behind a term should always be a part of "an objectivist, structured system of concepts" (ibid., 62); instead, they emphasize the "linguistic properties (morphological, syntactic, paradigmatic, etc.) of terms" and the contexts in which terms are used as the main criteria for what constitutes a term and what does not (ibid.). However, Warburton (ibid., 274) underlines that none of the existing theories of terminology adapt well enough to modern applications of terminology. Warburton (ibid., 74) especially notes that none of the theories or methodologies of terminology take

commercial settings and their requirements into consideration. This deficiency is relevant from the point of view of this thesis, as its topic is centered on terminology management in a company setting.

As a conclusion, Warburton (2014, 274) calls for the formation of a whole new approach: "*application-oriented terminology theory and methodology*". According to Warburton (ibid.), this new approach should allow more freedom from "fixed semantic models" and more flexibility so that "different linguistic contexts, communicative goals, and endusers [sic] of terminological resources" would be considered within its framework. However, an application-oriented terminology is yet to take shape as an established theory and practice.

2.3 Terminology management

Wright and Budin (1997a, 1) define *terminology management* as "any deliberate manipulation of terminological information". This definition, however, is far too broad for the purposes of this study, and it has to be specified. Kelly and DePalma (2009, 3) offer a listing of activities included in terminology management and state that terminology management "involves the systematic identification, storage, processing, presentation, and search for … terms by content authors, translators, marketers, and other participants in … content supply chain." This list of activities is, however, still insufficient a definition, since it is too similar to the concept of *terminology work* discussed earlier.

Warburton (2014, 3), on the other hand, has specified that terminology management deals with "the set of [terminology work] activities as an overall program and strategy". This view suggests that terminology management has an administrative quality; it is not simply about doing the practical activities, such as identifying terms, presenting them in a specific format, and publishing them. Rather, according to this view, terminology management considers the overall organization of all these practices.

The above view aptly fits the topic of this thesis, as one of the main purposes of this study is to develop terminology management at a case company comprehensively by taking into consideration the various elements related to executing successful terminology work in a company setting.

Therefore, in this thesis I use the term *terminology management* to refer to the set of activities related to the overall strategic organization of terminology work. These activities include the specification of roles, responsibilities, and processes to ensure consistent, up-to-date, and professional terminology for specific purposes and audiences. A more thorough inspection of the different aspects of terminology management and a look into terminology projects and processes and their basic structure are offered in the following subsections.

2.3.1 The many aspects of terminology management

The elements that constitute terminology management can be outlined in numerous ways and based on an abundance of criteria. Anita Nuopponen (2018) has created a useful framework for analyzing "the various dimensions and characteristics of terminology work" (ibid., 7). It should be noted that in her framework, Nuopponen (ibid., 8) uses the term *terminology work* to refer to "the wider activity related with terminologies", whereas I use *terminology management* in a somewhat similar meaning, as was discussed above. In the following, I will use Nuopponen's (2018) model and terminology as a basis to explore the different aspects that terminology management consists of. Later, in section 5.2 and its subsections, I will use Nuopponen's model to group and analyze the research materials.

In the framework, Nuopponen (2018, 6) has approached terminology work through five aspects: target group, purpose, compiler, product, and method. Nuopponen (ibid., 19–20) points out that the multiple types of terminology work presented in her model are not strictly discrete; rather, they can combine in several ways and they should be thought as a continuum. Starting from the target group, terminology work can be targeted at various audiences with differing needs (ibid., 10). These include domain experts, translators, internal or external users and stakeholders in organizations or companies, students, general audience, and information systems (ibid.). Bauer (2015, 334) has recognized the following target groups of terminology management within companies: technical writing, content and documentation management, language services, product management, software development, customer and staff training, procurement and purchasing, sales, legal and compliance, and marketing and PR.

The second aspect in Nuopponen's (2018, 6) model, the purpose of terminology work, is a slightly more complex issue, for there are several possibilities to approach it: from the point of view of the purpose in itself, immediacy to the need, or needs (ibid., 9). There are two main approaches for reaching the main purpose of all terminology work, which is "to facilitate the mutual understanding inside the special subject fields and over the language and other boundaries": descriptive and prescriptive or normative terminology work (ibid., 12). Descriptive terminology work aims at documenting all the terms that are used for a particular concept (Wright 1997, 18). Wright and Budin (1997b, 329) note that it is practiced by employees, such as translators and technical writers, who document terminology for the benefit of their work but who do not govern the usage of terms in a specific subject area.

Prescriptive terminology work, on the other hand, aims at producing precise and standardized terms to enable effective communication between experts, to ensure the appropriate implementation of standards, and to guarantee human rights and public safety under the law by reference to specified terms in legal contexts, for example (Wright and Budin 1997b, 329). It is practiced by domain experts, such as standardizers and language planners (ibid.). Wright and Budin (ibid.) also note that translators and other "non-experts"[1] (such as technical writers) can practice prescriptive terminology work when specifying "in-house usage".

As mentioned above, Nuopponen (2018, 9), also acknowledges other purposes for terminology work: it can be done in response to immediacy to the need or simply needs. Focusing first on the immediacy aspect, terminology work can be proactive or just-in-time (ibid., 10). In proactive terminology work, those who do terminology work try to anticipate the terminology needs of users, which can mean working on terminology of specific subject fields or in specific languages (ibid., 11). Just-in-time terminology work, which is often called ad hoc terminology work, is done based on requests at the time when it is needed (ibid.). Secondly, the needs as a purpose of terminology work

[1] Note that the use of the term *non-expert* here refers to the fact that technical writers, for example, do not typically have the same kind of expertise in the subject matter, such as the technology related to the product they are to document, in the same way as engineers or software developers, who have designed the particular product, have.

refer to either a need to create terminology within a specific subject field (domain-oriented terminology work) or a need to solve terminological problems detected in a collection of texts (text-oriented terminology work) (ibid.).

The third main aspect of terminology work in Nuopponen's (2018, 6) model is the compiler by whom terminology work is done. Nuopponen (ibid., 9) approaches this aspect with three further elements: expertise and relation, collaboration, and continuity. Concerning the expertise and relation, Nuopponen (ibid., 12) outlines three groups who work with terminologies: creators, compilers and mediators, and users. The creators are typically experts of a specific field, called domain experts or subject matter experts, who are familiar with the terminology of their field and often have a definitive role in term selection and concept definition (ibid., 12–13). Moreover, terminological work methods and standards have primarily been created for their use (ibid., 13). The compilers and mediators, such as terminologists, compile and analyze terminological data and produce terminological products (ibid.). Terminologists are terminology work professionals, who are experienced in producing professional and reliable terminological products and services (Dobrina 2015, 180). The users, such as translators, technical writers, teachers, and those working in the field, use terms and concepts in their work by searching for terms and definitions, for example (Nuopponen 2018, 13). These three groups often overlap and the distinctions between them blur in practice (ibid.).

Concerning the second element under the compiler aspect, collaboration, Nuopponen (2018, 13) acknowledges that terminology work can be carried out with differing degrees of collaboration. The basic model of collaborative terminology work necessitates cooperation between terminologists and subject matter experts (ibid.). However, terminology work can also be a completely individual effort, even though collaborative terminology work is the ideal scenario (ibid.). Collaborative terminology work can be intra- or interorganizational (ibid.).

Continuity is the third element that Nuopponen (2018, 14) links to the compiler aspect in her model. As Nuopponen (ibid.) summarizes, "[t]erminology work can be a freestanding onetime or recurrent effort, or it can be *continuous* practice integrated in the processes of an organization or e.g.

in the work of a translator". Moreover, terminology work is often outlined in the form of a project in terminological literature (Nuopponen 2018, 14; Fähndrich 2005; Dobrina 2015; Nykänen 1999; Suonuuti 1997). Terminology projects themselves can differ in their extensiveness and continuity (Nuopponen 2018, 14). Some terminology project types and examples of one project type in particular are presented in section 2.3.2.

The fourth aspect in Nuopponen's (2018, 6) model concerns the product of terminology work, which is further divided into two elements: product and language (ibid., 9). The product can range from one term in a termbase to a vast terminology in the form of a book, standard, or a web page (ibid., 14). A *termbase* is a database that consists of terminological entries (ISO 1087, 2019), often shortened as *term entries*. Term entries include data related to concepts and their designations, such as terms, definitions, notes, and information on the sources (ibid.). Moreover, depending on how many languages the product of terminology work is intended to cover, terminology work can be monolingual, bilingual, or multilingual (Nuopponen 2018, 15). Ideally, the same phases of a terminology creation process would be repeated for each language that the product will cover, but completing equally thorough analyses of concepts and concept systems for all languages may not always be possible due to the complexity of the work (ibid.)

The final aspect in Nuopponen's (2018, 6) model is the method for doing terminology work. Nuopponen (ibid., 9) lists four elements that affect the method: material, tools, orientation, and systematicity. The material here refers to texts, documents, consultations of subject matter experts, interviews, or other materials which are researched and from which terms are extracted for further analysis (ibid., 15). The tools, on the other hand, refer to the fact that terminology work can be done manually or aided by computers (ibid., 16). The extent to which computers are used in terminology work can take many different forms (ibid.). For example, terminology management systems can be used to both store and search for terminological data (Warburton 2016, 7). There are also software which can extract terms and other terminological data automatically from texts, though manual terminology work is still needed to verify the work of computers (Nuopponen 2018, 16–17).

Concerning the orientation element, Nuopponen (2018, 17) contrasts concept-oriented and term-oriented terminology work, even though in practice, both are used in terminology work (ibid.; Depecker 2015, 36). Indeed, terms and concepts have a central role in both orientations: in concept-oriented terminology work, a terminologist locates the concepts and drafts concept systems with the help of terms, and on the other hand, concept systems are needed even in term-oriented approaches for term extraction and data presentation purposes (Nuopponen 2018, 17). Finally, systematicity refers to the fact that a distinction is often made between systematic terminology work and non-systematic or ad hoc terminology work (ibid.). According to Nuopponen (ibid., 17–18):

> Systematicity is explicitly or implicitly connected with at least with [sic] three elements of terminology work: 1) systematic way of working, i.e. following a method as opposed to punctual/ad hoc search; 2) concept-orientation involving elaboration of concept system for the basis of further analysis as opposed to word-orientation in lexicography; and, 3) organizing and presenting the results systematically as opposed to an alphabetical order.

Nuopponen (ibid., 18) also notes that even if non-systematic or ad hoc terminology work do not have any established methods, a systematic method, which usually takes the form of a project, can be used to solve individual, ad hoc terminological issues by using a restricted version of the systematic method.

As a final note, Picht and Draskau (1985, 158–159) have recognized two factors which do not have anything to do with terminology as such, but which can still have significant effects on the realization of terminology work (and terminology management in general): the available time and money. Picht and Draskau (ibid., 159) further emphasize that the practical terminology work should not be considered only from the academic and, consequently, idealistic point of view, since it consists more often of investigation and production than research. Sometimes, it may be necessary to reach a compromise during the execution of terminology work, which can mean sacrificing some central terminological principles (ibid.). This is especially true when organizing terminology management and practicing terminology work in a company setting, a point which will be further examined in section 3.1.

2.3.2 Terminology projects and processes

As was noted above, terminology work, which in this thesis is treated as a part of terminology management, is often described as a project (Nuopponen 2018, 14; Fähndrich 2005; Dobrina 2015; Nykänen 1999; Suonuuti 1997). Nuopponen (2018) discusses terminology projects in her model of terminology work, relating them to the continuity element under the higher-level compiler aspect. Nuopponen (ibid., 14) notes that some projects are organized only once whereas others are repeated, such as when a terminology of a specific subject field needs to be revisited and updated. An example of a one-time project would be the project for introducing and implementing terminology management in an organization outlined by Bauer (2015). Dobrina (2015, 182), on the other hand, has recognized seven types of terminological projects, which all aim at producing a certain type of terminology resource designed to meet specific terminological needs and objectives, and with a specific target user group in mind. The project types are the following (ibid., 183–185):

1. Creating a monolingual resource
2. Creating a multilingual domain resource
3. Localising a monolingual mono-domain resource
4. Adding new languages to an existing translation-oriented terminology resource
5. Enhancing the terminological quality of a resource
6. Merging existing resources into a multidomain and/or multilingual resource
7. Producing terminology on demand (maintaining a terminological query service).

Dobrina (2015, 187) points out that especially type 1 projects have been discussed and outlined by terminological literature and international standards. Furthermore, Dobrina (ibid., 181) has outlined that all these projects would contain three main phases: 1. Preparatory phase, which consists of collecting relevant material; 2. Main phase, which consists of completing terminological concept analysis; and 3. Presentation phase, which consists of presenting the produced terminological information in the form of a terminology resource.

In the following, I will present two examples of terminology projects and one of a terminology process which I have located from terminological literature. These three examples are presented because they were used to develop the terminology processes for the case company (see section 5.2.4.1). Despite two of these examples being called projects and one a process, all these examples

outline the phases needed to create new terminology. Therefore, all these examples represent type 1 projects outlined by Dobrina (2015, 183). I will compare these three examples to Dobrina's (ibid., 181) three-part main phase model introduced above.

Firstly, Suonuuti (1997, 27) lists the following phases of a terminology project, which are based on ISO standards:

- Evaluating needs
- Determining the target group
- Identifying concepts
- Collecting and recording data
- Establishing the term list
- Establishing the concept systems
- Formulating definitions
- Selection and formation of the terms
- Revising the concept diagrams.

Here, the first four phases would fall into the preparatory phase outlined by Dobrina (2015, 181), whereas the rest would make up the main phase of analyzing and producing the terminological product. The third main phase, presentation of the product, is not included in Suonuuti's (1997) model at all.

Secondly, Nykänen (1999, 68) has outlined the phases of a terminology project on a higher level, as illustrated in Figure 2:

Figure 2. Phases in a terminology project (adapted from Nykänen (1999, 68), translated by me).

Nykänen's (1999, 63) model is based on international standardization work of terminology work methods. Nykänen (ibid.) also explicitly mentions that it is presumed that methods based on the theory of terminology are used during the execution of the terminology project and that experts in terminology and in the subject matter in question participate in it. In this model, the three phases from Dobrina's (2015) model can be easily distinguished. The planning and the initiation phase would fall under Dobrina's (ibid., 181) preparatory phase. The creation phase and the expert opinion round would make up Dobrina's (ibid.) main phase. The finalization phase, then, would be part of Dobrina's

(ibid.) presentation phase since Nykänen (1999, 68) includes publication of the created terminology in the subtasks of the finalization phase. The aftermath in Nykänen's (1999) model includes subtasks which fall outside the scope of Dobrina's (2015) model. These subtasks include gathering feedback from the users, gathering information related to possible update needs, and evaluating the project and its working methods (Nykänen 1999, 69–70).

Thirdly, Chiocchetti, Ralli, Lušicky, and Wissik (2013, 8–9) have established a terminology process which they call "terminology elaboration process" based on interviews of 16 different terminology centers or units working with a local, national, or international scope. Based on their interviews, Chiocchetti et al. (ibid., 9) found that the phases of the terminology elaboration process varied between the different terminology centers or units, but they were able to recognize nine core phases for the process, nevertheless. These nine phases are named as follows (ibid.):

1. Needs analysis
2. Defining priorities
3. Documentation
4. Term extraction
5. Term selection
6. Elaborating terminological entries
7. Revision and quality assurance
8. Dissemination
9. Maintenance.

