

UNIVERSITY OF JYVÄSKYLÄ

USER-FRIENDLINESS OF ENERMET OY'S
TECHNICAL DOCUMENTATION

A Pro Gradu Thesis

by

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ABSTRACT

HUMANISTINEN TIEDEKUNTA
ENGLANNIN KIELEN LAITOS

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Tutkielman tarkoituksena on selvittää, kuinka käyttäjäystävällistä suomalaisen energianmittausjärjestelmien valmistajan, Enermet Oy:n, tekninen dokumentaatio on yrityksen sisäisten käyttäjien mielestä. Päämääränä on saada selville, palveleeko dokumentaatio käyttäjien tarpeita ja kuinka helpokäyttöisiä, tarkoituksenmukaisia ja ajantasaisia dokumentit ovat. Lähtökohtana tutkimukselle on, että dokumentaatiota tarkastellaan nimenomaan käyttäjän ja hänen tarpeidensa näkökulmasta. Tutkimusten tulosten perusteella on tarkoitus kehittää Enermetin teknistä dokumentaatiota käyttäjäystävällisempään suuntaan.

Tutkielmassa esitellään käyttäjäystävälliseen tekniseen dokumentaatioon keskeisesti liittyviä käsitteitä ja vaatimuksia sekä aikaisempaa tutkimusta aiheesta. Tutkimusmenetelmänä käytettiin teemahaastattelua. Tutkimusta varten haastateltiin kuudesta eri maasta kahtatoista Enermet Oy:n työntekijää, jotka käyttävät dokumentteja säännöllisesti työssään. Haastattelutuloksia verrataan käyttäjäystävällisyyteen liitettäviin ominaisuuksiin.

Haastatteluista saatujen tulosten perusteella Enermet Oy:n tekninen dokumentaatio on melko käyttäjäystävällistä, vaikkakin parannettavaa löytyi monella osa-alueella. Vastaajien mielipiteet kuitenkin vaihtelivat kovasti, mistä voidaan päätellä, että heillä on erilaiset tiedon tarpeet. Lisäksi eri maissa on myynnissä erilaisia tuotteita, mikä vaikuttaa siihen, mitä käyttäjät dokumenteilta odottavat. Kulttuuriset tekijät nousivat myös tutkimuksessa esiin, vaikka vastaajien pienen määrän vuoksi suuria yleistyksiä kulttuurin vaikutuksesta ei voidakaan tehdä.

Enermet Oy:n teknisen dokumentaation käyttämisessä näyttäisi olevan erityisenä ongelmana dokumenttien saatavuus ja hallinta. Monet vastaajista kokivat, että dokumentit ovat vaikeasti saatavilla ja niiden versionhallinnassa on puutteita. Enermet Oy:n uuden Intranet-järjestelmän, Pingun, kuitenkin toivotaan tuovan parannusta tilanteeseen. Suurin osa vastaajista oli myös asiakkaille tarkoitetun Extranet-järjestelmän kehittämisen kannalla. Lisäksi vastaajat olivat yleisesti ottaen tyytyväisiä dokumenteissa käytettyyn kieleen sekä terminologian yhdenmukaisuuteen, mutta kuvia ja esimerkkejä halusivat monet vastaajista dokumentteihin lisättävän. Dokumenttien toivottiin myös sisältävän enemmän myyntiargumentteja sekä selitystä tuotteen arvosta asiakkaalle.

Asiasanat: document, technical documentation, documentation process, user-friendly, usability, accessibility.

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Document Type Abbreviations

FS	Fact Sheet
PD	Product Description
MIU	Manual for Installation and Use

1 Introduction

The importance of technical documentation continues to increase. As devices become more advanced technologically, the importance of documentation increases in the form of, for example, user's manuals. Documentation and its quality are especially significant in those areas of business where the correct use of devices and software has an effect on the lives of thousands of people and mistakes would thus be costly (Isohella 1998:5). Technical documentation is also related to legal issues as the product safety law requires adequate documentation to be delivered with the product. Good documentation is also an effective marketing tool, whereas poor documents are likely to alienate customers (Chisholm 1988:309).

Like Mead (1998:1) aptly puts it: "Technical documentation is not an end in itself but rather a means to an end". This end can refer to several things, for example, to allowing the document users to concentrate on the task they have to perform or to the way in which users can learn about the products or systems by reading the documentation. User-friendliness is a key concept in technical documentation, but often ignored when, for example, deadlines to produce documents are tight in organisations and resources meagre. However, the fact remains that effective, user-friendly technical documentation adds value to the product or service the company provides and can even become the value itself.

The topic of this study is the technical documentation of a Finnish energy metering company, Enermet Oy (hereafter, Enermet), which has operations in ten different countries around the world. The focus is on how user-friendly the documents are from the point of view of the user, i.e. how well they meet the users' information needs and whether the documents are easy to use and understand as regards their content, form, and the language used. More specifically, the views of the users of the documents inside the company, i.e. Enermet's marketing and sales personnel and product managers, will be examined by interviewing a selected sample of them and analysing the results.

The objective of the study, which is commissioned by the company, is to find out what could be done to improve Enermet's technical documents and the documentation process in order to serve the needs of users better.

I chose this topic for my Pro Gradu thesis as I am currently working for Enermet and in my work I deal with technical documents on a daily basis. Documents provide added value to Enermet's energy metering products and documentation is an important support function in the company. No actual user studies have been made about Enermet's documentation before so this study is going to fill a major gap in that respect.

The basis for the study is the development need of Enermet's documentation. At the moment, documents are written with Microsoft's Word, a general text-processing program, instead of a specialised documentation writing tool. In addition, there is no structured documentation management system, which would help improve the version control, updating and general manageability of the documents. When considering the implementation of a structured, modular documentation system, it is important to define the current state of the documentation as to how it serves the users' information needs. Improving documentation will in turn help sales work and reduce the number of customer service inquiries.

Although technical documents have been used for a long time as a means of providing essential information on different kinds of products and systems for their users, technical documentation is a fairly new field of study. Especially in Finland, not much research has yet been done on the topic. From the point of view of academic research, this study will contribute to the study of technical documentation. Furthermore, the existing literature on the subject is written mainly from an American point of view. However, as Enermet functions globally, my intention is to study the topic from an international point of view, taking into account also different cultural factors, which play an essential part in any writing, including technical documentation.

I will first clarify the relevant theoretical concepts from the point of view of the study and then give information about the company, its products, and its documentation. Then I will explore the concept of user-friendliness in the context of technical documentation and discuss some earlier research related to the subject. Before analysing the results, I will explain in more detail the aims and methods of the study. Finally, I shall discuss the implications of the results.

2 Overview of Documentation

In this background section, I will explain the key theoretical concepts related to documentation from the point of view of this study. Many different concepts are used in the literature with considerable overlap between them. I will make an attempt to clarify this somewhat confusing terminology. However, I do not intend to define the terms comprehensively but mainly for the purposes of this study only. The main emphasis will be on defining and discussing the concept of technical documentation.