Here, the first four phases would fit under the preparatory phase in Dobrina's (2015, 181) model. Phases 5–7 would be included in the main phase, whereas the eighth phase would be similar to the presentation phase in Dobrina's (2015) model. The final phase, maintenance (Chiocchetti et al. 2013, 10), on the other hand, is partly similar to the aftermath phase in Nykänen's (1999) model. Chiocchetti et al. (2013, 10–11) explain that "[m]aintenance activities can be event-driven (like a spelling reform or legal reforms) or can be motivated by the need to ensure and maintain the quality of the terminological resource". Moreover, Chiocchetti et al. (ibid., 10) point out that the maintenance phase is not necessarily completed at any specific point within process; it is a highly customized activity that could occur once a day, once a month, or every time a specific phase in the process is completed, depending on the maintenance activities and what has been agreed.

As can be seen from the examples, there is a great variety in the division of phases between the different models. The three main phases suggested by Dobrina (2015, 181) could be deciphered from all except Suonuuti's (1997) model, which suggests that despite some internal differences, the examples mostly share the same high-level structure. However, as Nykänen (1999, 62) admits, no universal rules for terminology project phases can really be given due to the differences between projects. Nuopponen (2018, 14) also points out that there is some "small-scale terminology work" that could not necessarily be thought of as a project, such as answering terminological queries. Still, Nykänen (1999, 70) emphasizes the importance of applying general project management methods to terminology work and dividing it into clear phases and subtasks. This increases productivity (ibid., 62) and facilitates the overall management of both the schedule and costs of the terminology project (ibid., 70).

3 Terminology management in companies

This chapter focuses on terminology management in a company environment. Firstly, the particulars of terminology management and its organization in companies are examined more closely. Secondly, the role of terminology management as a support process in companies is discussed. Finally, a model for assessing the maturity of the processes related to terminology is presented.

3.1 Organizing terminology management in a company setting

Given the plethora of constituents of terminology management (see section 2.3.1), it can be observed that there is no universal way to organize terminology management. Instead, terminology management should be customized to fit the needs of each organization or company (Kelly and DePalma 2009, 2). In this section, some motivations, characteristics, and constituents of terminology management, some of which have already been discussed above, are identified as topics to be considered when organizing terminology management in a company setting. These considerations are especially relevant for attaining one of the goals of this study, which is to develop terminology management at the case company.

Beginning with the motivations, terminology management has strategic relevance for companies. Firstly, terminology management can enhance a company's profitability (Warburton 2016, 7). For example, agreeing on the terms to be used for the core features of a new product at the start of a research and development project minimizes misunderstandings and prevents repetitive work and errors (ibid.). If a company has demanding publication or release schedules, the working hours saved by systematic terminology management can make production more effective when compared to a situation where terminology management has not been organized or invested in (Kelly and DePalma 2009, 8).

Secondly, the importance of managing terminology reflects to customer relations. As Fähndrich (2005, 238) has stated: "Customers who understand a company's language are more likely to choose its products." If a company fails to use consistent terminology across different materials, it can cause unnecessary confusion and frustration to its customers (ibid., 237–238). This may even lead to legal

proceedings and compensation claims in industries such as pharmaceutics or medical technology in which a misunderstanding could cause a health hazard to customers (ibid.). Investing in terminology management produces documentation that is more user-friendly to customers (Bauer 2015, 331).

Thirdly, the language use of a company is a part of a company's image and identity (Fähndrich 2005, 237). Consistent and accurate use of terms is one of the elements that define the quality of all texts (ibid., 238). The better the quality of written communication, the more positively a company and its products are perceived by customers (ibid.). Therefore, terminology has a critical role in establishing a distinct company image (Bauer 2015, 331). If the company terminology is not defined and managed, it can develop into ever-increasing jargon used by the company employees (Fähndrich 2005, 239) or by business partners and suppliers, and these unchecked terminology choices may reflect an undesirable image to customers (Warburton 2016, 7).

Moving on from motivations to the characteristics and constituents of successful terminology management, it could be noted that a termbase is crucial for storing and managing terminology in all settings, including companies (Schmitz and Straub 2010, 38). It is often presented as a solution that enables a more consistent use of terms throughout the company (Warburton 2016, 7). For example, a centralized termbase can help to prevent conflicting term use between two or more separate teams of writers which both produce content for the same product or service, such as writing teams in the marketing department and the product development department (ibid.). Furthermore, a company's termbase has an important role in the transfer of knowledge within the company. From the termbase, new employees can find company-specific terms and their meanings which they could not necessarily find elsewhere (Fähndrich 2005, 238–239). Termbases can typically be combined with several types of knowledge management systems, such as translation memories, document management systems, and controlled authoring software (Warburton 2016, 6).

Still, even if consistency in term use would be the desired goal, companies often have to balance between standardizing and allowing creative language use, especially in the marketing department (Warburton 2014, 10). Using several synonymous terms of the same concept may be necessary for

market differentiation purposes and for search engine optimization purposes (ibid.). Search engine optimization (SEO) refers to strategies that aim at improving "a website's presence and visibility on a search engine's results page" (Veglis and Giomelakis 2020, n.p.). For example, search engines are more likely to retrieve a specific document or text within a website if the document or text matches with different types of queries from users due to the use of variant terms (Warburton 2014, 10).

The extent to which the product of terminology work, such as a termbase, is approved, accepted, and used by the target group is often recognized as one of the factors that determine the success of terminology management (Lin 2011, n.p.; Bauer 2015, 336). Großjean (2009, 90) has stated that achieving consistent terminology use requires that everyone at the company uses the same terms with no exceptions allowed. While this requirement seems logical enough, it can be quite an extreme and even conflicting demand in a company setting when taking into account the market differentiation and SEO concerns, as was discussed above. Moreover, Kelly and DePalma (2009, 24) have noted that different user groups have differing needs for the termbase and its use, and these varying needs should be taken into account in the design of the termbase.

Identifying and understanding all the potential stakeholders of terminology management, including those who create terms and those who use them, are also essential in ensuring successful terminology management (Lin 2011, n.p.). In addition, ensuring the support and sponsorship from executives and stakeholders is similarly critical, and this in turn requires that the executives and stakeholders themselves understand the role and importance of terminology management in "the company's overall communication strategy" (Warburton 2016, 23). To enable continuous participation and support from stakeholders, terminology management should be integrated into the employees' formal objectives and performance measurements (ibid.).

Continuing with the stakeholders, there is a tendency for terminology management to be operated by employees working in certain departments within the company: technical documentation and language services (Bauer 2015, 337). The main reason for this is the fact that employees working in these departments "are directly involved in the documentation and localization processes requiring

professional terminology management" (ibid.). Moreover, technical writers typically have a beneficial, strategical position in the company; they work closely with product development teams, in which new terms emerge as new products are developed (Warburton 2016, 10). Interestingly, these employees often adopt terminology management tasks voluntarily and in addition to their everyday tasks (Bauer 2015, 337).

One challenge related to investing in professional terminology management at companies is that the benefits of this investment are only visible after significant efforts have been dedicated to terminology management (Bauer 2015, 340). Measuring the effects and benefits of terminology management is challenging because they are rarely linked directly to a company's finances (Suonuuti 1998, 12). It might take several years for the effects to appear since to be able to directly measure the effects of terminology management, the resulting terminology should, for example, cover a sustainable amount of the concepts related to the company's lines of business and be implemented in a majority of the company's documentation (ibid., 12–13).

Overall, terminology management in a company environment is an act of balancing between the best practices and theoretical principles of terminology management and requirements from the business environment and the stakeholders to ensure an increase in business value for the company (Lin 2011, n.p.). While a completely aligned terminology between several business functions might be suggested by terminology best practices, striving for total compliance might be unrealistic (ibid.). For example, some business functions can be highly controlled by a plethora of rules, regulations, and protocols, and changing the established terminology there might prove impossible if those driving the change do not have the authority and resources to make such fundamental changes (ibid.).

As a final note, as has been discussed above, terminology management is "a horizontal activity" in that it has ties to a variety of processes and functions throughout the company (Bauer 2015, 326). In the next section, the role of terminology management in companies is examined from a process perspective.

3.2 Terminology management – a support process

Terminology work, and more broadly speaking, terminology management, can be perceived as a support process for other processes within an organization (Suonuuti 1998, 12). Examples of processes that terminology management typically supports are translation and documentation processes (Suonuuti 1998, 13), information management processes (Bauer 2015, 324), and content development processes (Kelly and DePalma 2009, 28). Suonuuti (1998, 13) further underlines that in fact, a terminology process supports all processes within a company that include documentation in a broad sense, be it internal documentation describing the results of a process or technical documentation created for customers, for example.

When planning the design and execution of a process, it is important to acknowledge the varying needs of the other processes it supports and determine the correct timing of the process (Suonuuti 1998, 14). For example, Suonuuti (ibid.) argues that terminology work should be done simultaneously while designing a new product. The terminology should preferably be finalized before the product documentation and translations are produced because it would guarantee consistent use of terminology in different outputs (ibid.). However, doing terminology work during the documentation phases of all the processes within the company is practically impossible, especially in larger companies, as it would require a significant number of terminologists and other resources, such as time (ibid.). Suonuuti (ibid.) suggests several possibilities for overcoming this problem: dividing the process into several phases, limiting or dividing the target group into primary and other users, and designing two or more processes for terminology work. There are some problems, however, connected to the last two solutions.

Firstly, in dividing the target group into primary users and other users, there is a risk that the resulting terminology will not be widely accepted and actively used (Suonuuti 1998, 14–15). Even if the terminology might have a primary target group, the needs of all users should be taken into account, for example by adding notes and examples within the terminology (ibid., 15). Secondly, if there are several processes, there should be a clear connection between the different tasks associated with the

processes and a logical order between the different phases (ibid.). Thirdly, having several terminology processes makes managing them more complicated and challenging (Suonuuti 1999, 116). However, having multiple terminology processes might sometimes be the only possibility to produce necessary results, especially in large and expanding companies (ibid.).

A successful terminology process supports the company's other processes at appropriate times, acknowledges and offers solutions to all intended users of the terminology, and the results of the process are valued and in active, wide-spread use (Suonuuti 1998, 15). The process should not remain unchanged after its creation, but instead it should be constantly developed (ibid.). The working methods should be reviewed regularly, and feedback should be both gathered and reacted to (ibid., 15; Nykänen 1999, 69–70). Moreover, the process should be well-defined and allow the development of the terminology since terminology itself is prone to change over time (Bauer 2015, 338).

3.3 Maturity model for terminology processes

Even if a company has designed a process or several for terminology management and is working with them, simply having a process is not a key to success. Regarding the explanation as to why some companies fare better than others process-wise, JoAnn Hackos (1994, 44) has stated the following:

> An effective and mature process produces results. With a mature process in place, projects are well planned and managed, original schedules and budgets are maintained, changes are made rationally and deliberately, and projects are diligently managed so that everyone knows what is expected of them. The products developed through mature processes are planned to meet the quality expectations of the customers.

Therefore, process maturity seems to be a significant indicator of the effectiveness and functionality of processes. But how can one judge whether a process is mature or not?

Hanne Thomsen (2005) has created a model for evaluating the maturity of processes within the field of terminology. The model provides a tool for evaluating the state of terminology work practiced in companies and a basis for its strategic development (ibid., 248). This model could, therefore, be used in designing and developing terminology management in companies since terminology management, as defined in this thesis, is about the overall organization of terminology work (see section 2.3). In this section, I will introduce the different levels of process maturity as presented by

Thomsen (2005). Later, in sections 5.1 and 5.3, I will use Thomsen's model to analyze the state of terminology management at the case company at the beginning and at the end of the research.

Thomsen (2005, 243) bases her model on two earlier publications: a maturity model for information processes designed by Hackos (1994, 1997) and a maturity model for the different aspects of language work practiced in companies by Sabine Kirchmeier-Andersen (2003). In her model, Thomsen utilizes a six-level approach already used by Hackos (1994). These six levels, numbered from 0–5, are Oblivious, Ad hoc, Rudimentary, Organized and repeatable, Managed and sustainable, and Optimizing (Hackos 1994, 47). The seven different aspects of terminology work that are analyzed at every level are the organization, content, aim, and target group of terminology work, the termbase and its structure, and quality management (Thomsen 2005, 245).

At level 0, **Oblivious**, terminology work is not practiced at the company at all, as none of the employees are aware of terminology work and its uses (Thomsen 2005, 245). At level 1, **Ad hoc**, terminology work is practiced to the extent that some employees gather their own lists of terms to enhance consistency in their own work (ibid.). The terms have been selected to these lists mostly at random and for individual use only, and no resources have been dealt for quality management of the terminology (ibid.). To move to the next level, the employees should take their individual lists to common use, share their knowledge, and begin to standardize their use of terms (ibid., 254).

At level 2, **Rudimentary**, the collaboration of term lists has been initiated, but the work remains quite disorganized and employees only do terminology work when they have time off from their other tasks (Thomsen 2005, 245). The aim of terminology work at level 2 is to improve the consistency of communication with customers and to save time spent on translation (ibid.). Especially in larger companies, several term lists or even termbases may have been compiled for different users, mainly for translators and language specialists (ibid., 245–246). The content of these term lists or termbases is unsystematic; they may contain word-for-word translations and some terms may have definitions or explanations (ibid., 246). Some quality checks on some parts the terminology may be organized, but no system for quality management has been designed (ibid.). To move to the next level, a shared

termbase and guidelines for updating it should be created (ibid.) Moreover, the employees should commit to properly sharing their knowledge on terminology work and to using the approved terminology in their work (ibid.).

At level 3, **Organized and repeatable**, as the name suggests, terminology work is organized quite well (Thomsen 2005, 246). Specific people have been assigned the task of approving the terminology, and overall quality checks are usually made (ibid., 252). Still, employees working with terminology regard it as an additional task stealing time from their other, more important tasks (ibid., 246). The aim of terminology work is still to enhance quality and consistency in all written communication with customers (ibid.). Another principle is to produce product-specific terminology and extend the scope of the subject areas covered by the terminology, even if the selection of terms may still occasionally be disorganized (ibid.). A shared termbase has been taken into use and it is well-structured and has update guidelines (ibid., 254). The termbase provides more information about the individual terms based on the needs of its users, but the different fields within the base are not filled systematically (ibid.). The target group of terminology work has been widened to everyone who writes to customers (ibid., 253). To advance to the next level, terminology work should be included in the overall planning within the company and a sufficient amount of resources should be invested in it (ibid., 246).