2.1 Definitions in Documentation

According to Sprague (1995:5), a *document* is “a set of information pertaining to a topic” and has the following characteristics: a document is

- Structured for human understanding
- Represented by a variety of symbols
- Stored and handled as a unit.

Thus, a document contains the information necessary to represent an idea or a concept. A document can be presented in many forms, not only in paper format as text but also as an electronic file, photograph, or video animation. A document has no value as such, rather its value arises only from the information it conveys to the reader (Tyrväinen 1994:63).

There is a wide variety of documents in organisations, including contracts, reports, manuals and memos, to name but a few. For many industries, documents are not the actual product but by supporting the product, they generate revenue for the company (Sprague 1995:5).

The difference between the terms document and documentation is not always clear. Nevertheless, *documentation* is most often used to refer to a set of documents. Like documents, also documentation can be either printed or electronic. Documentation can also refer to the process of manufacturing the documents (Suomi 1988:8), in other words, designing their contents and producing them. Therefore, the term documentation has two meanings that are

somewhat overlapping. In this study, documentation is used in the first sense, i.e. to refer to a set of documents.

The term *technical documentation* is used when documents include technical information. Thus, it encompasses a variety of documents from computer manuals to cookbooks. What all different technical documents have in common is that they have to convey information in an understandable manner so that the user can act upon it (Donovan 2001:1). The concept of technical documentation is discussed in more detail in chapter 2.3.

Product documentation usually refers to the documentation that is delivered to the user along with the product (Isohella 2001). However, product documentation can also be used to refer to marketing material (Lahti 2000:8) that is not necessarily delivered at the same time with the product.

User documentation is often used to refer to material that is delivered with the product and intended to assist in using the product or service. It can also include training material related to the product. Weiss (1991:4) defines user documentation as a set of information products that help users “get full benefit from the system”. The information products can include manuals, training materials, and online help.

Customer documentation includes all the documentation meant for the customer. Tyrväinen (1994:62) describes customer documentation as “the most elegant part of the product documentation”. In addition to technical documents, customer documentation can include marketing material or even training material.

Nowadays the term *information design* is sometimes used instead of customer or user documentation to refer to information products related to technical devices or systems and the design and manufacturing of these information products. The term is useful in the sense that it emphasises the fact that the presentation of information, including graphic design, is designed instead of

only writing the documents. However, the term can be somewhat ambiguous, as information design can also be used to refer to the way information is presented on page or screen (Redish 2000:2), not to the whole process of designing the information for users.

Most of the types of documentation mentioned above are in use at Enermet, too. Technical documentation intended for users at Enermet is most often referred to as customer documentation, and the terms user documentation, product documentation and information design are not used as such. However, in the context of Enermet, the term customer documentation could in principle be replaced with the term information design, for example.

2.2 Summary of Documentation Concepts

For the purposes of this study, I have gathered the concepts related to documentation to the following figure. They are presented in the context of an organisation such as Enermet and the figure is intended to help the reader understand the relationship of the concepts in relation to the study. The user groups of documents can be either internal (within the company) or external (e.g. customers).

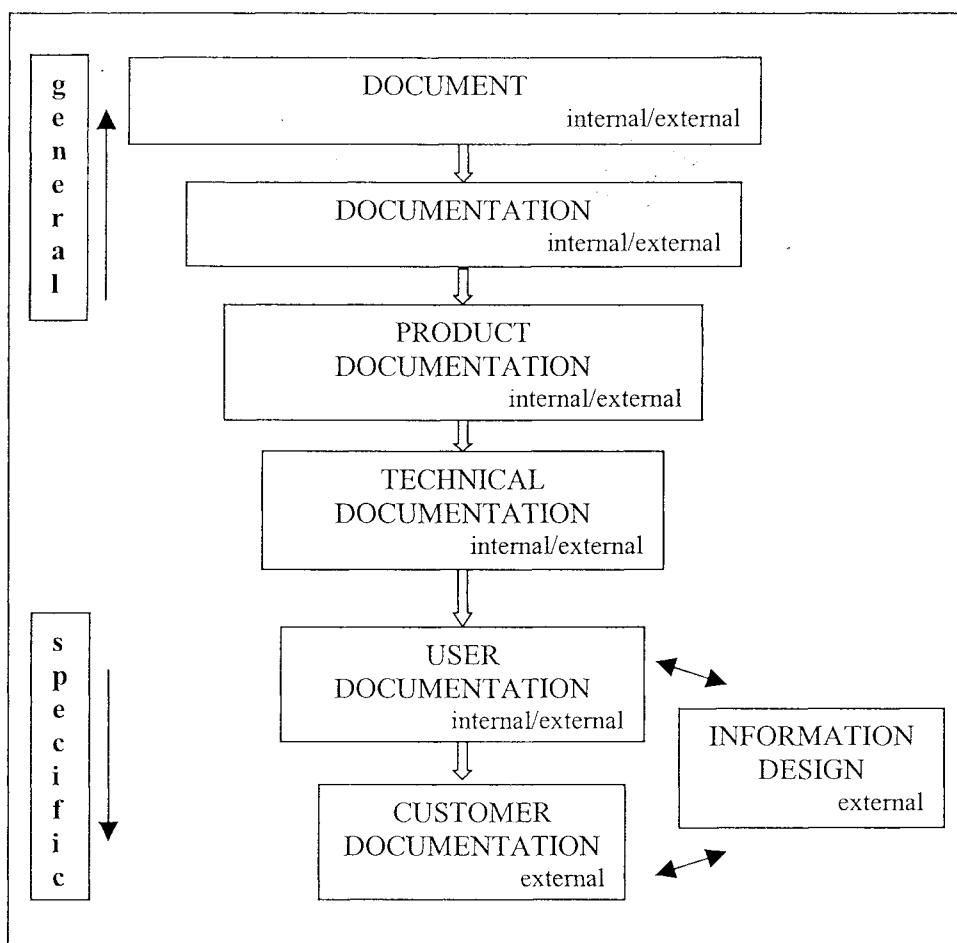


Figure 1. The theoretical terms related to documentation used in the study.

In Figure 1 the document is presented first since it is the most general concept. As explained in chapter 2.1, there is a great variety of documents, so the concept is not tied to any specific context. Documentation is an extension of a document, as it can refer to either a set of documents or the manufacturing of documents. Product documentation gives information about specific products and it can be either technical information related to the use of the product or marketing material intended for sales purposes. Technical documentation, which is the focus of this study, gives information about the product from the technical point of view including instructions for using the product and technical specifications, among other things. User documentation consists of a more limited set of documents, as it includes only those documents that are related to the use of the products and therefore, it does not include any general descriptions. Customer documentation is intended for customers only, although in many organisations customer documents are used inside the

company as well. Yet, their main purpose is to give information to the customer. Customer documentation can be considered to encompass all communication to the customer in the form of documents, not just technical information or instructions for use. The term information design is often used instead of customer or user documentation but its meaning can vary in different contexts.

2.3 Technical Documentation Defined for the Purposes of the Study

Technical documents describe the structure and functionality of a certain technical target, which can, for example, be a device, system, or a factory (Heimbürger 1993:18). Technical documents cannot be separated from the product they are related to. Thus, they are an essential part of the product and have no value on their own. The main function of technical writing and thus also of technical documentation is to accommodate technology to users (Dobrin 1996:110).

According to Haramundanis (1998:1), technical documentation can refer to both the production of technical documents and the result of that production, i.e. a set of technical documents. She goes on to define technical documentation as “any written material about computers that is based on fact, organised on scientific and logical principles, and written for a specific purpose” (Haramundanis 1998:1). However, in my view it is not relevant to limit technical documentation exclusively to computers and to written materials, as there are other technical devices besides computers and there can also be multimedia presentations in addition to written material, for example. What is more, I think it is worth emphasising that when writing technical documents one has to have a specific audience in mind to whom to write. Therefore, for the purposes of this study, by combining the definitions of Heimbürger and Haramundanis and by adding something of my own, I will define technical documentation as follows:

Technical documentation refers to any material describing the structure and functionality of a technical target, such as a device or a system, which is based on fact and written for a specific purpose and to a specific audience.

Technical documentation can either be in printed form or electronic material on a CD-ROM or in an online environment. Furthermore, the users' knowledge level about the target of the documentation often varies, with users ranging from novices to experts.

Haramundanis (1998:2) states that sometimes the term technical documentation is also used to refer to all kinds of documents related to the product, such as parts lists, engineering drawings and product specifications. However, in her view a more suitable term for this kind of documentation is engineering documentation, instead of technical documentation. This division would indeed clarify the terminology as then technical documentation could be more exclusively used to refer to user manuals and other information relevant to the user.

2.3.1 Types of Technical Documents

One way of dividing technical documents is presented by Haramundanis (1998:2) who classifies them in three categories: marketing materials, materials that report, and instructional materials. Marketing materials are intended to persuade, whereas materials that report state the facts neutrally. Instructional materials are meant to instruct and train (Haramundanis 1998:2). This tripartite division coincides well with Enermet's documentation so that the Fact Sheet and the Presentation represent marketing materials, the Product Description belongs mainly to the category of reporting materials, whereas the Manual for Installation and Use is clearly an instructional material. More information on the document types at Enermet is given in chapter 3.2.2.

3 Enermet, Its Products and Documents

In this chapter I will briefly introduce Enermet and its operations. I will also describe the products it sells and the way its documentation related to the products is organised and the kind of documents it produces.

3.1 The Company and Its Products

Enermet was founded in 1948 as part of Valtion Metallitehtaat. Later on, it became part of the IVO Group and nowadays the main shareholders of Enermet Group are the Industri Kapital 1994 fund, Leonia MB fund, and Fortum Group. It is one of the world's leading suppliers of energy metering systems. Enermet specialises in developing and manufacturing comprehensive systems for the metering of energy, the control of its use, and the refinement and management of metering data. The company also provides its customers with metering data services for electricity, district heating and cooling, gas and water. Enermet's customers include energy companies, industry, individual real estates, and real estate companies. (*Enermet as a partner.*)

Enermet operates in ten different countries around the world: Australia, Czech Republic, Denmark, Finland, Germany, the Netherlands, New Zealand, Norway, Sweden, and Switzerland. In addition, the company has representatives elsewhere in Europe, North America, Asia and Africa, which makes its products and solutions available in altogether 30 countries worldwide. The biggest market area is the Nordic countries, which make up almost 50 per cent of the market share. Central Europe is the second largest market area for Enermet and its importance is continuously increasing. Australasia is the third largest market area. Enermet employs approximately 400 people, of which the great majority works in Jyskä, Finland, where the research and development and production are located. The local companies abroad are sales companies responsible for marketing the products and solutions in the countries in question. (<http://www.enermet.com>, 2002.)

When the interviews were conducted for this study (December, 2001 – February, 2002), Enermet’s operations were divided differently than they are now, at the moment of writing. At that time, there were three business lines, Metering Devices, Systems and Services, and Production and Logistics. Since then, Enermet has renewed its organisation to be a functional line organisation. However, I will explain the division as it was at the time of the interviews, as that is the period relevant for this study.

The purpose of Metering Devices was to design and market energy meters for measuring electricity and heat energy, and devices for the gathering and transfer of metering data. The meters can be used as stand-alone devices or as part of a more extensive energy metering system.

The Systems and Services business line was responsible for designing customised metering information systems. These systems provide solutions for remote meter reading applications. The solutions include software, communication solutions and system integration. The main product is the Avalon data gathering system. Comprehensive metering services are also provided for customers, including the metering equipment as well as mass reading, consulting and billing services.

The purpose of the third business line, Production and Logistics, was to manage and develop the order-delivery logistics chain in co-operation with external partner companies.

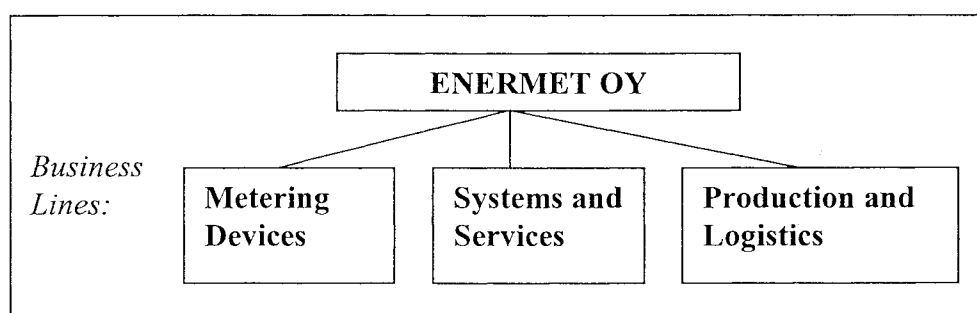


Figure 2. The structure of Enermet Oy in February, 2002 (at the time of the interviews).

3.2 Enermet's Customer Documentation

The documentation of Enermet was at the time of the interviews organised so that it was produced in the Sales and Marketing department, which was part of the Metering Devices business line and responsible for marketing communications. Nowadays customer documentation is produced in the new Marketing department, as sales and marketing are now handled in different departments. There are currently two technical writers who design and write the documents and organise their localisation. Earlier on, an external documentation company was also used to write some of the documents, but at the moment all documents are written by Enermet's own technical writers.

3.2.1 Documentation Process

The documentation process itself is often a long one. The process starts when the product development process is only at an early stage, when the product specifications are created and the budget for the product is made. The technical writer decides together with the project manager and the product manager what documents will be needed for any particular product, also in which languages and when they are needed. In addition, they estimate the cost of producing the documents at this stage. However, no actual specifications are written about the contents of the documents. The document types that are created of most products are the Fact Sheet (hereafter, FS), the Product Description (PD) and the Manual for Installation and Use (MIU). See chapter 3.2.2 for more information on the document types. Often a PowerPoint presentation is also made, but for that there is no such clearly defined structure as there is for the other three document types.