At level 4, **Managed and sustainable**, terminology work has been successfully integrated into the daily processes and routines of the company (Thomsen 2005, 247). Terminology work is no longer a burden to the employees, as it has been allocated proper time and other resources, such as further training on terminology work (ibid.). Furthermore, terminology work is usually initiated at the beginning of a product development process (ibid.), which is the ideal situation (Suonuuti 1998, 14). The aim of terminology work now includes also the improvement of the internal communication within the company (Thomsen 2005, 247). An example of this is conducting a concept analysis to explain the differences between terms not only relevant to customers but to employees as well (ibid.). All employees have understood the value of the shared termbase for themselves and for the

company (ibid.). The termbase now comprises all the relevant subject areas and translations, and there are plans to add terms from new subject areas (ibid., 253). The terms are always checked for quality, and all the required fields in the termbase are similarly always filled in (ibid., 252–254). The termbase has also been updated so that it allows the export and import of data between different systems, such as a translation memory system or a word processing system. The target group of terminology work has been further broadened to include the whole company, not only the writers (ibid., 253). To advance to the highest level, the company has to design processes and invest resources for the revision of the existing terminology and the processes related to terminology work (ibid., 254–255).

At the final level, **Optimizing**, the processes related to terminology work are being constantly evaluated and improved (Thomsen 2005, 247). Routines for organized maintenance and revision of the termbase have been established, but even they are judged for improvements on a regular basis (ibid.). All the relevant people are now engaged in terminology work at the company, and there are plans to integrate the termbase to a larger knowledge base of the company (ibid., 255).

Using a process maturity model to analyze the current state of the company's processes is, however, only the first step in improving them (Hackos 1997, 380). Hackos (ibid.) advises that a strategic plan based on the results of the process maturity analysis should be created. To enable a change for the better, the information and recommendations gathered from the maturity model analysis should be formulated into goals, measurable objectives needed to achieve the goals, strategies needed to meet the objectives, and finally action plans for realizing these strategies (ibid.).

Thomsen (2005) does not comment on whether organizations tend to be on certain levels of the model, whereas Hackos (1994, 46) found that most of the publications organizations she analyzed were at process maturity levels 1 or 2, only a few were at level 3, and levels 4 and 5 were mostly theoretical and based on the most ideal developments of the earlier levels. Clearly, more studies analyzing terminology processes in companies by using Thomsen's (2005) model would be needed to find out more about the maturity of terminology processes and to refine the model itself.

4 Methods and materials

In this chapter, the research methods and the research materials of the study are presented. First, action research, the research approach chosen for the study, is introduced, followed by descriptions of the research methods: participant observation and semi-structured interview. After these, the research materials are presented. Finally, the action research process as realized in the study is explained in detail.

4.1 Action research

This study uses a qualitative action research approach. Action research originates in the social sciences, and Kurt Lewin is often mentioned as the pioneer of action research (Susman and Evered 1978, 586; Kuula 1999, 29; Savin-Baden and Major 2013, 244). According to Susman and Evered (1978, 586), in 1946, Lewin introduced a research approach in which the researcher acts "on or in the social system" under study and aims to change it while also generating theoretical knowledge about it. This summarizes the core of action research. Another noteworthy point is that action research is not a research method in itself; rather, it is an approach to doing research which combines practical development work with different types of research methods (Heikkinen 2018, 215). Later, in sections 4.2 and 4.3 below, the research methods used in this study are presented and discussed further.

In addition to social sciences, action research has commonly been applied in the humanities and education sciences (Heikkinen 2018, 216). However, Susman and Evered (1978, 586) have argued that action research is well suited for solving organizational problems, as well. According to them (ibid., 599), action research typically aims to develop the "interpersonal and problem-defining" competences of the people within the organization. These competences are cultivated, for example, by "establishing problem-solving procedures" and "generating workable new constructs from one's experiences" during the action research process (ibid.).

Action research combines practical development work with research to find out how to improve practices within social environments and situations (Heikkinen 2018, 216). This is achieved by involving the people who are a part of the research setting, such as a team of employees at a

workplace, to the actual research process (Kuula 1999, 10). Furthermore, the researcher does not approach the object of their study from outside but is an active participant in the development process (Heikkinen 2018, 215). In this collaborative research process, the researcher offers theoretical knowledge and experience, whereas those part of the social community under study have "practical knowledge and experience of the situations in which they are trying to solve problems" (Susman and Evered 1978, 597). Susman and Evered (ibid.) also underline that the knowledge of the researcher and that of the individuals of the community have equal value for the action research process; the solutions to problems within the community or their practices are co-produced between the researcher and the members of the community.

Action research can be outlined as a "cyclical process" (Susman and Evered 1978, 588). Different researchers have developed slightly differing models to describe the action research process, but in this study, I will introduce and use the model presented by Carr and Kemmis (1986, 186). They (ibid., 185–186) describe action research as a "self-reflective spiral" which comprises overlapping cycles consisting of four phases: planning, action, observation, and reflection. An outline of this process is presented in Figure 3.

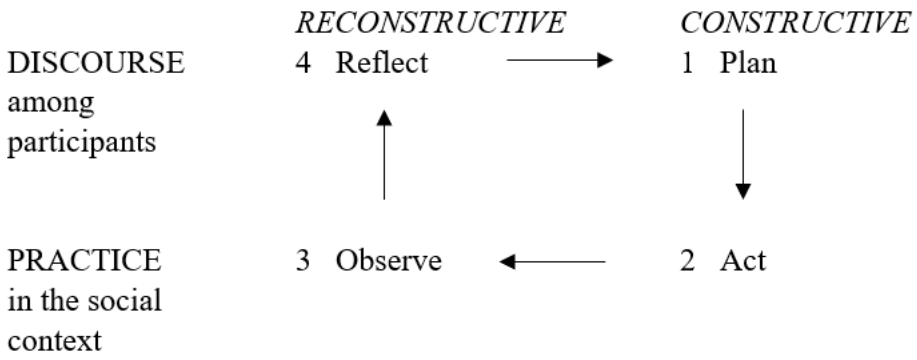

Figure 3. The phases of action research (reproduction from Carr and Kemmis 1986, 186).

The action research process begins with constructive practices, namely planning and acting (Carr and Kemmis 1986, 186). In the first phase of the process, a plan for implementing change is constructed together with the participants whose practices are to be developed (ibid., 165). The planning phase also includes reflection since reflecting on the past and present and identifying the problems to be solved are used as a basis for constructing the plan (ibid., 186). Next, an action or a variety of actions

are realized in practice according to the plan made in the earlier phase in order to reach the intended consequences (ibid., 185). However, Carr and Kemmis (ibid.) also state that actions always involve risks as they may produce other outcomes than those which were initially anticipated.

After the constructive phases, two reconstructive phases follow: observation and reflection (Carr and Kemmis 1986, 186). In the observation phase, the consequences of the actions are observed in the social system under study (ibid., 185). Reflection, then, is the final phase of the action research process. By reflecting on the earlier phases and their consequences, the researcher and the participants aim to gain new insights into their practices and overall situation and to develop them further (Heikkinen 2018, 222).

Of the four phases, the planning and reflection phases are discursive, meaning that these phases are mainly realized by verbal discussions between the participants of the action research process, while the other two, the action and observation phases, include primarily practical activities (Carr and Kemmis 1986, 186). Common to these all phases, however, is the fact that all those involved in the practices to be developed should participate in every part of the action research process with the researcher (ibid., 165).

According to Heikkinen (2018, 222), reflection is one of the main constituents as well as one of the principles in ensuring the quality of action research. Moreover, reflection should be practiced throughout the action research process. The phrase “self-reflective spiral”, which Carr and Kemmis (1986, 184–185) use to characterize action research, is an apt one since a full cycle of planning, acting, observing, and reflecting is expected to be followed by another and then another so that the previous cycles are reflected upon and learned from during the execution of the next cycle. The improvement of the practices, shared understanding, and situations within the social community under study are dependent on this iterative spiral of cycles, as according to Carr and Kemmis (ibid., 185), completing only one cycle of the process is not enough. In practice, however, it might be difficult to clearly distinguish the different phases of a cycle from each other as they often overlap (Heikkinen 2018, 224).

Considering the study at hand, an action research approach was a natural choice given the circumstances and the aims of the study: I would have access to the research setting as an employee of the company, I was familiar with the company and some of its employees due to my internship, and the aims of the study included developing terminology management at the company and discovering how more employees could be involved in terminology management. Therefore, the setting and the aims of the study were closely related to a specific social system and social practices in which change was needed. There was also a wish from both the company and me that this change would be created collaboratively. This would ensure that the new practices would fit the needs of the company and its employees as well as facilitate their adoption within the company due to the early engagement of the employees themselves.

4.2 Participant observation

As a research method, observation is "the act of noting a phenomenon, often with instruments, and recording it for scientific purposes" (Angrosino 2007, 54). The research approach and the research subject affect the choices of how and what kind of phenomena or objects are observed (Vilkka 2018, 162). The objects of observation can include people, conversations, actions, texts, artifacts, environment, communication, interviews, surveys, or pictures (ibid.). Compared to other data gathering methods, observation enables a researcher to gather unique contextual information about the object of the research in a natural setting (Savin-Baden and Major 2013, 400).

There are several possibilities to classify the types of observation. Concerning the study at hand, perhaps the most relevant classification of observation is the one based on the stance which the researcher takes on participating in the research setting. The term *participant observation* is often used to refer to the kind of observation in which the researcher is amongst the community being researched and interacts with the members of the community (Angrosino 2007, 99). Angrosino (ibid.), however, points out that participant observation should not be regarded as a research method in itself but as a research strategy since it can facilitate other data gathering methods in the field in addition to observation, such as surveys or interviews. Participant observation is typically used in ethnographic

research (Angrosino 2007), but due to the placement of the researcher among the community members to observe and act there, the method is well-applicable to an action research setting, as well.

Savin-Baden and Major (2013, 394), on the other hand, think of participant observation as a continuum and are of the opinion that all observation includes some level of participation within the research setting. According to them (ibid., 396), even the researcher who observes situations via web cameras is a participant in the research site. They (ibid.) call this method *peripheral participation*, while DeWalt and DeWalt (2011, 29) use the term *passive participation* to refer to the kind of participant observation in which the researcher does not interact with people directly but instead is a participant in the research setting by using the research site as a place to conduct observation. Other types of participation that Savin-Baden and Major (2013, 396) list are *balanced participation*, *active participation*, and *complete participation*. In balanced participation, the researcher participates in the research setting and the activities of the community members only occasionally, aiming at simultaneously being an insider and an outsider in the eyes of the community members (ibid.). In active participation, the researcher participates in the activities of the community members more and acquires a central place in the research setting (ibid.). In complete participation, the researcher has been accepted as a member of the community and participates fully in its activities (ibid.).

This idea of different levels of participation is a useful one since as Vilkka (2018, 167) notes, researchers often have to use several types of observational techniques during the same research, and therefore, thinking of them as different levels of participation may be useful in practice. For example, in action research, the researcher's participation may be highly active if the researcher guides the members of the research community to certain actions while working alongside them (ibid.). On the other hand, a participant observer may have to balance between observing from the outside and actively participating in the situations within the same research, depending on the objectives of the research (ibid.). Because the researcher may have to assume several different roles during the same research, it is important that the researcher recognizes the different roles they acquire in the research setting and reflects on them during the research process (ibid.).

Moreover, as the presence of the researcher inevitably has some effect on the research situation, these possible effects should be considered (Savin-Baden and Major 2013, 399). Angrosino (2007, 61) has stated that people tend to change their behavior when they know someone is observing them, even if the observation has been designed to be as unobtrusive as possible. This tendency to change behavior under observation is referred to as *observer effect* (ibid.). However, DeWalt and DeWalt (2011, 186) also note that one of the strengths of participant observation is the trust which community members place on the researcher and which enables them to share the type of insights and information that they would not share to an outsider of the community. A part of gaining this trust is that the community members forget, at least occasionally, that the researcher is an outsider (ibid.), which implies at least a momentary neutralization of the observer effect.

Considering the study at hand, I have direct access to the field of my study and the community I am researching. Thus, this is an ideal setting for practicing participant observation. My own level of participation within the research setting might be labeled as active participation. During the research process, I actively participated in and organized a variety of meetings with the employees of the company, which I will elaborate more in section 4.4.1. These meetings provided the setting for my observations. Moreover, the 11 months I spent at the company in total allowed me not only the possibility to familiarize myself with the research setting and the community, but also enabled the employees to get accustomed to my presence. As a result, I had a double role of an employee and a researcher during the research, which I will reflect in chapter 6.

4.3 Semi-structured interview

Interviewing is one of the most common data collection methods in qualitative research (Kvale 2007, xv). Generally speaking, an interview can be characterized as "a conversation that has a structure and a purpose determined by … the interviewer" (ibid., 7). However, an interview is essentially an interactive process in which knowledge is co-constructed in the conversation between the interviewer and the interviewee (Kvale and Brinkmann 2009, 2). Typical for a qualitative research interview is the attempt to comprehend the world from the interviewee's point of view (ibid., 1). However,

interviews may be used for a variety of different purposes. Interviews often enable the gathering of in-depth information which can be used to answer the research questions of the study at hand (Savin-Baden and Major 2013, 371).

There are several possibilities to categorize interviews. One of them is the categorization based on the structure of the interview: for example, interviews can be structured, semi-structured, unstructured, or informal. In this study, I use a semi-structured interview method. Semi-structured interview is a form of interview in which the researcher creates and follows an interview protocol outlining the topics to be covered and a set of predetermined questions, but which also allows the researcher to stray from this protocol and ask additional questions inspired by the interviewee's comments and reactions, for example (Savin-Baden and Major 2013, 359). The form of the questions is often open-ended so that the interviewees are able to express their views on the topics under discussion while also generating data that is comparable across the interviewees, even if the questions may be posed in a slightly different order than what was initially planned in the interview protocol (ibid.). Savin-Baden and Major (2013, 359) state that a semi-structured interview is a good choice especially when the researcher interviews each interviewee only once. The method allows enough freedom for the interviewer to optimize the use of time available for the interview while still maintaining the focus of the interaction (ibid.).

As a novice interviewer, I found it necessary to structure the interview beforehand to ensure I would get well-comparable data and still have some freedom to ask additional questions and slightly stray from the order of the questions, if necessary. For these reasons, I chose this method for my study. Furthermore, as Kvale and Brinkmann (2009, 106) have pointed out, interviews are a way "to develop knowledge for … collective activities in action research". Indeed, to answer my research questions, I require input from the employees themselves to construct a picture of the current state of terminology management and to get an insight on the needs and hopes the employees may have related to terminology management.

4.4 Research materials

In the subsections below, the different types of research materials analyzed in chapter 5 are outlined. The first two types, the combination of field notes and a field diary and the interviews, were acquired by using the two methods presented above, participant observation and semi-structured interview. The third type of data, documents, were acquired from the company during the research.

4.4.1 Field notes and a field diary

Writing field notes is the primary data gathering method during participant observation (DeWalt and DeWalt 2011, 138); indeed, observations themselves are not data that can be analyzed unless they are recorded in some way (ibid., 139). Punch (2012, 90) has explained that "[f]ield notes describe what is happening in the field: the researcher's observations, descriptions of places, events, people and actions." The researcher controls and decides the structure and content of the field notes: what is recorded, in how much detail it is recorded, and how much context is added, for example (DeWalt and DeWalt 2011, 139–140). Field notes are, in fact, a combination of data and analysis (ibid., 139): reflections, connections to one's research questions or sources in literature, or new ideas or themes inspired by the observation can also be included in field notes (Punch 2012, 90).

Field notes can be recorded in several different ways. DeWalt and DeWalt (2011, 141–151) list jot notes, expanded notes, methodological notes, diaries, journals, logs, meta-notes, and headnotes as different types of field notes a researcher may opt for. Punch (2012, 90), on the other hand, contrasts field notes with field diaries by stating that while field notes report the events in the field, field diaries record the researcher's own thoughts and feelings related to these events and the whole research process. Details and emotional aspects of the research, such as difficulties, relationships with research participants and changes in these relationships, related to simply "being in the field" are easily forgotten if not written down while still in the field (ibid.). From an action research point of view, keeping a field diary may be especially crucial. This is exemplified in the following quotation:

> If the researcher's daily reactions to events and contexts are not recorded, it will be virtually impossible to reconstruct the development of understanding, and to be able to review the growing relationship between the researcher and study participants in a manner that allows for reflexivity at the end of the process. (DeWalt and DeWalt 2011, 139)

As was discussed above in section 4.1, action research is a highly reflective and collaborative process which aims at the development of practices, understandings, and situations (Carr and Kemmis 1986, 185). Therefore, recording both the researcher's and the other participants' reactions in a field diary is justified, as it facilitates the reconstruction of the different types and levels of development that take place during the research process.

My own recording of the observations at the case company fall somewhere between expanded field notes and a field diary. When planning the research, I decided to limit my observations to the many types of meetings which I would attend during the days spent at the company premises or which I would participate in remotely. Due to my prior experiences at the company as a trainee, I concluded that meetings would provide the most beneficial opportunity to conduct observation and collect data at a large company, such as the case company, where teams are sometimes divided into multiple different locations, and easily observable interactions between team members, for example, may be scarce outside the meetings. Furthermore, as the communication and cooperation between people is one of the main research interests in action research (Heikkinen 2018, 216), observing meetings seemed a natural choice given the action research approach of the study.

I organized or attended various types of meetings over the course of the development project, including regular meetings with a specific employee who had been assigned to co-lead the development project with me; meetings in which I introduced the development project to employees of different departments; meetings to discuss terminology projects; meetings in which I instructed the employees to use the company's termbase and how to do terminology work; and review meetings for the terminology processes. For the duration of the development project, I also became a member of a terminology group that had been formed within the company prior to the study. Therefore, I was able to closely monitor the workings of the terminology group during the regular group meetings. During these different types of meetings, I wrote down short notes and afterwards expanded these notes into full sentences and a narrative format. I did this directly after the meetings every time I was able to do so, but sometimes I had several meetings in a row or was otherwise prevented from immediately

focusing on more extensive writing. However, I always wrote the notes in the narrative form by the end of each workday.

Due to the narrative format I opted to produce, I feel inclined to call the end product of my note taking as a field diary. Moreover, even though my main focus was on retelling the agenda of the meeting and its progression, the reactions of the participants, the observations and opinions of the participants which they voiced during the meeting, and the decisions and topics of discussion during the meeting, I also included my personal reactions and feelings into the narrative every now and then. I did this mainly because I believed it would facilitate reflecting on the research process and its developments as well as on my own roles as an employee and a researcher. I wrote the field diary in English from October 2019 until the middle of May 2020. The word count of the finished field diary is 49,451 words.

4.4.2 Interviews

Following the typical setting of the semi-structured interview method, I designed an interview protocol to be used during the interviews (Savin-Baden and Major 2013, 359). This interview protocol included the themes, the set of questions, and some introductory information which I gave at the beginning of each interview. The final version of the interview protocol is presented in Appendix 1.

The questions were divided into four themes: background information, the use of terms, terminology work, and the company's termbase. The first theme, background information, consisted of questions related to the interviewees' work tasks and the number of years at the company. The main aim of these questions was to gather some background information which could be used during the analysis of the interviews to determine possible differences between the interviewees. The second theme, the use of terms, was the broadest of all four, as the majority of the questions were related to this theme. The main aims of the questions of this theme were to discover what kinds of observations the interviewees had made about the use of terms at the company and what their experiences and attitudes related to possible issues or challenges in the use of terms were. This theme also included

questions about the experiences which the interviewees had had related to the information flow and collaboration between different departments within the company.

The third theme, terminology work, focused on the organizational aspects of terminology work. I was most interested to learn how the interviewees thought terminology work should be organized at the company, whose responsibility terminology work was considered to be, and how important terminology work was regarded and why. The final theme was a rather short one. It had a few questions related to the company's termbase: whether the interviewees were familiar with it, how and what they had used it for, and whether they considered it useful or not. The aim of these questions was to find out the extent to which the interviewees were familiar with and interested in the product of terminology work at the company.

The interview protocol consists of 26 main questions and an abundance of probing questions, such as "In what kind of situations?" and "What kind of challenges?" (see Appendix 1). After the first interview, which was a pilot interview to test the interview questions, I decided to add more probing questions to my interview protocol. This was because I was unable to ask enough additional or probing questions during the pilot interview due to nervousness, even if I had a feeling that the interviewee might have misunderstood my question or did not offer an argument for their opinion. However, in the later interviews, depending on how broadly the interviewee answered the main questions, I did not ask all or sometimes any of the probing questions from the interviewees. I also did not ask the questions always in the same order, which the semi-structured interview method permits (see section 4.3), since sometimes the interviewee touched upon a subject in their answer for which I had a question that would normally come later.

I conducted seven interviews in total. This number includes the pilot interview, since even though the other interviews were slightly more thorough due to the larger number of probing questions, I decided to include the pilot interview as part of the research materials. The interviewees were employees from several different departments within the company: customer documentation, UX design, marketing, product development, and management. These are some of the target groups

affected by and possibly involved in terminology management as recognized by the co-leader of the development project and me (see section 5.2.1). Therefore, I deemed it necessary to interview employees working in these departments to gather representative data.

The interviews were conducted face-to-face at the company premises during December 2019 and January 2020. In the interview invitation, I informed the interviewees about the topics of my study and the interview, the estimated length of the interview, the recording of the interview, as well as the anonymity and confidentiality of participation. At the beginning of each interview, I repeated and elaborated on the information I had written on the invitation and presented the specific themes to be discussed in the interview (see Appendix 1).

The length of the interviews varied between 25 minutes and 1 hour. I recorded the interviews and after I had conducted them, I transcribed them. The interviews were both conducted and transcribed in Finnish. I excluded a majority of filler words or hesitation markers, such as *tota* and *niinku* from the transcriptions, but otherwise I wrote down the interviews word for word. I removed these unnecessary words because I would not be focusing on the language use of the interviewees, which also facilitated the later analysis of the data. When presenting and analyzing the interview results in chapter 5, I will refer to specific interviewees and their answers using letters A, B, C, D, E, F, and G, and the pronouns *they/their/them* to protect the anonymity of the interviewees. Within chapter 5, I will also include direct quotes from the interviewees to address certain topics, which I have translated from Finnish into English.

4.4.3 Documents

Documents are "[w]ritten, printed, visual or electronic matter that provides information or evidence or that serves as an official record" (Savin-Baden and Major 2013, 403). Documents have a communicative purpose and may have been created by those who are part of the environment, such as employees of the company under research, or by outsiders, such as employees of another company (ibid., 405). Documents can be used by researchers as a form of data to facilitate the understanding of the research context and its participants (ibid., 403). Furthermore, documents represent "natural"

data, especially if they have been created before the research project and have not been intended as a research data at all, which adds to the validity of the documents as research data (ibid., 410).

As a third type of research materials, I will use a set of documents which are company confidential material. This set of documents consists of a project plan, two old terminology process drafts, and the finalized terminology process descriptions. The two old terminology process drafts, created by the employees of the company prior to the start of the research, depict two processes related to terminology work: one for creating new terminology and one for changing the already defined terminology. They also represent "natural" data (Savin-Baden and Major 2013, 410), as they have not been intended as research data during their creation.

4.5 Action research process

In the following, I will depict the procession of the action research process as it occurred in the study. A simplified model of this process is illustrated in Figure 4.

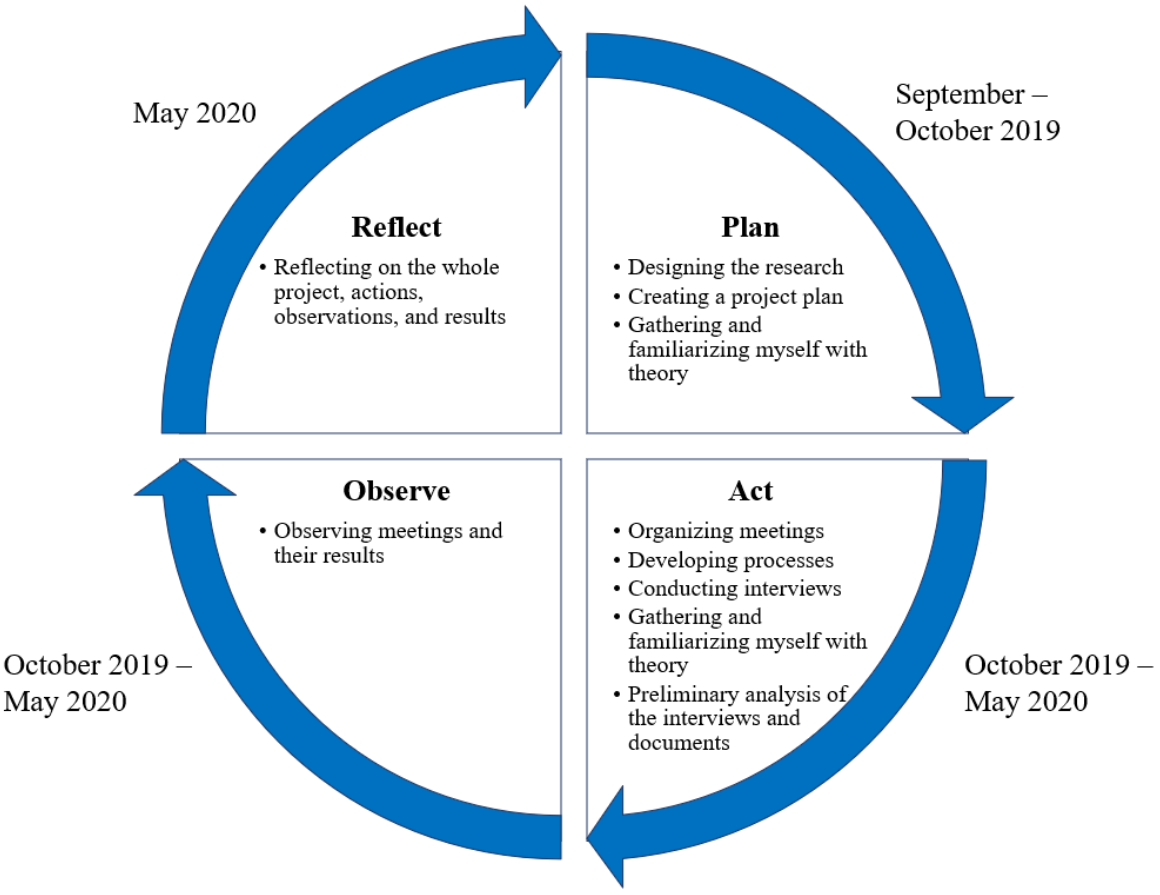

Figure 4. The action research process as realized in the study.

The first phase of the action research, planning, began at the beginning of September 2019, when I had the first official discussion with another company employee and my supervisor about my research and the development project that was to take place at the company as a part of it. The discussions continued until October, and a project group and a project plan were created around the middle of October. This plan outlined the upcoming tasks and goals to be achieved by the end of the project, which would be the middle of May 2020. Two main goals were listed for the project: to develop the processes related to terminology management, and to figure out how employees from different departments within the company could be involved in terminology management. In addition to forming the project plan, the planning phase included planning the research and gathering and familiarizing myself with theory, such as former studies and terminological literature, to formulate the theoretical background for the study. Gathering and familiarizing myself with theory occurred during the planning and the action taking phases.

Another company employee, a documentation specialist with a background in terminology work, was appointed to aid me in the development project at the company. From now on, they will be referred to as *the project co-leader*. We co-led the development project and worked closely together throughout it. This collaborative way of working complies well with action research: this way, solutions are co-produced by the researcher and the community under study. One could note that the project group, which initiated change at the company, was rather small as it consisted of only the project co-leader and me. However, the small size of the project group is justified by the limited resources of the employees and compensated by the fact that more employees participated in the project overall, for example by attending the various types of meetings we organized during the project.

After the project plan was made, the action phase began. The actions taken in this phase included organizing meetings, developing the terminology processes, and my interviews. In addition, a preliminary analysis of the interview results and the documents took place in the action phase and some of the findings were used during the development project. One example of this was using the

old terminology process drafts to design the new processes (see section 5.2.4.1). The main analysis of the research materials was done after the culmination of the development project.

The third phase, observation, for the most part, took place simultaneously with the action phase. As mentioned earlier in section 4.4.1, I limited my observations to the meetings during the development project. The final phase of the action research process, reflection, occurred at the end of project. During this phase, the whole project, the actions taken, the results observed, and the fulfillment of the goals were reflected upon by those employees who had been involved in the project the most: the project co-leader, my supervisor, the terminology group, and me. These reflections occurred during a few meetings towards the end of the development project, when I asked the employees to reflect on the aforementioned topics while also offering my own thoughts on them. Another form of final reflection at the end of the research was done by myself as I identified and reflected on the findings and other aspects of the research. These reflections are reported in chapter 6.

As a result, one full cycle of action research was fulfilled. Due to the specific time I had been given for the development project at the company and to the scope of this thesis, the execution of another action research cycle of a similar scope was not possible. However, executing this one cycle, in fact, consisted of an abundance of similar loops of planning, acting, observing, and reflecting on a smaller scale. For example, to be able to organize the review meetings for the terminology processes, the project co-leader and I had to plan these meetings beforehand; the meeting itself was the action we had planned; I made observations during the meeting; and afterwards, we reflected on the feedback we had received during the meeting and pondered whether there was something we could improve for the next review meeting. These other cycles and the resulting spirals are not illustrated in Figure 4 for the sake of clarity. Indeed, as Heikkinen (2018, 224) has stated, the various types of processes that occur in the activities of a work community cannot be summarized in only one spiral. Moreover, the different phases of action research often overlap in practice (ibid.; see section 4.1), as was also the case in this study.

5 Results and discussion

In this chapter, the results of the study are presented and discussed. Firstly, the state of terminology management at the beginning of the research is analyzed. Secondly, the development of terminology management at the case company is examined. Thirdly, the state of terminology management at the end of the research is analyzed and compared with the starting point. Fourthly, future development ideas for terminology management at the case company are presented.

5.1 The state of terminology management at the beginning of the research

In this section, I will use Thomsen's (2005) maturity model for the processes related to terminology (see section 3.3) as a basis for analyzing the state of terminology management at the beginning of the research. I will compare the research materials with the model to find out on which levels the case company was situated based on the seven aspects of the model: the organization, content, aim, and target group of terminology work, the termbase and its structure, and quality management (ibid., 245). The analysis in this section will also provide answers for the first two research questions of this study: How is terminology management currently organized at the case company? How can terminology management be improved at the case company?