When a decision has been made concerning which documents are needed, it is time for the technical writer to start gathering information for writing a first draft of the document. The technical writer co-operates intensively with the project and product managers and other technical experts on the subject during the writing. The writer always writes the documents in English, regardless of where the product is to be sold. No specific documentation tool is used in writing, the documents are written with Microsoft's Word text processing

program. Usually the FS is written first since that is the document that is needed for sales purposes as soon as the product goes to the market. If a formal launch is organised for the product, not only the FS, but also the PD and the Presentation have to be ready before the launch. The MIU is needed either when the product goes to testing, or at the latest when the first devices are delivered to the customer.

The project manager always checks the documents before they are approved. In the case of the FS and the PD, an approval from the product manager is also needed. Usually the technical writer writes the documents in small portions, so that s/he gets feedback regularly about them from the project manager. There is no formal procedure for testing the documents, however, and only the writer who has produced the document usually tests them. Yet, the possible linguistic ambiguities in the documents are exposed during the translation process, so from the linguistic point of view the documents are tested while translating them from English into Finnish or some other language.

When the document has been officially approved, it has to be localised to suit the needs of different language and market areas. In most cases, an external company specialised in localisation and translation takes care of the localisation. Earlier on most of the local companies handled the localisation and translation of the documents themselves but now the aim is to do it in a centralised manner, so that the technical writer in Finland arranges the localisation of all documents. However, often there is a contact person in the local Enermet company, to whom all inquiries from the localisation company regarding the terminology in the documents can be directed. If there is not, the technical writer in Finland will respond to the inquiries. When the document has been localised, it is sent to the local Enermet company to be checked.

For internal purposes of use, the documents are stored in the Product Data Bank, located in an Intranet system called Pingu. All the approved customer documents go to the Product Data Bank, which, in addition to customer documents, includes a Change Log where all the changes in the documents

and information about new documents are recorded. The document files are in PDF format with only the latest version of the document available in the Product Data Bank. Pingu is a new system and the aim is to develop it further so that it would include more information in future, not just customer documents. At the moment it is not very easy to use because, for example, it is often difficult to locate the document you are looking for, as there are no search functions available. It is also a problem that not all local companies have Pingu available yet, so the documents have to be sent to them separately via e-mail. However, Pingu should become available in all Enermet companies in the near future.

Enermet's present customer documentation process is summarised in the following figure with each phase presented with the outputs of that phase and the required participants.

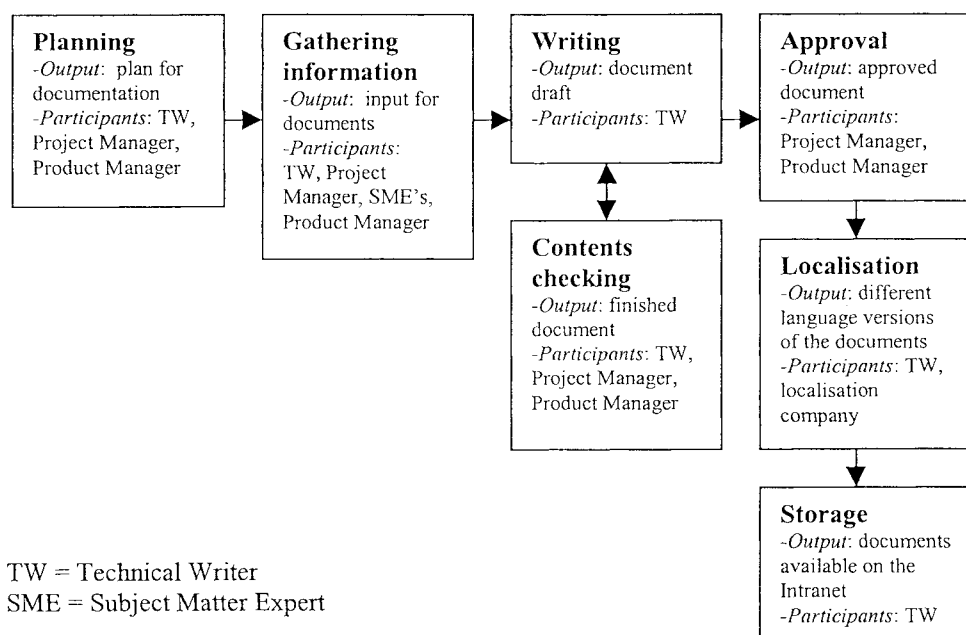


Figure 3. Enermet's customer documentation process.

In general, the documentation process works reasonably well. It is flexible and the close co-operation between technical writers and project managers has produced good results. Also, the fact that the technical writers write the documents from the beginning to the end themselves, and not just edit the text written by others, has proven effective. However, there is still a lot that could

be improved. For example, as mentioned above, there is a lack of testing of the documents and no formal procedure for reviewing the documents. Although there are distinct document types and a structure for each of them, no documentation specifications that would facilitate the designing and writing of the documents are written at the beginning of the documentation process for each product. Furthermore, without specific documentation tools, the version control and management of the documents are somewhat cumbersome and ineffective.

3.2.2 Document Types

The division into four document types (the Fact Sheet, the Product Description, the Manual for Installation and Use, and the Presentation) was developed at Enermet a couple of years ago. The structure of the documents has taken shape over the past few years and its development is still not over. For example, the Presentation does not yet have a clearly defined structure.

The FS is mainly a sales document and only two pages long. Its purpose is to introduce the device or system to the customer, so that it attracts the attention of the customer. Therefore, it should contain sales arguments and explain the value of the product to the customer in simple terms. It usually gives a list of the features of the product, but it is not supposed to include too much technical information. If the writer chooses to include technical features in the FS, their benefit should be explained to the customer, not just to have a list of them. The FS usually includes a picture of the product and at the end of the document a summary of the technical details. Enermet's sales people normally give the FS to the customer when the customer makes the first inquiry about the product.

The PD is a combination of a sales document and technical document. It is used for sales and support purposes within Enermet, but it is also given to the customers when a deal is being made. The PD describes the product in more detail than the FS, but it does not give actual instructions for use. It gives information about different versions and delivery packages, for example,

which is needed when the customer wants to place an order. The PD also explains the basic functionality of the product.

The MIU is a document that is not supposed to include any sales arguments or give a description of the product, rather its purpose is to help the user to install and use the product in a real situation. Thus, it is usually delivered to the customer with the device or system. The main focus of the MIU is to give instructions regarding the tasks to be performed, so the language is straightforward and simple. The MIU also includes a section called Troubleshooting, which gives information regarding what to do if something goes wrong when the user tries to install or use the product. This document is intended mainly for customers, but it is also sometimes used within the company for support, among other things.

The Presentation has the same aim as the FS, to introduce the product to the customer who has shown interest in it. Thus, it includes sales arguments, but it also gives facts about the product. The Presentation is also used in training.