Starting from **the organization of terminology work**, the company was on level 2. Some attempts at organizing the work had already been made at the company prior to the research. To begin with, six of the seven interviewees mentioned that they discuss terms and term choices with their co-workers, especially if they are having difficulties to decide which term to use, albeit to a differing degree: two interviewees explicitly mentioned that they consult their co-workers only occasionally, while three said that they rely mostly on others' help. This suggests that some degree of collaboration in terminology management existed at the company, which is a clear level 2 characteristic (Thomsen 2005, 252). Another proof of some organization is that the company had a termbase. Moreover, as I have noted in the field diary, the documentation specialists of the company had been introduced to the principles of terminology work and practiced doing it during 2019. Based on my field diary markings on the check-up meetings, which the project co-leader and I organized for every

documentation specialist at least once to discuss terminology related issues in their current documentation projects, all terminology work seemed to be almost at a standstill at the beginning of the research: only one documentation specialist had recently done terminology work. However, most of the documentation specialists recognized that terminology work should be done in their current or future projects, but so far, they had not had any time to do it themselves.

There were also actions, roles, and responsibilities related to terminology management which had not been properly considered and fulfilled yet. For example, a terminology group had been formed shortly prior to the research. The main purpose of this group was to process the feedback that the termbase and the term entries within it received, as I observed while attending the terminology group meetings. There were also other potential tasks for the group, such as to function as gatekeepers for termbase updates and to have the main responsibility of developing terminology work and related practices at the company, which the project co-leader and I identified in our meetings, but which had not been realized yet at the beginning of the research.

Moreover, some guidelines had been created related to the creation of new terms, such as one of the two old terminology process drafts used as research documents in this study. Yet, based on my field diary markings, not all documentation specialists even knew that some guidelines existed, and one specifically mentioned that the instructions were hard to find and contained confusing information. During the check-up meetings with documentation specialists, it also became clear that they recognized the importance of doing terminology work, but at the same time, several of them admitted that they were constantly pressed for time and had serious difficulties in getting terminology work done in addition to their normal tasks. Doing terminology work only when there is time from other tasks is another level 2 characteristic in Thomsen's (2005, 245) model.

Moving on to the second aspect in Thomsen's (2005) model, **the content of terminology work**, the company was again set on level 2. Typically for a level 2 company, terminology work covers terms from different topics that have already been gathered, and terms compiled by individual

employees (ibid., 253). This closely resembled the situation at the case company, too, as I observed while working there.

Concerning **the aim of terminology work**, the third aspect in Thomsen's (2005) model, the company could be placed on level 4, with level 2 and 3 characteristics also strongly present. According to Thomsen (ibid., 245–246), the aim of terminology work in both levels 2 and 3 is to improve communication with customers, but on level 3 there is a bigger emphasis on ensuring quality and consistency in communication. On level 4, terminology work is also done with an internal focus, for example to clarify concepts (see section 2.2) for the employees themselves (ibid., 247). The aim of the case company's terminology work, as summarized by the project co-leader, was to facilitate the daily work and communication of the company employees. This suggests that based on the aim of terminology work, the company was already on level 4 in Thomsen's (2005) model. The case company's aim also resembles the purpose of terminology work as summarized by Nuopponen (2018, 12): to make it easier for people to comprehend one another in the context of specific subject areas over boundaries such as those set by languages (see section 2.3.1).

However, the aim of terminology work was not only in-house-oriented, for the importance of consistent term use with customers was emphasized especially by the interviewees. According to interviewee B, the company should focus on standardizing term use in customer materials since they had observed that the use of terms was quite careless: different writers used different terms and there was no consistency. Interviewee C implied that practicing terminology work and using terms consistently affects both internal and external communication in a positive manner:

> … communication to customers is especially important, so we must have a system for it. So, it's really important to direct it [terminology work] to customers, and it wouldn't do any harm to develop the kind of culture also within the company that would entail speaking of things using same terms, so that there wouldn't be misunderstandings. Then, the communication with customers would become more natural in different situations, so that we wouldn't always have to search for the correct terms. (Interviewee C)

On a similar note, interviewee F believed that terminology work is important as it improves consistency in term use and communication both within and outside the company. Moreover, the same interviewee thought that communication from different departments, such as sales, marketing,

and customer documentation, should be consistent as it would bring more clarity to communication and create a professional impression of the company. This statement also implies that at the beginning of the research, communication to customers was not as consistent as it should be, as there seemed to be differences in how different departments communicate about the same things.

Based on the fourth aspect in Thomsen's (2005) model, **the target group of terminology work**, the case company was again on level 4. All employees of the company were considered the intended target group of terminology work, which is implied by the aforementioned aim of improving the communication of the employees. Also, within the field diary, I have explicitly noted that the company's termbase was meant for use by everyone at the company.

Concerning the fifth aspect in Thomsen's (2005) model, **the termbase**, the company was on level 2. This is based on the fact that while the company had a termbase, there were several different formats of it instead of one with a solid structure. Therefore, termbase-wise, the company did not quite qualify for level 3, as on that level the termbase is required to have a solid structure and guidelines on how to update it (ibid., 254). While some instructions for the update of the termbase existed, there was confusion especially among the documentation specialists as to who should do the actual tasks related to the update, a point which came up in several check-up meetings. Moreover, I have noted in the field diary that the instructions were not yet comprehensive, and several practices related to the update and maintenance of the termbase remained undefined.

However, when focusing on the sixth aspect in Thomsen's (2005) model, **the structure of the termbase**, and more specifically, what types of information it contains and how dutifully the different fields are filled, the company was already on level 4. Having worked with the termbase closely during my internship and continuing to work with it during the research, it was clear that there were several mandatory fields to fill in for every term entry within the termbase.

Finally, based on the last aspect of Thomsen's (2005) model, **quality management**, the company again reached level 4. There was a clear rule, which had been marked to the old terminology process drafts as one phase, that prior to adding a term to the termbase, the term entry had to be

checked and validated by subject matter experts within the company; hence, quality approvals were always being made.

As a summary, while the overall organization of terminology management seemed to be quite disorganized at the start of the research, the case company still reached relatively high levels in Thomsen's (2005) model for most of the aspects of the model. In fact, the company reached level 4 on four aspects: the aim and target group of terminology work, the structure of the termbase, and quality management. Considering the three remaining aspects, the organization and content of terminology work, and the termbase, the company was on level 2. All in all, then, this means that the case company was only able to fulfill all the requirements from level 1. However, Thomsen (ibid., 247) states that the boundaries between different levels are not rigid and consequently, organizations may well be situated on several levels simultaneously. Furthermore, Thomsen (ibid.) notes that in such a case, the company should focus on fulfilling the requirements of all the levels the characteristics of which it shares before it can reach higher levels.

As the case company had characteristics from levels 2 and 4, Thomsen's (2005) model offers a considerable list of future improvements for fully reaching level 4 on all aspects. In Table 1, I list the improvements suggested by Thomsen.

Table 1. The improvements required for the case company to reach level 4 in Thomsen's (2005, 253–255) model.

Improvement
Terminology work is organized properly, for example certain employees have been appointed the responsibility of approving the collected data.
Knowledge is shared properly among those working with terminology.
Employees are required to use the approved terminology.
Terminology work is no longer perceived as a burden that takes time from more important tasks.
Terminology work is started early enough, possibly already in the product development phase.
Terminology is included in an overall planning at the company.
The termbase includes product-specific terminology.
The termbase covers relevant subject areas and includes translations for languages relevant to the business.
The termbase enables export and import of term entries between different systems, such as a translation memory system or a word processing system.
There are plans for adding terms from new subject areas to the termbase.

After implementing all these improvements, terminology management at the company would reach level 4 in Thomsen's (2005) model. I identified these improvements at the beginning of the development project so that they could be taken into account while developing terminology management at the company. They were not, however, taken as a list of requirements that needed to be achieved during the development project, but were used as guidelines instead. I will return to these improvements suggested by Thomsen's model in section 5.3 to examine to what extent these improvements were realized during the research.

5.2 Developing terminology management

The analysis in this section and the following subsections together aim to answer the second and the third research questions of this thesis: How can terminology management be improved at the case company? How can employees from different departments within the case company be involved in terminology management? In the subsections below, I will use Nuopponen's (2018) categorization of the dimensions of terminology work, or more accurately in this thesis, terminology management, (see sections 2.3 and 2.3.1) as a basis for determining how the different aspects presented in the model were developed during the research. I chose this model as a basis to offer structure to the discussion and analysis of the research materials because it is a comprehensive framework designed for the analysis of the different aspects of terminology management, as was seen in section 2.3.1. Nuopponen's model was used to the extent it fit the data and the actual development of terminology management. Thus, the following aspects and their sub-elements were used to structure the data: target group, compiler (expertise and relation, collaboration, continuity), product (product, language), and method (tools, systematicity). In addition, when discussing the method aspect of terminology management in section 5.2.4, I propose a new element to be added to Nuopponen's model, namely *processes*, and use this new element to analyze the process development aspect of the study.

5.2.1 Target group

The results discussed in this section have been gathered from the field diary. While the product of terminology work, the company's termbase, was targeted at all employees of the company, as was

noted in section 5.1, there are some departments within the company which are more directly involved with terminology than some others, as recognized by the project co-leader and me. These main target groups, as one could call them, are customer documentation, marketing, and communications. The centrality of these three departments culminates in the fact that content creation forms the majority of the work of the employees working in these departments; they produce large amounts of written materials for customers, and therefore they are bound to use an abundance of terms on a daily basis. There is another group of employees that could be considered the fourth main target group of terminology management, as they similarly use plenty of terms while producing written content in their daily work: translators. Still, translators are never explicitly mentioned as one of the main target groups within my field diary, even though term translation and localization were recurrent topics throughout the development project. One reason for this lack of mention might be that I seem to have regarded the translators' role as one of the central target groups of terminology management as too obvious, and therefore forgot to explicitly address it in my field diary. Another is that translators at the case company are external employees, and in the development project we focused on determining the internal target groups and the prioritization among them.

Naturally, there are other groups of employees that are closely connected to terminology and its use or creation within the company, even if to a different degree than employees of the main target groups. During the first half of the development project, the project co-leader and I identified the following departments or groups of employees to also be important target groups of terminology management: product design, engineering, training, validators, product managers, and UX designers. I will return to them shortly in section 5.2.2.2 when discussing the collaboration element of terminology management since as Nuopponen (2018, 10) has noted, the questions of "to whom" and "by whom" terminology management is done are closely connected to each other.

5.2.2 Compiler

The results discussed in this section and the following subsections have been gathered from the field diary, interviews, and the finalized terminology process descriptions. In the subsections, I will address

the three elements that constitute the compiler aspect in Nuopponen's (2018) model: expertise and relation, collaboration, and continuity.

5.2.2.1 Expertise and relation

While explaining the expertise and relation element, Nuopponen (2018, 12) distinguishes three different groups who work with terminology: creators, compilers and mediators, and users (see section 2.3.1). All these groups can be distinguished within the case company with some overlapping between them, so that one employee can belong to multiple groups.

Based on the interview results, product managers and other subject matter experts are commonly recognized as the creators of terminology within the company in the sense that they are the most knowledgeable of the subject field and the subject matter of terms. Interviewees C, D, and F thought that product managers have the highest authority on the decisions concerning which terms are to be used. Interviewee F stated that especially if the term is product-specific, they consult either a product manager, a project manager, or an R&D manager to determine what the correct term is

> … because they have such a comprehensive view of the whole field – of what is comprehensible in the field – … and they also have … [an ability] to look from the point of view of science … [and] technology … [and they have] an ability to distinguish nuances and details in … terms. (Interviewee F)

Yet, interviewee F had also noted that just because a subject matter expert uses a certain term to refer to a concept, it does not automatically mean that it is the right term to use. Several explanations for this statement can be found from the interviews.

To begin with, six of the seven interviewees had observed terms being used inconsistently in the written materials of the company, meaning that several different terms were used to refer to the same concept. Moreover, five interviewees mentioned that they have at times difficulties in determining which is the correct term to use. One reason for this could be the observation that terms seem to be tied to certain product areas or even projects, so that different terms are used for the same concepts depending on who you ask and in which department or project they work. This was explicitly confirmed by three interviewees in total. Moreover, interviewee D had observed that within product areas, employees are accustomed to using certain terms and they have strong opinions on them;

enough so that even if they heard that in another product area, a different term was used for the same concept, they would still stick to the term they are accustomed to using rather than try to harmonize the term use between groups. Interviewee A had a very similar observation in that those employees who have been working at the company for a long time are used to using certain terms and they stick to them even if they would be in contrast with the terms that others use.

When it comes to compilers and mediators of terminology, there was only one group of employees who had some experience with these roles and who were commonly recognized as the right choice for them: documentation specialists. Six interviewees knew that documentation specialists were responsible for doing terminology work, including the compilation of terms, or at least thought that they should be. The interviewees offered several reasons why they thought documentation specialists should be especially the compilers of terminology. For example, four interviewees emphasized that documentation specialists are experts in writing and language, and therefore terminology work would be a natural addition to documentation specialists' duties. In addition, two interviewees explicitly commented the advantageous position that documentation specialists have in the company:

> Documentation has the advantage that they are primarily – I'm not sure if I would say more on the outside – but that they are perhaps not as deeply involved in the design of things so the question of "Hey, what does this mean? It is not that obvious" comes more naturally to them. So, I think that is a good thing. (Interviewee A)

> I think it's good that you [documentation specialists] are the ones to keep things in check a bit because you have a view over the borders between different product development teams, product area teams, and product teams. So that if one team has gathered the best terms in their own opinion and they think that those terms fit in every context, then you see that they [terms] don't work in another context – that they [terms] can't be put [to the termbase] like this. (Interviewee D)

The beneficial position of technical writers in companies and their tendency to be closely involved in terminology management has also been acknowledged in terminological literature (e.g. Warburton 2016, 10; Bauer 2015, 337), as was noted in section 3.1. All in all, then, most of the interviewees considered documentation specialists to be a good choice for the compilers of terminology because they are 1) well-equipped to the job due to their language expertise and 2) in a good position to

observe and question term use in different groups. Moreover, in a customer documentation team meeting, which took place halfway through the development project, it was agreed among the documentation specialists that terminology work would be a required part of their work from now on.

As concerns the users of terminology within the case company, practically all employees are considered potential users, which I have noted in my field diary. Moreover, I consider the creators and compilers of terminology also to be users of terminology, as for example product managers and documentation specialists use the terms they create or compile in their work. Thus, the three groups listed by Nuopponen (2018, 12) are proven to be overlapping.

In addition to these three groups, a separate terminology group had been formed shortly prior the research, as was noted in sections 4.4.1 and 5.1. At the time of the research, it consisted of three documentation specialists, a localization specialist, and me, but there were hopes that employees from other departments would join the group in the future. During the development project, more responsibilities, especially related to the terminology processes, were added to the group members. These include reviewing the term entries before they are added to the termbase, updating the termbase, and having discussions and making decisions related to the development of terminology management at the company, as mentioned in the finalized terminology process descriptions. Over the course of the development project, I witnessed the members of the group becoming more confident and competent in their tasks and roles. The practices of the terminology group became properly established, and the group became a governing group of a kind to help maintain and develop terminology management at the company, especially through their close involvement in the terminology processes (see section 5.2.4.1).