The following table summarises the characteristics of the four different document types currently used at Enermet.

Table 1. Enermet's document types.

<i>Document type</i>	<i>Main purpose</i>	<i>Contents</i>
Fact Sheet	To attract the customer's attention to the product	Sales arguments Value for the customer
Product Description	To give exact information about the product	Description of different parts of the product Description of the most important functions
Manual for Installation and Use	To assist the end user in using the product	Product facts Explanation of concrete features Instructions Troubleshooting
Presentation	To present the product to the customer	Sales arguments Value for the customer Product facts

3.2.3 Use of Technical Documents

The main function of Enermet's technical documents is to provide information for the customers. There are actually two phases in which customers need information in the form of documentation. First, they need the documents when they are planning on buying Enermet's products or systems and want to learn about their features. Secondly, after the customers have purchased the product, especially if they are new to the product, the documents provide them with necessary information on installing and using the product.

Customers have traditionally received their copy of documentation on paper, but nowadays they get them more and more frequently by electronic mail as PDF files. There are also plans of creating an Extranet, an online environment in which the documents would be available with restricted access, in the future. This Extranet would most likely improve the availability of the documents for the customers, which so far has been somewhat problematic, and reduce the need for printed documentation.

In addition to customers, there is another important user group of Enermet's technical documents, i.e. people within Enermet, which is also the target group of the present study. The documents provide information for employees in many different positions, e.g. in marketing, product management and support. Especially in the local companies abroad, the documents are an important source of information about the products, as there is no such a close and direct contact to product development as there is in Finland.

4 User-friendly Technical Documentation

In this chapter, I will explain the concept of user-friendly documentation as I define it for the purposes of this study. I will also discuss related concepts, such as usability, user orientation, and accessibility.

4.1 *User-friendliness as a Concept*

In short, the general meaning of user-friendliness refers to the ease of use and the appropriateness of a product from the point of view of the user. The concept has often been used in connection with designing graphical user interfaces, in particular. User-friendliness is a term that has, however, suffered from over-use and thus lost much of its meaning (Borgman 1987:29). Nielsen (1993:23) even considers the term old-fashioned and inappropriate, when applied to computer systems and devices, and argues that “users don’t need machines to be friendly to them, they just need machines that will not stand in their way when they try to get their work done”. Nevertheless, I have chosen user-friendliness as the starting point of this study as it is a many-sided concept that, when applied to documentation, can refer to the language, visual layout, order of presentation, and even the availability of documentation, among other things.

The dictionary definitions of user-friendliness also emphasise the ease of use. Longman Dictionary of Contemporary English (1987:1162) defines user-friendly as “easy to operate or understand; not needing special training”. Furthermore, the Oxford dictionary foregrounds the ease of use for novices, in particular, by defining user-friendly as “easy for non-experts to use; not difficult or intimidating” (Oxford Advanced Learner’s Dictionary of Current English 1989:1407).

Christine Borgman (1987) discusses the concept of user-friendliness from a psychological perspective and states that the most important characteristic of a user-friendly system is its transparency. That is, if the user does not have to focus on using the system itself but can operate it by “looking through the

system to the task being accomplished” (Borgman 1987:30), the system is transparent and thus user-friendly. Thus, the system supports the task instead of becoming the task itself. Borgman (1987:36) also states that a transparent system is “congruent with the user’s thinking style and workflow”. In consequence, the system functions appropriately from the user’s point of view.

4.2 User-orientation

User-orientation is the near-synonym of the concept of user-friendliness. In fact, it is difficult to point out how these two concepts differ from each other. In user-oriented documentation, “the function that is being documented must be organised into the terminology and task sequences that its users already understand or can readily grasp after brief training” (Ramey 1988:150). Thus, as in the case of user-friendliness, user-orientation also emphasises the ease of use and understanding. Barfield (1993) contrasts user-oriented models with device-oriented and designer-oriented models and states that user-oriented models provide the users with more possibilities of exercising their creativity when using a system or a product than device-oriented or designer-oriented models. Thus, when the documents have been written from the user’s point of view, they can be regarded as user-oriented and also user-friendly.

4.3 Usability

The concept of usability is most often used in connection with user interfaces but it is also essential in technical documentation. Usability is the ease with which the user can use the product, system, or document. In the context of documentation, it can refer to both printed and online material. According to Haramundanis (1998:5), the organisation of information is one of the key issues in document usability, i.e. information should be organised so that the reader is able to understand the information quickly. This view is corroborated by Atlas (1992:139) whose criterion of usable documents is that the reader can “find and use the instructions quickly, easily and without error”. An additional requirement for usable documentation is that it enables users to perform the tasks they want with the equipment (Gleason and Wackerman 1992:131). This

refers to the appropriateness of documentation, which is also emphasised by Weiss (1988:177) who states that documents have to contain the right material for the right audience; otherwise they are of no use.

Nielsen (1993:26) lists the main attributes of usability as follows: learnability, efficiency, memorability, errors, and satisfaction. Learnability means that the system is easy to learn. Efficiency refers to maintaining a high level of productivity when using the system, whereas memorability refers to how easy the system is to remember. The system should also enable fast recovery from errors and it should be pleasant to use. (Nielsen 1993:26.) These attributes can also be effectively applied to technical documentation, so that, for example, the documentation is easy to learn if the user learns quickly how the information is organised.

Usability is also closely related to user-friendliness and these are often used in similar contexts. For example, Weiss (1991) uses the terms usability and user-friendliness interchangeably when referring to the ease of use of systems and products. According to Wright (1994:10-12), the concept of usability lacks precision and has a very slippery meaning, by which she means that usability has not been defined sufficiently precisely in the literature. The same claim could also be made about the concept of user-friendliness.

The usability of documents is usually determined by usability tests. A usability test is a systematic way to gather reliable data about the usefulness of a product or a document (Weiss 1991:160). There are several methods for testing usability, ranging from laboratory tests to observations in the field. Usability testing is an important part of document design but unfortunately it is often neglected in companies. It requires more resources and money than most companies are prepared to invest (Haselkorn 1988:5). According to De Jong and van der Poort (1994:229), if companies do not invest in testing of important documents, they “are insufficiently committed to the quality of their documentation for the intended users and tasks”. One of the benefits of usability testing is that it not only improves the quality of the document that is

being tested, but also “helps to establish guidelines which will enhance the effectiveness of every generation of documentation to follow” (Debs 1988:11). Thus, in the long run, the quality of documents and documentation processes is likely to improve as a consequence of usability testing.

4.4 Requirements of User-friendly Technical Documentation

User-friendliness is one of the most important characteristics of effective technical documentation since often the users of products are not technical experts of the area in question, but ordinary consumers using the product for the first time. When complex systems are used, the documentation has to be as easy for the user to understand as possible, without, however, oversimplifying things.

One of the prerequisites for user-friendly documentation is knowing the intended audience of the documentation and the tasks they need to perform. When writing technical documents, one has to understand the users' needs for information and find out what users expect from the documents. The users' background and experience have to be taken into account when planning the contents of documents. For example, a non-technical audience requires more background information to be included than a technical audience (Savakinas 1992:9). The knowledge about the audience is also imperative in the case of Enermet's documentation. It is difficult to produce effective and user-friendly documentation if no knowledge exists about the intended audience. Of course, users often differ in many respects; they are likely to have different educational levels, job experience, and attitudes, for example. Then it is up to the technical writer to decide whether to attempt writing for an average reader or focus on a specific target audience. Furthermore, the purposes the documents are used are likely to vary, which provides an additional challenge for the documentation.

In relation to technical documentation, user-friendliness refers generally to the ease of use of the documentation. However, the ease of use is only one aspect of user-friendliness in my view, so for the purposes of this study, I have

defined the concept of user-friendliness in technical documentation so that it corresponds with the characteristics presented in the following figure.

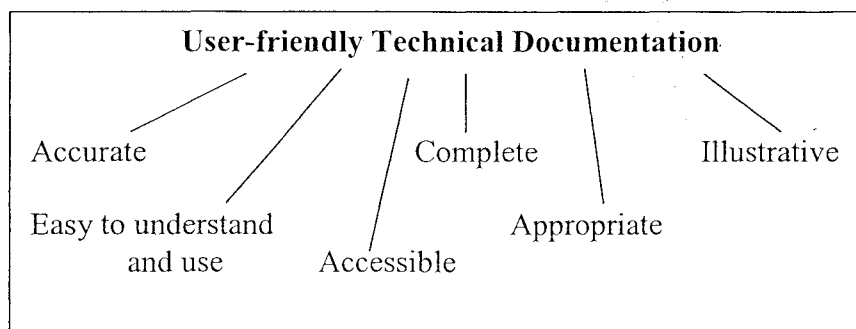


Figure 4. Characteristics of user-friendly technical documentation in this study.

Accuracy refers to the correctness of information in the documents. There are no errors or mistakes that would confuse the reader (Haramundanis 1998:4). Ease of understanding and use refers to the way the documents are used, including the availability of the documents. For example, how easy it is to find the correct document and whether the document is delivered on time and in an appropriate format to the users. Accessibility in this context refers to the ease of finding information in the documents. A complete document includes all the relevant information, whereas an appropriate document fulfils the user's information needs. An illustrative document provides examples and graphical representation to help users understand the information. These characteristics are to some extent overlapping since, for example, an accessible document is also easy to use. Nevertheless, each of the qualities is essential to the definition of user-friendliness.

Weiss (1991:18-19) presents criteria for effective documentation that are similar to my definition of user-friendliness. In his view, the four requirements are availability, suitability, accessibility and readability. By availability he refers to the existence of documents. Suitability is close to appropriateness, i.e. how well the documentation suits the user's needs. In defining accessibility, Weiss emphasises the fact that documents need to be task-oriented so that users' tasks are the starting point for the documentation. Readability refers to the ease of understanding of the documents. (Weiss 1991:18-19.)

In order to be user-friendly, documents should be free of errors. According to Weiss (1991:20), errors can occur on three different levels in technical documentation: strategic, structural, and tactical. Strategic errors are failures in planning and analysis and due to poor definition of audiences or tasks, for example. Structural errors include failures in design and modelling. These are due to insufficient outlining and lack of reviewing of the documents. Tactical errors have to do with editing and revision and include, for example, errors in grammar and spelling, and careless inconsistencies. (Weiss 1991:20-21.) Of these three levels, errors on the strategic level cause the biggest problems from the point of view of user-friendliness. Thus, a document cannot be user-friendly if it is written for the wrong audience, for example.

The benefits of usable or user-friendly documentation are, according to Spencer (1996:74), the following:

- Users are able to understand the document's functions, such as the table of contents, chapters and glossary, more easily and do not become confused by unrecognisable components.
- Users can quickly find what they are looking for in the documentation.
- Users get help from the documentation for completing a task.
- Users are able to work efficiently thanks to the documentation.
- Users also "feel empowered by good documentation" and feel that it equips them with proper tools for doing tasks. (Spencer 1996:74.)

In addition, according to Roberts (2001:91), "user-friendly products make users feel good about themselves, the product and the company". Thus, they help promote a positive image.

However, when users do not experience the benefits of user-friendly documentation, many problems are likely to arise. Spencer mentions the following problems (1996:74):

- Users find it hard to understand what the documentation contains.

- Users may be unable to discover the full potential of the documentation and only use some parts of it.
- If the layout of documentation is inconsistent, users cannot immediately know where to find particular information and they have to decode the documentation first.
- If the documents use different words for the same object or activity, users become confused when they do not know whether the words refer to the same object/activity or not.
- If different types of documentation are used for the same purpose, it is also likely to cause confusion in the users. (Spencer 1996:74.)

Thus, for documentation to be effective and fulfil the needs of document users, the requirements of user-friendliness mentioned above need to be taken into account when designing and writing the documents.

4.4.1 Illustrations and User-friendliness

Illustrations bring more liveliness to documents and also make the document more user-friendly by aiding the understanding of complex issues. Illustrations can convey ideas that are difficult to get across in words (Haramundanis 1998:119). However, despite their advantages, illustrations, as Westendorp (1994:43) points out, are often regarded as secondary to text and they are usually added to documents only after the text has already been written. One explanation for the lack of illustrations is given by Lewis (1988:235) who states that technical writers often lack skills in visualisation and knowledge about methods of visual communication. Thus, it would be beneficial for technical writers to develop skills in visualisation.

Weiss (1991:102) recommends using illustrations (or exhibits, as he calls them) to reinforce the text by overlapping with the text, not supplementing it. Redundancy is in Weiss' view "absolutely necessary to ensure effective communication" (1991:102). Lewis (1988:238) adds that illustrations are especially useful in hardware documentation when assembly tasks are described. Pictures can also increase reader motivation (Lewis 1988:244).

However, Wright (1994:18) claims that some readers ignore graphics and other ancillary materials in the documents, as departing from the text often disrupt the process of understanding. This claim may be true to a limited extent but the advantages of using illustrations in my view override such concerns.

4.4.2 Accessibility and User-friendliness

Accessibility, which refers to the ease of finding information, is an essential requirement for user-friendly documentation. If the document is not accessible, users may easily get frustrated as they cannot find the information they need. The effort required from the user to find information in a document is called the document overhead (Weiss 1988:178). If there is a lot of overhead in a document, the user has to jump from page to page to find the information s/he is looking for. Repetition reduces the overhead and the need for page-flipping, yet it can also cause maintenance problems as the same text has to be updated in several places (Weiss 1988:181). Due to this maintenance problem, Haramundanis (1998:64) warns against duplicating information in documents stating that it is frustrating for the reader to find conflicting information on the same product. However, Schriver (1997:413) suggests that the more difficult the topic, the more worthwhile it is to use redundancy in documents. Nevertheless, it can sometimes be difficult to find the right balance between user-friendliness and the requirements of document maintenance.