During the development project, a need for another even more administrative role was also identified. Consequently, the role of a termbase admin was assigned to two members of the terminology group. According to the finalized terminology process descriptions, the responsibilities of a termbase admin include the maintenance and publication of the termbase. One motivation for

this additional role was the need to divide and optimize the workload within the terminology group, so that not everyone would have all the same responsibilities.

5.2.2.2 Collaboration and continuity

Even if documentation specialists seemed to be the right choice for the compilers of terminology, based on my field diary, there were hopes within the company that in the future, employees from other departments would be taught to do terminology work on their own, too. Several of the documentation specialists themselves admitted that they had difficulties in getting terminology work done in addition to their normal tasks. Moreover, interviewee F voiced a hope that more resources would be allocated to terminology work, especially more employees to do the work so that the workload could be shared among a larger group of employees. Clearly, more collaboration in the area of terminology management was needed at the case company.

All interviewees mentioned departments and one or more groups of employees other than documentation specialists who should be somehow involved in terminology management. Interviewee A thought that product managers and other subject matter experts should define the terms. Similarly, interviewee C thought that subject matter experts are the best choice to create terms and define them. Interviewee B suggested that a separate terminology work group be created, one that should include marketing employees, product managers, subject matter experts, and an experienced terminologist. Interviewees D, E, and F all had a wider perspective in mind. Interviewee D thought that everyone at the company can somehow contribute to terminology management, either by commenting, creating, or collecting terms. Interviewee E considered that each employee whose work is somehow related to terminology should contribute to terminology management, while interviewee F thought that everyone who participates in product development should participate in terminology management. Interviewee G, then, believed that in addition to customer documentation, the marketing department could be somehow involved, but did not elaborate on the issue further.

Yet, those who had recognized the role of documentation specialists as compilers of terminology (six of the seven interviewees) agreed on the uniqueness of that role in that no other

group of employees that they could think of could be involved in terminology management in the same way as documentation specialists. The interviewees offered multiple arguments as to why they themselves or other employees in their department would be unable to participate in terminology management to the same extent as documentation specialists. Interviewee A thought they would not have the time for it; interviewee E reasoned that they do not write anything scientific or instructive as part of their job, so it is not their responsibility to pay attention to the use of terms in the same way; and interviewee G thought that they and their co-workers have too many other responsibilities, and emphasized that not all who work in their department are language experts.

Initially, the project co-leader and I had had plans to include employees from all target groups (see section 5.2.1) in the development project, so that together with the employees we could figure out how they could be involved in terminology management. This more collaborative development work would strongly adhere to the action research approach of the study (see section 4.1). However, as the project progressed, these broader considerations had to be dropped. One thing that complicated defining the roles of the different target groups in terminology management was the fact that it was overall such a new and foreign practice within the company. Moreover, it had been initiated within one department, namely the customer documentation department, which led me to the conclusion that employees of other departments did not necessarily know what terminology management or terminology work are about and why they should be practiced. The latter point was confirmed by a manager-level employee in a meeting halfway through the development project. Similarly, interviewee F pointed out that they had observed that some employees of the company, for example some supervisors, are not aware of terminology work as an established practice.

Therefore, as I saw it, it would have been impossible to contemplate different aspects of terminology management, including collaboration, with employees who are not at all familiar with the subject in question; to be able to discuss terminology management with different groups, these groups would have had to be properly informed about terminology management first. However, organizing these various information sessions and consecutive discussions proved to be too laborious

given the limited time and resources of the development project. Over the course of the development project, it became clear that developing the terminology processes (see section 5.2.4.1) would require more time and effort than the project co-leader and I had anticipated. Consequently, it was decided to focus more on the process development and limit the extent to which the collaboration and involvement of the different target groups would be examined and developed.

In the end, the project co-leader and I decided to collaborate with the three main target groups, namely customer documentation, marketing, and communications. With the role of customer documentation having been determined quite early in the project as the compilers, the involvement of the two other departments remained to be determined. Early in the project, the communications department was, however, further dropped from consideration since we were unable to find any volunteers from the department to participate in the project. As the development project progressed, we found two volunteers from the marketing department with whom we began a series of meetings to discuss the kind of role the marketing employees could and would have in terminology management at the company.

One topic that came up in these meetings was the ever-present hurry and pressure that the marketing employees feel in their daily work. This is troublesome considering one of the goals of the study, namely to discover how to include more employees in terminology management, since it would be challenging to add any new responsibilities or practices in an already tight schedule and workload of the marketing employees. Another topic was search engine optimization (see section 3.1) and how it affects the use of terms in the marketing materials produced by the marketing employees. One of the marketing employees pointed out that they are forced to use synonymous terms in their materials to ensure that those materials show up to customers when they search for products or services online. However, the free use of synonymous terms conflicts with the aim of the company to facilitate the daily work and communication of the employees through terminology management. Uncontrolled term use enables the formation of communication barriers within the company: “Communication is thus characterised by insular solutions when what is really needed is a networked approach”

(Fähndrich 2005, 239). On the other hand, Warburton (2014, 10) has emphasized that companies have to balance standardization goals with free, creative language use due to business needs, as was discussed in section 3.1.

In the end, despite our intentions, we were unable to come to a decision as to what the role of marketing would be in terminology management. The main reason for this was the fact that the marketing employees had not had enough time to discuss the topic with their co-workers due to more pressing tasks. Moreover, one of the marketing employees seemed quite certain that they and their co-workers would not have time to do anything new in addition to their normal tasks. This indicates that the marketing employees, similarly to documentation specialists, seem to regard terminology work as a burden that is only done if there is time after completing other tasks (see section 5.1). During the final meeting with the marketing employees, a decision was made to continue the discussions with the marketing department after the development project had been concluded.

Finally, as concerns the continuity element in Nuopponen's (2018) model, terminology management had not been a continuous practice prior to the development project: as was observed in section 5.1, terminology management seemed rather to be at a standstill. However, due to the development of the new terminology processes (see section 5.2.4.1), there were hopes that in the future, terminology management would become a continuous practice at the company.

5.2.3 Product

The results discussed in this section have been gathered from the field diary. In the following, I will address both elements which Nuopponen (2018) has outlined under the product aspect of her model: product and language. Terminology work at the company produces two kinds of products: term entries and a termbase consisting of those term entries. During the development project, the project co-leader and I discussed and implemented a few structural changes to the termbase so that more metadata related to the term entries could be added there. Other than that, the products of terminology work were not improved during the development project, even though especially the termbase and

the tools for maintaining and accessing it received some criticism. I will elaborate on this criticism in section 5.2.4, when discussing the tools element.

Considering language, terminology work practiced by the company was multilingual in scope. Terminology work was done in English first, after which translators localized the terms in a specific set of languages. Therefore, the terms in other languages than English did not go through an equal terminological analysis, which would be the ideal case (Nuopponen 2018, 15). This exemplifies one of the compromises made to balance between the theoretical principles of terminology and the practical needs and restrictions of the business environment (Lin 2011, n.p.; see section 3.1). Moreover, the set of languages was not constant yet, which had led to a situation in which some terms did not have translations for every necessary language. However, this deficiency was recognized during the development project, and a new process for adding new or previously missing localized terms to the termbase was consequently created (see section 5.2.4.1).

5.2.4 Method

In this section, I will address the tools and systematicity elements under the method aspect in Nuopponen's (2018) model. The findings in this section have been gathered from the field diary and the interviews. Considering the tools for terminology management, the company has two separate tools for accessing the termbase, one of which is also used to maintain it. In addition, there are two other software programs used to coordinate and communicate about terminology work among the employees. I will not discuss these tools in detail or name them, as they are company confidential information. However, from the point of view of developing terminology management, it could be noted that the tools related to the termbase received some criticism during the development project, both by the interviewees and other company employees in several meetings. For example, a marketing employee commented in a meeting that the termbase should be integrated with the current tools which the employees use in their daily work so that they would not have to use another program to use the termbase; otherwise, according to the employee, the marketing employees would not use it.

Moreover, a documentation specialist commented in another meeting that the current termbase tools require unnecessary manual work that would not be needed if a proper terminology tool was in use.

In the interviews, the wish for a new terminology tool was voiced by interviewees A, B, and F, all of whom wished for one particular feature: the tool should recognize terms from a text and notify the user whether the terms they use are approved in the termbase or not. Interviewee B thought that having the kind of tool that would check the terms for the user would both facilitate an individual's daily work and aid in making the term use more consistent across the company. Interviewee B also implied that because the current tools require manual checking, it discourages their use and consequently causes the employees to rely on their memory when choosing which terms to use in a given situation: "No one is capable of checking every term from some list. So, you just rely on your memory that this is how we have been calling it earlier."

Moreover, relying on one's memory was mentioned as the main technique for selecting which terms to use by three interviewees in total. This could result from the company's long history without a termbase since the termbase was a relatively new addition at the company. Yet, as interviewee B implied, it is not enough to simply have a termbase, if it does not meet the needs of its users. Interviewee D addressed this issue explicitly by stating that "The termbase in itself doesn't help unless people adopt it." This is a valid statement, as the success of terminology management is partly determined by the extent to which the product of terminology work is approved and used by its target group (Lin 2011, n.p.; Bauer 2015, 336), as was discussed in section 3.1. However, despite the criticism which the current tools received, the project co-leader and I agreed that acquiring a new tool for terminology management would fall outside the scope of our development project. Still, during the project it became clear that a change of tools would benefit the company and its employees.

As concerns the systematicity of terminology management, there were hopes that through the development project, the company would attain systematic ways of working for terminology management. Related to these ways of working, one could observe that Nuopponen's (2018) model fails to directly address the practical side of the word *method*, namely in the meaning of "a procedure

or process for attaining an object" (Merriam-Webster, s.v. *method*). Nuopponen (2018, 20), however, notes that further subcategories are still possible to be distinguished and added to the model. Therefore, I will add a further element under the method aspect in Nuopponen's (2018) model in order to address the more practical aspect of terminology management: processes. In the following section, I will look at how the terminology processes were developed during the research.

5.2.4.1 Processes

The findings presented in this section have been gathered from all research materials. The process development work consisted of four, partly overlapping phases outlined in the project plan: drafting, reviews, making changes, and implementation. In the end, the implementation of the finalized processes had to be left for the company to oversee since the other phases were more time-consuming than we had estimated. My research time at the company was culminated shortly after I finalized and published the processes within the company at the end of April, and hence there was no time left to observe the implementation.

Due to the action research approach of the study (see sections 4.1 and 4.5), the processes were drafted and developed in close collaboration between the project co-leader and me. During the first process drafting meeting, we discussed how many processes would be needed to manage terminology at the company. One thing that was clear was that multiple terminology processes would be needed, as the company had already recognized a need for two terminology processes and created process drafts for them: a process for creating new terminology and another for changing existing term entries within the termbase. As Suonuuti (1999, 116) has noted, despite the complexities that having multiple terminology processes may cause, it may be a necessary decision especially in large companies, such as the case company (see section 3.2). In addition to the two terminology processes mentioned above, the project co-leader had recognized a need for a third process: the implementation of terms into the company materials. However, no one had had any time to work on the third process prior to the research. At the beginning of the development project, we thought that these three processes would be enough to manage terminology at the company. As time went on, new ideas arose and old ones

developed, so that in the end, the number of terminology processes increased from three to five. These five terminology processes are:

1. New term creation process
2. Term change process
3. Term implementation process
4. Localization complementation process
5. Maintenance process.

In the following, I will address the development of these processes through the different phases which I listed above and which were realized during the research: drafting, reviews, and making changes.

Drafting the processes. With the project co-leader, we identified the phases which comprised each process and defined and discussed the following concerning each phase separately: what initiates the phase, what happens during the phase, which roles are needed for the phase, what is the deliverable of the phase, and what initiates the next phase. The new term creation process was the first one we drafted. For that process, we used one of the old process drafts as a starting point. One of the first things we discussed were the roles that would be needed to complete the process. The old process draft mentioned five roles: terminology coordinator, localization coordinator, subject matter expert, translator, and validator. Over time, we recognized eight roles in total, most of which would occur in all five processes. A significant development concerning the roles and their responsibilities was that terminology group members were given a significant amount of responsibility in four of the five processes, and termbase admins (see section 5.2.2.2) were appointed a governing role in every process.

During the drafting of the new term creation process, we also used several project or process models which I had identified from terminological literature. We found the models by Suonuuti (1997) and Chiocchetti et al. (2013) (see section 2.3.2) to be the most useful in terms of the level of practical detail they offered for the different phases. These models were especially used to name the phases of the new term creation process and to help describe the actions that would take place during each phase. Later in the project, I found Nykänen's (1999) model (see section 2.3.2) and presented it

to the project co-leader. At that point, however, we had already finished the first draft of the process and found that the current draft already included quite similar content as Nykänen's model. So, in the end, Nykänen's model did not lead to further changes in the process but served as a type of verification, nevertheless.

Another example of how the models by Suonuuti (1997) and Chiocchetti et al. (2013) were used was the addition of a separate preparatory or planning phase at the beginning of the new term creation process, so that factors such as the scope and subject area of the terminology would be determined early on. Yet another example was the division of the review phase of the process into two different reviews: terminological review and content review. This was inspired by Chiocchetti et al. (2013, 9) model and their division of the "revision and quality assurance" phase into three levels: linguistic revision, formal revision, and content revision (ibid., 10). The terminological review, which we formed by combining linguistic revision and formal revision from Chiocchetti et al. (2013) model, was a new addition to the process since we deemed it necessary to have a separate review to ensure the terminological correctness and quality of the term entries. All in all, however, the project co-leader commented that the models I introduced in our meetings were too theoretical for company use as such. This notion conforms to Warburton's (2014, 74) claim that the existing theories of terminology do not consider commercial settings and their needs (see section 2.2). Therefore, only chosen parts of the models could be utilized for the case company, as exemplified above.

As concerns the term change process, I was unable to locate any suitable process models from terminological literature. Consequently, the old process draft, the experiences of the employees in updating the term entries, and some parts of the newly drafted new term creation process were used to build the term change process. Using experiences as a basis for creating new solutions is a method utilized in action research to develop the competences of the people participating in the research (Susman and Evered 1978, 599), as was noted in section 4.1. While drafting the term change process, the maintenance of the termbase also came up in our discussions, as I had identified updating the content of the termbase as a method of maintaining its quality. Over time, I kept identifying other

maintenance activities from terminological literature and online resources, even though I was not able to find a solid maintenance process. It was not clear from the start whether these maintenance activities would form a separate process at the case company. However, after a discussion with an employee experienced in process development, it was decided to form a separate maintenance process, as the employee in question commented that if there is any regularity and anything that should be controlled about specific activities, then those are already strong arguments for a process. This also exemplifies an instance where an employee's practical knowledge and experiences helped to develop new practices, which I as a researcher had initiated from a theoretical viewpoint, as is customary to action research (Susman and Evered 1978, 597; see section 4.1).

Initially, the aim of the maintenance process was to ensure the quality and up-to-dateness of the termbase. Some actions with which to accomplish these goals, which I had listed in my field diary, include checking terms from specific subject areas, identifying missing terms, and checking the correctness of definitions. These types of check-ups for the term entries within the termbase were suggested by interviewee D as they had observed notable deficiencies in the terms of a specific subject area. Over time, we extended the maintenance process to include a developmental aspect as well. Some developmental tasks which I had listed in my field diary include the following: evaluating the terminology processes and their update needs, evaluating the usability and structure of the termbase, and gathering feedback related to termbase. Therefore, the maintenance process became to denote maintenance related to the termbase and terminology management within the company.

The implementation process was the most difficult process to draft since we had to start without a reference, and I found no help from terminological literature. The following quote from my field diary exemplifies the struggles we faced while drafting the process:

> It's a very complex process to think about, as the company has produced a mass of material over the years and continues to produce [a] large amount of written material every day. Updating every text that has ever been written is impossible …, but thinking about the priorities for this [term] implementation will be very challenging nonetheless. Simply taking the approved terminology to use in future texts would be simpler, but it doesn't then fix in any way those texts that have already been published.

Indeed, it was challenging to think how the implementation of the approved terms in both existing and new materials should be organized, since terminology management was such a new practice at the company that no official terminology changes had been made before, at least not in any systematic and comprehensive way. Due to the novelty and the complexity of the process, the first draft we produced was quite rudimentary compared to the other first drafts. We strongly felt that we needed substantial input from other employees, so we tried a more collaborative way of working by bringing a rudimentary draft to the first review meeting in order to come up with the necessary solutions with more people involved than just the two of us.

Over the course of the development project, a need for the localization complementation process arose in discussions with the project co-leader and other employees, such as localization specialists. Even though term localization was incorporated as part of the new term creation and term change processes, there was a clear need for a separate process, one dedicated to localizing terms that would not, for one reason or another, be localized through the completion of the new term creation or term change processes. The resulting localization complementation process was mostly created on the basis of the already-defined processes and especially the phases related to localization. Overall, the translation and localization of terms were recurrent issues throughout the development project. For example, the old instructions on translating terms and working with the different terminology files had proved inadequate, as there were several practical details that had not been regulated and agreed with the translation vendor. In short, term localization caused a lot of confusion to all involved in it. This was recognized already at the early stages of the development project, and over time, the situation was improved. For example, I and a few other employees wrote more instructions to translators, and several meetings were organized with representatives from the translation vendor to develop and agree on policies and practices related to the processes.

Reviewing and making changes to the processes. The reviews were organized either as face-to-face meetings in the company premises, as online meetings, or as “email reviews” in which feedback for the terminology processes was requested via email. The reviewers partly varied from

review to review, but one or more terminology group members and documentation specialists were always present in each review. Representatives from the translation vendor were also present in some of the reviews. Initially, we had planned to organize further reviews to employees of other departments, but due to the limited collaboration during the development project (see section 5.2.2.2), the reviews were limited, too.

Each process was typically reviewed in a separate meeting. Prior to each review, I sent the process draft to the reviewers a few days in advance so that they could familiarize themselves with it beforehand. Then, in the review itself, the project co-leader or I explained the purpose of the process, after which we presented the process phase by phase, asked the reviewers to comment, and took notes of the feedback. After the review, the project co-leader and I went through the feedback and made changes to the processes based on it. Each process was reviewed 1–5 times, and after changes were made on the drafts, the updated version of the draft was then reviewed again in a meeting or alternatively sent for a final check-up via email to the reviewers. All in all, the reviews were a prime example of how new practices were developed together with those directly involved in them, as is characteristic to action research (see section 4.1).

As an example, in the following I will describe the review process for the new term creation process, which was reviewed three times in total. In the first two reviews, the reviewers consisted of terminology group members and documentation specialists, while the third review was with the representatives from the translation vendor and one member of the terminology group. The first review led to some structural changes within the process. For example, the original 11 phases of the process were reduced to 8. This was mostly due to the criticism received from the reviewers that an 11-phase process was too long and intimidating, as it made the process seem very complex and laborious to complete as just one part of a documentation specialist's work. As a result, the project co-leader and I decided to combine some phases of the process so that it would appear simpler on the outside and thus be more approachable to the users of the process. In the second review, the reviewers found the file handling in the different phases somewhat confusing, and consequently a point was

made to provide more information about the file handling in the practical instructions I wrote for the processes. The process itself seemed mostly clear to the reviewers in the second meeting, which implies that decreasing the number of phases was a successful change. Overall, this second review led to some minor alterations within the phase descriptions. I was unable to attend the third review meeting, but afterwards the project co-leader and I made changes especially related to the tasks of translators and validators based on the notes which the project co-leader had taken during the review.

At the end of the development project, after most of the process drafts had been approved by the reviewers, the project co-leader and I organized an information session about the terminology processes to documentation specialists, their supervisor, and a few localization specialists. After this, the final check-ups for the processes were made by a few reviewers, the project co-leader, and me.

5.2.4.2 Terminology processes for terminology management at the case company

In this section, I will shortly present the outcome of the development project: the five processes for managing terminology at the case company. The processes and their interrelationships are visualized in Figure 5.

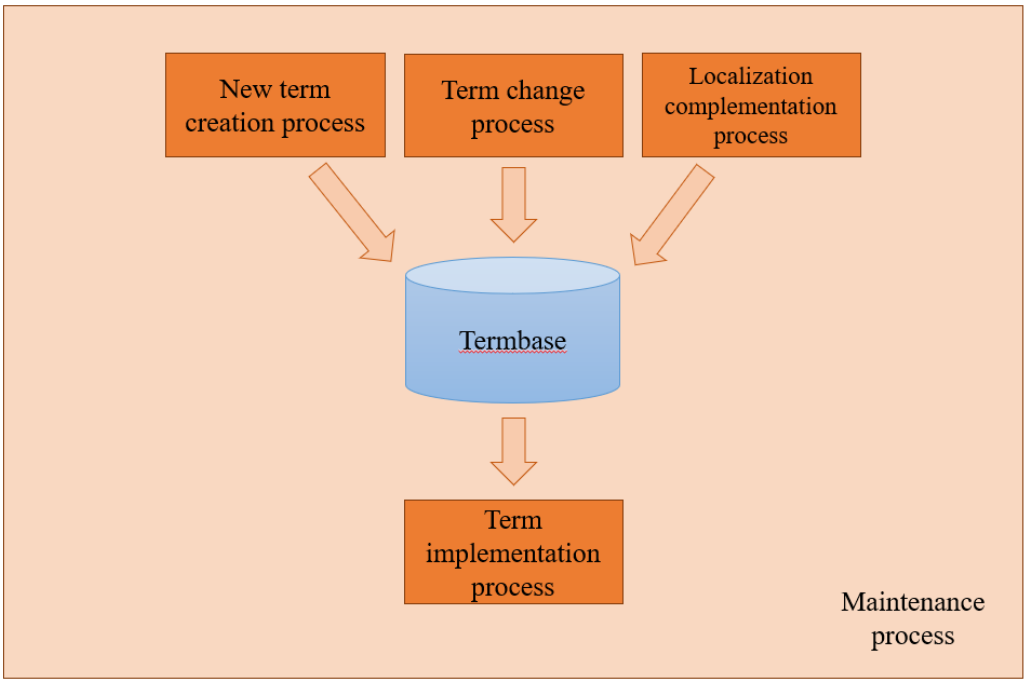

Figure 5. Terminology processes at the case company.

At the top of Figure 5, there are three processes that produce or update the term entries within the company's termbase. These are the new term creation process, the term change process, and the

localization complementation process. The purpose of each process can be inferred from the names themselves: the new term creation process is essentially a process for creating new term entries to the termbase; the term change process is for modifying the existing term entries within the termbase; and the localization complementation process is for localizing the terms in those languages to which the terms have not been localized yet within the termbase.

After the terms have been published within the termbase, the term implementation process governs how the terms will be implemented and in which company materials. Lastly, the maintenance process is a background process that aims at maintaining the quality of the company termbase and developing terminology management further. I will not present any of the processes in more detail as they are company confidential content.

5.3 The state of terminology management at the end of the research

In this section, I will use Thomsen's (2005) maturity model for the processes related to terminology (see section 3.3) as a basis for analyzing the state of terminology management at the end of the research. The different aspects of Thomsen's model and a comparison of the case company's placement on them at the beginning and at the end of the research are summarized in Table 2.

Table 2. The case company's placement on the levels of Thomsen's (2005) model based on seven aspects of terminology work at different phases of the research.

	Organization	Content	Aim	Target group	Termbase	Termbase structure	Quality management
Level at the beginning	2	2	4	4	2	4	4
Level at the end	3	2/3	4	4	2/3	4	4

To begin with, it could be noted that no noticeable or significant changes were made based on four of the seven aspects in Thomsen's (2005) model and thus, they remain on the same level as at the beginning of the research (see section 5.1). These four aspects are: the aim of terminology work, the target group of terminology work, the structure of the termbase, and quality management. As concerns the remaining three aspects, namely the organization of terminology work, the content of terminology

work and the termbase, several developments took place over the course of the development project, which will be examined below.

Beginning with the organization of terminology work, the case company now fulfills the criteria set for a level 3 company: terminology work has become well-organized, there are specific people responsible for approving the collected terminological data, and yet terminology work is still perceived as a time robber (Thomsen 2005, 252). The creation of the new terminology processes was crucial in improving the organization of terminology management at the company, and a part of this work was making decisions on the different roles and responsibilities connected to the different processes and the phases within them. During the development project, it was confirmed that the documentation specialists would have the responsibility of doing terminology work, for example compile terminology for the termbase. The terminology group also became more established in its practices and responsibilities, which were both significantly increased to the point that the terminology group became a governing group in terminology management, as was discussed in section 5.2.2.1. Still, throughout the research, it was clear that the other responsibilities of the documentation specialists were easily prioritized over terminology work, and terminology work continued to be regarded as a burden among the documentation specialists. For example, during the development project, many of the documentation specialists carried out terminology projects in which they created new term entries for the termbase. While this increased activity in terminology work is a positive change, the projects progressed quite slowly and were easily left aside by the documentation specialists as more urgent tasks arose, which I noted throughout the research.

As concerns the content of terminology work, the case company can in part be placed on level 3. With the increasing number of terminology projects carried out and planned during the development project, the company was clearly making attempts to include terms from all areas that are relevant to the company and its business. Still, the termbase has gaps in terms of topics and languages represented in it, as is characteristic to a level 3 company (Thomsen 2005, 253). However, being on level 3 also requires the company to have a product-specific terminology (ibid.), which is

not yet the case at the company. Therefore, the company remains somewhere between levels 2 and 3 on this aspect.

Based on the termbase itself, the case company again falls somewhere between levels 2 and 3. One criterion on level 3 requires having guidelines for the update of the termbase (Thomsen 2005, 254), which became fulfilled during the development project: in their own ways, most of the new terminology processes and the practical instructions I wrote for their execution work as guidelines for the termbase update. An exception is the term implementation process because it focuses on implementing terms from the termbase into the company materials without changing anything within the termbase itself. Another criterion on level 3 requires that the termbase has a solid structure (ibid.), but the situation with the multiple versions of the termbase (see section 5.1) still holds at the end of the research, which partly keeps the company on level 2.

Moreover, in section 5.1 (see Table 1), I listed the improvements suggested by Thomsen (2005) for reaching level 4 in the model. These improvements and the status of their implementation at the case company are shown in Table 3.

Table 3. The improvements for reaching level 4 in Thomsen's (2005, 253–255) model and their implementation at the case company.

Implemented at the case company (✓) or not (–)	Improvement
✓	Terminology work is organized properly, for example certain employees have been appointed the responsibility of approving the collected data.
✓	Knowledge is shared properly among those working with terminology.
–	Employees are required to use the approved terminology.
–	Terminology work is no longer perceived as a burden that takes time from more important tasks.
–	Terminology work is started early enough, possibly already in the product development phase.
–	Terminology is included in an overall planning at the company.
–	The termbase includes product-specific terminology.
–	The termbase covers relevant subject areas and includes translations for languages relevant to the business.
–	The termbase enables export and import of term entries between different systems, such as a translation memory system or a word processing system.
✓	There are plans for adding terms from new subject areas to the termbase.

As can be seen from Table 3 above, the company managed to implement three of the ten improvements during the research. These are organizing terminology work properly at the company, sharing knowledge properly among those working with terminology, and having plans for adding terms from new subject areas to the termbase. The first and the third of these implemented improvements were already discussed and proven above. The second implemented improvement, namely the improved knowledge sharing, was developed partly by the writing of more instructions and guidelines related to the new processes and other terminology management topics, and partly by creating new communication channels for the employees to discuss terminology management and organize their work.

As I mentioned in section 5.1, the above improvements suggested by Thomsen (2005) were not taken as goals for the development project, but they were rather used as guidelines. This turned out to be reasonable, as merely improving the organization of terminology work and terminology management, especially the development of the terminology processes, required most of the time and resources of the project. All in all, Thomsen's model offers plenty of future improvement ideas for the company, as those improvements that were not implemented during the development project can now be taken as long-term goals for the company.

5.4 Future development of terminology management at the case company

Similarly to how terms are prone to change over time as languages of the world constantly evolve, terminology management should be revised and developed at regular intervals. The case company seems well aware of this, as I have noted in my field diary. Plans were already in the making on how to develop terminology management even further. For example, expanding the communication and planning the involvement of the other target groups were recognized as the next steps in this development by the project co-leader. The importance of reviewing and developing the terminology processes in the future was also acknowledged, and initial plans were made to review the processes after six months of using them, at the latest. Indeed, as Suonuuti (1998, 15) has noted, one characteristic of a good terminology process is constant development (see section 3.2).

While Thomsen's (2005) maturity model for terminology processes offers quite a few recommendations as to how the case company should develop its terminology management in the future (see Table 3 in section 5.3), I have a few further recommendations of my own, which are based on my experiences at the company during the research. These recommendations have to do with the company's termbase, the roles and responsibilities in terminology management, and communication about terminology management.

Firstly, the company's termbase received valid criticism during the development project from the company employees, as was noted in section 5.2.4. As both my field diary and some of the interviews imply, the current tools for the use and maintenance of the termbase do not meet the needs of the employees. This is likely to negatively affect the adoption and use of the termbase. Consequently, if the termbase, which requires considerable time and effort from the employees who maintain it and financial investments from the company, is not used, it would severely undermine the overall investment in terminology management and the whole purpose of terminology management, which is to facilitate the daily work and communication at the company. Therefore, acquiring a new tool or tools for terminology management that meet the needs of the users would be beneficial for the company.

Secondly, placing the responsibility of doing terminology work on documentation specialists only can be perceived as an unsustainable solution, especially over time. Perhaps the main argument against this solution is the fact that currently, the documentation specialists are expected to do terminology work in addition to their everyday tasks without reducing the responsibilities they already have in their work. Even if terminology work may be argued to fit well to a documentation specialist's tasks, as was discussed in section 5.2.2.1, it was clear that during the development project, documentation specialists struggled to get terminology work done and they often had to postpone or drop it to be able to perform their other tasks.

It seems quite obvious, therefore, that more people would be needed to engage in terminology management at the case company. The interviews indicated that some employees working in other

departments commonly feel pressed for time, too, so finding more volunteers to participate in terminology management might be challenging. For this reason, I would deem it beneficial to hire full-time employees to work with terminology management; otherwise, the workload and responsibilities of a group of existing employees should be reduced so as to make it possible for them to give terminology management the time and effort it requires and deserves.