Accessibility is an important aspect of user-friendly documentation also in the sense that users hardly ever read the document from cover to cover. Instead, they are likely to search only for specific information in the documents and therefore, it is essential that information can be found easily by using, for example, what de Jong and van der Poort (1994:236) call access aids, i.e. features to help locating information, such as the table of contents and an index.

4.4.3 Providing Examples

Like illustrations, examples can make complex issues easier to understand. Good examples often clarify instructions and are part of a user-friendly approach to technical documentation. Nielsen (1993:152) mentions as one of the benefits of examples the fact that users can modify them for their own needs and do not have to read so much explanatory text. In fact, in a study by LeFevre and Dixon (1986), the respondents preferred using examples when trying to perform a task instead of reading the instructions. The respondents seemed to consider examples more useful and important than instructions, and they disregarded the instructions when examples were provided. Consequently, LeFevre and Dixon (1986:29) recommend that when the instructions include important information for the reader, examples should not be used because they may direct the reader's attention away from the actual instructions. Thus, some kind of balance between providing examples and instructions should be sought.

4.4.4 Cultural Issues

Cultural diversity often poses a challenge to writing user-friendly technical documents. Particularly when the audience of the documentation consists of different nationalities, as is the case with Enermet, cultural issues need to be taken into account. Not only can culture influence the way readers perceive the text and graphics, but also their needs and expectations for the documents are likely to be affected by cultural factors. Warren (1994:178) illustrates this by stating that the amount of context expected by the reader can vary significantly in different cultures and, for example, Americans do not want to read any more than they have to in order to perform a task, whereas German readers may read the whole document before doing anything. Therefore, different approaches should be used for these different audiences.

In addition, different styles of writing are preferred in different countries. An example is given by Hoft (1995:76) who states that French readers often regard American documentation as excessively repetitive. However, individual differences can sometimes override cultural aspects (Thrush 1997:165), so

document users from the same culture do not necessarily regard the same things as important, for example. Furthermore, as a consequence of different cultural backgrounds, people also have different learning styles (Sanderlin 1992:142).

Kirkman (1988:345) points out an important aspect of writing for international audiences, namely that the text has to be understandable for both native and non-native speakers of English if it is not to be translated. Thus, as regards the language, the document has to be appropriate for the whole audience. This can be achieved by using, for example, simple sentence structures and vocabulary. Making the language easily comprehensible will also facilitate the translating process.

Adapting a document for use in a specific target country or market is called localisation (Hoft 1995:11). Localisation helps overcome cultural differences. It is not just translating the text but adapting the whole document to suit the needs of a particular culture. Another related concept is internationalisation, which refers to making the product enough generic to accept different cultural contexts (Hoft 1995:18). In the case of documentation, this means that the document has both core information, which is common to all users, and international variables, which are culturally dependent information that needs to be localised (Hoft 1995:18). Keeping these two types of information separate reduces the need for extensive localisation. To minimise localisation even further, documents can be globalised so that they are appropriate for several countries without having to make modifications. Thus, if the globalisation is done carefully, there is no need to localise the documents as they are suitable for different cultures as such. However, as Hoft (1995:25) points out, making information products truly global requires a lot of skill and effort.

5 Previous Research on Technical Documentation

Technical documentation is a fairly new field of study and research on issues of user-friendliness, in particular, is limited. In this chapter I will present some examples of recent studies that have been made in the areas of technical documentation related to this study. As can be seen from the studies, it is possible to use different kinds of methods and approaches when studying technical documentation. The studies in question have used interviews, observation, and questionnaires as research methods. What these three studies have in common is that all of them have examined technical documentation from the users' point of view with their needs as the starting point, which is also the aim of the present study.

5.1 *Research on User-friendliness*

The user-friendliness of technical documentation has not been studied much. The majority of the studies are case studies, so their results can be generalised only to a limited degree. Nevertheless, they serve as useful examples. One of these studies is a Pro Gradu thesis by Suvi Isohella (1998), in which she examines the technical documentation in a Finnish company by interviewing customers who use the documentation in their work. She uses the Finnish term *käyttäjälähtöisyys* which can be regarded as meaning the same as the term user-friendliness although its literal meaning would be something like user-based. Isohella found that the technical documentation of the company in question is, in general, user-friendly, particularly as regards its appropriateness and ease of understanding. She also pointed out in her study that factors influencing the user-friendliness of software documentation include such personal factors as the occupation of the persons using the documentation, computer skills, personal attitude, and reading habits (Isohella 1998:4). Thus, it can be concluded from this study that it is not only the characteristics of the documents that contribute to the perceived user-friendliness of the documents, but the whole process of interaction between the document and the user also has an effect. Some personal factors can be taken into account when designing and writing the documents in order to make them more user-friendly, but not

all. For example, the users' personal attitudes can be difficult to find out even by means of a study as they are subjective and it may not be possible to make generalisations of them.

Furthermore, Isohella (1998:93) suggests in her study that using customer-specific documentation seems to have made the documents more user-friendly in this case. This suggestion is based on the findings according to which the respondents found the customer-specific documents appropriate, easy to use and consistent, whereas if the documentation would not have been tailored customer-specifically, the factors that the respondents appreciated in the documents would have been missing, such as pictures of the customer's own system. (Isohella 1998:93.)

5.2 *Research on Usability*

Another study that is worth mentioning in this context deals with the efficiency of documentation. Maria Lahti (2000) examined software user documentation and evaluated its efficiency by using communication theories, such as Grice's maxims, in her Pro Gradu thesis. These four maxims of quantity, quality, relation and manner are intended to explain how the exchange of meanings in conversation is possible. Lahti conducted a usability test by observing test users performing tasks with different software with the help of documents, both online and printed. She then analysed the situations that had posed problems for the users by using the Gricean maxims. Lahti's conclusion was that these maxims help to interpret problems faced by the users, but not all of the problems can be explained with the maxims. Some of them were due to the conflict between the test users' internal mental models and the documentation. That is, conceptions of what the parts of a system are and what kind of causal relations there are vary from user to user and have an effect on how users relate to the documentation. As users function in accordance with their own mental models and expect to find some information, for example, under a specific term but they cannot find it there, it is often difficult for them to get around this problem and start using another term. (Lahti 2000.)

The biggest problem that was evident in Lahti's study for the test users concerned breaking the maxim of quantity. If the amount of information was not adequate, or there was too much information, it was difficult for the test user to interpret the information. (Lahti 2000:129.)

Lahti's study is of particular interest as it shows how mental models and individual differences play a part in document usability. What the study has in common with Isohella's study is that both found personal factors to be of relevance when evaluating the usefulness of documents for users. Thus, individuals may relate to documents in different ways and what is user-friendly and usable for one, may not be that to the other.