Thirdly, terminology management should be made better known within the company. As both my observations and some interviews indicate, knowledge and understanding of terminology management is scarce outside the customer documentation department, which partly prevents collaboration between different departments when it comes to terminology management. An increased knowledge of terminology management and the company's termbase might also make the employees' use of terms more consistent by making the employees more aware of terms and why consistency in their use matters. Indeed, inconsistent term use emerged as a common occurrence within the company, as observed by a majority of the interviewees, some other employees of the company, and me. Moreover, if terminology management would be better known within the company, it would likely make it easier to open the dialogue with different groups of employees, which in turn could strengthen the company's internal communication and help locate more employees to actively participate in terminology management.

6 Conclusion

This study focused on developing and improving terminology management in a comprehensive manner for a case company. The study was carried out with an action research approach, and therefore, in close collaboration with the employees of the company. The study sought answers to three research questions: what the current state of terminology management at the company is, how terminology management can be improved at the company, and how employees from different departments within the company can be involved in terminology management.

As regards the first question, by using Thomsen's (2005) maturity model for terminology processes, it was determined that terminology management at the beginning of the research was in a state of disorganization and inactivity. At the same time, it turned out that based on some aspects of the model, such as the quality management and the target group of terminology work, the case company was already on a relatively high level on the model, namely on level 4. This imbalance among the different parts of terminology management indicates that some attempts at organization had clearly been made, but terminology management lacked systematicity and well-defined practices, roles, and responsibilities among the employees.

Considering the second question, terminology management at the company was improved by developing five processes for terminology management. This work included the definition of roles, responsibilities, and actions to be adopted by different employees at specific phases of the processes, and the writing of detailed and thorough practical instructions for executing the processes phase by phase. Moreover, a specific group of employees, the documentation specialists, were appointed the responsibility of doing terminology work. Yet, the study also indicated that this solution might not be the best one for the company in the long run, mostly because doing terminology work in addition to the daily tasks of documentation specialists proved challenging already during the development project. In addition, the terminology group, which had been formed within the company prior to the research, stabilized its ways of working and became the core group in terminology management and its development at the company, mainly through the major role to which the group members were

appointed in the new terminology processes. The study also indicated some future improvement ideas, both based on Thomsen's (2005) maturity model and outside its recommendations. These included developing the company's termbase, acquiring a new tool for terminology management, and increasing communication about terminology management within the company.

The third research question could not be properly answered based on the study. Overall, focusing on the practical aspects of terminology management through the process development work required more time and effort than expected. Consequently, the decision was made to focus more on the process development aspect of the study. Furthermore, in addition to having to limit the extent of collaboration with different departments during the development project (see section 5.2.2.2), the project co-leader and I faced difficulties in finding volunteers even from the main target groups to participate in discussions and decision-making. One explanation for this difficulty were the tight schedules of the company employees. As the basis of the action research conducted at the company was to develop solutions and practices together with the employees, due to the lack of discussion with other departments, the involvement of employees from departments other than customer documentation in terminology management could not be determined during the study.

As concerns the study itself, the action research approach fit the purpose of the study well, even though the full potential and benefits of action research were not realized in the study. On the one hand, the action research approach enabled close collaboration with the company employees, and new practices, solutions, and roles related to terminology management were successfully created and defined during the study. By involving employees in the development project, the suitability of the new terminology processes for the case company is likely to be higher than if I had designed the processes by myself and as an outsider to the community.

On the other hand, as was discussed above, employees from other departments than customer documentation did not become engaged in terminology management, despite one of the aims of the study being to discover how to involve more people in it. Moreover, even if documentation specialists did terminology work during the development project more than before, there seemed to be no change

in the attitude that terminology work is somehow secondary and a burden. These two findings imply that no extensive changes in practices and attitudes occurred at the company, even if this is what action research could accomplish (see section 4.1). The terminology processes created during the study offer an opportunity for changes to take place in the future, but even they do not guarantee changes in attitudes, practices, and collaboration within the company. Moreover, to further guarantee the suitability of the terminology processes, they should be tested in practice. Action research would have been a beneficial setting for developing the processes even further by testing them in use. However, this was ruled out of the scope of the study as it was deemed to be too laborious and time-consuming given the limited resources of the study. Therefore, a lot of responsibility was left on the case company to continue its development, to engage more employees in terminology management, and to implement the new practices in its operations in the future.

Another limitation in the conducted action research is that not all those involved in the practices under development participated in every phase of the action research, as should be the case (see section 4.1). For example, only the project co-leader, my supervisor, and I participated in the first phase of action research, planning (see section 4.5). However, it would have been quite challenging or even impossible to first identify and then include all the relevant employees in the action research conducted at the case company given the size of the company and the topic of the study. Terminology management is such a multifaceted set of activities that the resulting group of people who are or could potentially be involved in one or more of its many practices would have been simply too large to function properly.

During the development project, my roles as a researcher and an employee of the company often blended together. My researcher role was emphasized especially in the interviews, in the regular meetings with the project co-leader, when I presented my findings from terminological literature to aid us in developing terminology management at the company, and at the end of the development project when I asked certain employees to reflect on the project. On the other hand, having worked with some of the company employees already during my internship and continuing to do other

terminology related work at the company outside the development project, I was not solely a researcher in the eyes of the employees. Therefore, I think the employees most often regarded me as a co-worker rather than a researcher, which then minimized the observer effect (see section 4.2) and helped me gather more insightful and unbiased data than in a situation in which I would mostly have been regarded as an outsider of the community.

The two research methods used in the study, participant observation and semi-structured interview, combined well with the action research approach and were thus successful choices for the study. Participant observation enabled me to closely monitor how terminology management was developed little by little and identify emerging challenges and concerns voiced by employees working in different departments. The interviews helped me gather more targeted results for questions such as who should be involved in terminology management and how. In hindsight, the interviews could be criticized for being too broad and especially for placing too much emphasis on the use of terms, as that theme alone provided so many possible topics for analysis that most of them could not be analyzed within the scope of the thesis. On the other hand, the interview results provided further justification for the study, for example by indicating that the employees had been struggling with managing terminology and its use by themselves.

Moreover, these two methods provided same or similar results on more than one occasion, which significantly adds to the reliability of the results. However, the information gathered from interviews and my observations mostly concerns individual employees or their opinions, even if there are indications for some results to concern bigger groups of people. For example, I was able to observe a whole team of documentation specialists over the course of the research, which implies an increased reliability on results related to the documentation specialists.

While taking notes in the field and writing the field diary, I found myself recurrently worrying whether I am collecting and recording the right kind of data. Using these methods for the first time was both challenging and educational. Even though the word count of the finished field diary was almost 49,500 words, which was more than I had expected, I found that I should have been even more

meticulous in writing it. For example, during the analysis of the data, I remembered several findings or moments from the field, but upon browsing the field diary, I realized that I had not noted them in the diary. This mainly results from the challenge of sharing the roles of a researcher and an employee; it was challenging to remember to record some aspects or details which were self-evident to me as an employee of the company but still important to note from a research perspective. In connection to these issues, the use of documents as a third type of research materials proved to be a necessary choice for the research. Especially the old terminology process drafts had a central role in the development of the new processes. The project plan and the finalized terminology process descriptions, on the other hand, included necessary details that I had not addressed in my field diary.

Two theoretical models were used in the analysis of the research materials and thus became tested with the case company. Thomsen's (2005) model is very detailed, which facilitated using it as a tool for analysis. It was especially helpful for determining the state of terminology management at the beginning and at the end of the research. Based on the seven criteria of the model, the case company became to be placed somewhere between levels 2–4, which indicates that seven months was too short a time for the case company to completely rise from level 2 to level 3, for example. Therefore, the study exemplifies that terminology management is a multifaceted endeavor and its development requires considerable time and effort.

Nuopponen's (2018) model similarly provided a fitting framework for structuring and analyzing the findings of the study. However, my research materials did not provide enough or any material related to all aspects and elements within the model, which was why I did not use the whole model in the analysis. I also discovered that one additional subcategory to the model was necessary in order to discuss and emphasize the practical meaning of *method* in Nuopponen's framework (see section 5.2.4 and its subsections). A considerable amount of the development work done at the case company involved creating and organizing practices in the form of terminology processes, and the addition of the subcategory *processes* to the model enabled me to examine this significant constituent

of terminology management. Thus, the study exemplified that theoretical models benefit from empirical testing in validating and fine-tuning them.

All in all, the study exemplifies that terminology management requires customization and adjustment of theoretical models and ideas to the needs of a given company. Even if terminology management was successfully improved from what it was at the beginning of the research, as judged by the company employees and me, all aspects of terminology management could not be improved during one research project. Limitations had to be made prior and during the research itself, and the list of future development items is considerable. However, by the end of the research, the case company was better equipped and more motivated to continue improving its terminology management also in the future, which further suggests that the study was successful, especially from the point of view of the case company.

Even though the results of the study directly benefit the case company, they also contribute to the fields of technical communication and terminology and have relevance for other companies aiming at developing their terminology management. The study has emphasized that in theory, terminology work may seem to be a natural fit and a beneficial enrichment to technical writers' duties, but it has also proved that implementing this in practice can be a challenging endeavor. By identifying a new subcategory to Nuopponen's (2018) model, the study has contributed to the development of this terminological model. Moreover, by offering a detailed look into the development project carried out at the case company, this study exemplifies and uncovers the many details, topics, and viewpoints that have to be considered in order to organize and improve terminology management in a company context.

Finally, the study provides several topics for future research. Perhaps the most obvious one would be a follow-up study organized at the same company to determine the state of terminology management a year or two from now and examine what types of developments have taken place in the meantime. As the implementation of the new terminology processes was left for the company to organize and oversee, it would be especially interesting to find out how well the new processes work

in practice and what types of changes or adjustments may have been necessary. Further studies related to terminology management and its organization in different companies both in Finland and abroad are also needed. There is little information available especially on what kind of processes companies use to manage their terminology, save for a process for creating new terminology. More studies focusing on the practical aspects of terminology management are therefore needed to shed more light on the practical and process-related issues and to help companies organize their terminology work in a sustainable manner.

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Appendix 1

Haastattelurunko

- Haastattelussa on neljä teemaa: aluksi kyselen taustatietoja, toinen teema on termien käyttö, kolmantena teemana on termityö ja lopuksi kysyn muutaman kysymyksen yrityksen termikannasta. Haastattelu kestää noin tunnin.
- Äänitän haastattelun ja kirjoitan sen jälkikäteen tekstitiedostoksi analyysia varten. Säilytän äänitteen siihen saakka, kunnes gradututkielmani on hyväksytty yliopiston puolesta. Tämän jälkeen tuhoan äänitteen. Ennen tuhoamista äänite pysyy vain minun hallussani.
- Käytän haastatteluja vain tutkimustarkoituksessa, ja käsittelen ne luottamuksellisesti ja nimettöminä. Mikäli nimiä esiintyy äänitteellä, muutan ne peitenimiksi tekstimuotoon kirjoittaessa. Häivytän myös muut mahdolliset tunniste- ja henkilötiedot tutkimuksesta. Henkilöllisyytesi ei tule paljastumaan tutkimuksesta.
- Tutkimuksen tavoitteellinen valmistumisaika on toukokuussa 2020 ja se julkaistaan Tampereen yliopiston Trepo-julkaisuarkistossa.
- Voit keskeyttää minut missä vaiheessa tahansa haastattelun aikana.

Teema 1: Taustatiedot/Pohjustavat kysymykset

- Missä roolissa toimit ja mitkä ovat työtehtäväsi yrityksessä?
- Millaisia kirjoittamiseen liittyviä työtehtäviä sinulla on?
- Millaista kirjallista materiaalia olet tuottanut tai julkaissut yrityksessä?
- Kuinka kauan olet ollut töissä yrityksessä?

Teema 2: Termien käyttö

- Termin määritelmä: kielellinen ilmaus, jota käytetään jollakin erikoisalalla yleiskäsitteen nimityksenä
- Oletko kiinnittänyt huomiota termien käyttöön yrityksen kirjallisissa materiaaleissa? Missä materiaaleissa? Millaisia havaintoja?
- Oletko kiinnittänyt huomiota termien käyttöön ihmisten välisessä suullisessa vuorovaikutuksessa yrityksessä (esim. palaverit)? Millaisia havaintoja?
- Keskusteletko usein termeistä muiden työntekijöiden kanssa? Millaisissa tilanteissa?
- Oletko kokenut haasteita termien käyttöön liittyen? Millaisia haasteita?
- Miten olet ratkaissut mahdollisia ongelmia termien käyttöön liittyen? Yksin vai yhdessä muiden työntekijöiden kanssa?
- Kuka/Ketkä tekevät päätöksiä esimerkiksi termien valintaan liittyen?
    - Kerro lisää tilanteesta, jossa valitsitte termejä

- Onko sinulla tullut vastaan tilanteita, ettet tiedä/muista, mitä termiä käyttää?
- Mitä teet, jos et kirjoittaessasi tekstiä tiedä/muista, millä nimellä kutsua jotakin ilmiötä/ominaisuutta/laitetta/laitteen osaa/tms? Miten päätät? Miten valitset lähteet?
- Koetko yhtenäisen termien käytön olevan tarpeellista? Miksi?
- Oletko itse tai joku työkaverisi/työryhmäsi pyrkinyt käyttämään termejä yhtenäisesti? Millä keinoin? Millä osastolla työskentelevät?
- Miten realistisena koet termien käytön yhtenäistämisen yrityksessä? Miten sen voisi toteuttaa?
- Millaisia kokemuksia sinulla on tiedonkulusta ja yhteistyöstä yrityksen eri osastojen välillä?
- Olisiko tiedonkulkua eri osastojen välillä tarpeellista kehittää? Miten?

Teema 3: Termityö

- Termityön määritelmä: työ, jonka tarkoituksena on kerätä, analysoida, tallentaa, muokata tai esittää käsitteitä ja niiden nimityksiä (esimerkiksi termejä) koskevaa tietoa
- Kenen vastuulle koet termityön kuuluvan?
- Kenen pitäisi tehdä termityötä yrityksessä? Kenen pitäisi olla osallisena siinä?
- Miten termityötä pitäisi mielestäsi tehdä yrityksessä? (Esim. jatkuvasti vs. tarpeen mukaan, yksin vs. ryhmissä, miten järjestäytyneenä?)
- Oletko itse ollut tai haluaisitko olla mukana tekemässä termityötä yrityksessä? Millaisessa roolissa?
- Miten tärkeänä koet termityön tekemisen yrityksessä?

Teema 4: Yrityksen termitietokanta

- Onko yrityksen termitietokanta sinulle tuttu?
- Oletko käyttänyt yrityksen termitietokantaa? Mihin? Jos et ole, missä tilanteissa voisit kuvitella käyttäväsi sitä?
- Mitä mieltä olet yrityksen termitietokannasta? Mitä hyvää ja mitä huonoa?
- Koetko että termitietokannasta on hyötyä? Millaista hyötyä?

Lopuksi: Onko sinulla kysyttävää?