5.3 Research on Accessibility

Another kind of approach to studying technical documentation from the user's point of view was adopted by Inger Lassen (1997). She studied how accessible and acceptable readers find texts which have a high frequency of syntactically and morphologically complex constructions. Lassen uses the term accessibility in a somewhat different meaning than in the present study, as she refers to accessibility as the "ease of understanding or comprehension due to the style of writing" (Lassen 1997:36), whereas I use it in this study to refer to the ease of finding information. In Lassen's study, an acceptable text is one that is accepted by the reader as good, appropriate, and useful (Lassen 1997:37).

For the study, Lassen had selected technical texts that included grammatical metaphors and rewritten versions of them that used more simple constructions. For example, these more simple texts were written in the active voice instead of the passive. Then she conducted a survey to find out whether the respondents found the simple texts more accessible and acceptable than the complex ones. The results were somewhat contradictory since some readers preferred the texts with grammatical metaphors whereas others preferred the more simple versions. However, what is interesting to note is that the respondents' occupation and knowledge of the genre had an effect on the

choice of style. For example, those who were not at all familiar with the genre of technical documentation preferred the texts without grammatical metaphors whereas the opinions of those who had previous knowledge of the genre varied a good deal. Thus, it becomes evident from this study as well as from the first two that personal factors are indeed influential when users form opinions on technical documentation.

However, what is problematic in the studies summarised above is that cultural factors have not been taken into account to a great extent. For example, the respondents in Lassen's study consisted of both British and Danish respondents but no conclusions are made about how culture possibly explains some of the differences between the responses of these two groups. Instead, explanations are sought only from the respondents' backgrounds, that is, their occupational group.

6 Aims and Methods of the Study

In this chapter I will explain the aims of this study and the methods that will be used to achieve these aims. I will also briefly introduce the method of the semi-structured interview. In addition, I will explain how the interviews were conducted and who the interviewees are.

6.1 *Aims of the Study*

Technical documentation can be studied from several different points of view, either from the point of view of the organisation, technical writer, documentation system, target audience, or the document itself, among others. In this study, I will examine documentation from the user's point of view because the views of the users are essential when trying to improve documentation. Furthermore, I have chosen user-friendliness as the starting point for this study, so I intend to find out how user-friendly Enermet's technical documents are.

The following goals help to clarify the overall theme of user-friendliness. First of all, the study aims at examining whether the current documentation of Enermet serves the users' needs. In order to develop documentation, it is important to hear from the users themselves which areas of documentation they think need to be improved and how the documents could be of more use to them. With this first-hand knowledge, it is easier for the technical writers to adapt their writing to the needs of the users by including information they need in the documents and leaving out information they do not need, for example. Thus, I will interview Enermet's employees who use the documents on a regular basis. Their views will then be compared with the research literature on the user-friendliness of documentation. This also includes discovering the ways in which the users use the documents, i.e. to what purposes they use the documents, what kind of information they look for in the documents and what kind of information needs they expect the documents to fill.

The second aim has to do with the content and form of the documents, i.e. how easy to use and understand the documents are and whether the information is relevant and up-to-date. This also includes the issue of document availability. In addition, the study will examine whether the current division of the documents into different types at Enermet is appropriate from the user's point of view.

The purpose is to analyse the results of the study in detail by taking into account not only the overall opinions of the respondents, but also individual comments made by the respondents. This is because a more detailed analysis of the results is likely to benefit Enermet most when planning the development of the documentation.

Based on the findings of the study, I will make suggestions and recommendations on how to improve Enermet's technical documentation in order to serve the users' needs better.

6.2 *Method of the Study*

I have chosen the interview as the research method since interviews usually give more profound information than questionnaires. The specific interview method used in the study is the semi-structured interview. I decided to use the semi-structured interview, and not the structured interview, as the method of data collection because the structured interview would have been too restrictive for this study. The views of the participants regarding Enermet's technical documentation were likely to vary and problematic areas were not very well known in advance. Thus, a strict list of questions might have provided an overly narrow picture of the views on Enermet's documentation. In this study it was also important to be able to ask follow-up questions in order to gain a deeper understanding of the matter.

6.2.1 Semi-structured Interview

In the semi-structured interview, also called the qualitative interview, the interviewer has a list of questions prepared in advance but during the interview, he or she can modify the questions based on what the interviewee says. The themes to be discussed are the same for all the interviewees but the questions need not be, as the interviewer can present them in a different order and form (Hirsjärvi and Remes 2000:204-205). The benefit of such an approach is that while you have a written outline, a conversational guide, to keep the interview on course, you can flexibly ask further questions or change the order of the questions, if necessary (Rubin and Rubin 1995:145). As with all interview methods, the interviewer can explain difficult questions in more depth and rephrase them if the respondent seems to have misunderstood them (Nielsen 1993:210). In addition, it is easier to motivate the participants in an interview than when using the questionnaire, for example (Hirsjärvi and Hurme 2000:36).

The conversational guide prepared to provide structure for the interview can either be a brief checklist of topics or a more elaborate protocol with all the questions written out in full. These conversational guides do not provide a rigid structure; rather they evolve throughout the interview and can be customised for each separate interview. (Rubin and Rubin 1995:161.) Thus, the benefit of the semi-structured interview is that it is a flexible means of gathering information as it enables asking further questions arising in the course of the interview.

There are, however, some drawbacks of using the semi-structured interview as a research method. For example, interviews take time and the interviewer should have enough skill and experience to make the most of the interview (Hirsjärvi and Hurme 2000:35.) Therefore, the interviewer's role is crucial to the success of the interviews.

6.2.2 The Interviews and the Interviewees

The aim in choosing the interviewees for the study was to get as versatile picture as possible about views on Enermet's technical documentation. In order to achieve this aim, different kinds of markets and people in different positions and with varying work experience were needed. I chose the local companies of Enermet to be involved in the study by discussing with Marketing Manager Markku Uotinen and Technical Writer Teija Leppävuori. The countries included are Australia, the Czech Republic, Germany, the Netherlands, Norway, and Switzerland. We chose not to include Finland in the study, as information from Finnish Enermet employees would be relatively effortless to get by other means. Most people from whom I asked if they were interested in participating in the study had a very positive attitude towards the study and took part in it willingly.

In all, I interviewed 12 people for the study. Most of the interviewees worked within sales and marketing and/or support at Enermet, but some were also involved with product management. Of the interviewees, three were from Australia (one of them was working in Finland at the time of the interview), three from Germany, two from Norway, two from Switzerland, one from the Netherlands, and one from the Czech Republic.

All of the interviewees were men, as there were no women available for the study. Their ages ranged from 28 to 50, with an average of 38 years. Most of them were engineers by education but a few of them had some kind of commercial background as well with, for example, studies in marketing or business economics. The interviewees' work experience at Enermet ranged from 1,5 years to 12 years, with an average of 4,5 years. The product range the interviewees were involved with varied from country to country, depending on which products were sold in that particular country.

The interviews were conducted between the beginning of December, 2001, and the beginning of February, 2002. They took place in Jyskä, Finland by different means; three of the interviews were conducted face-to-face in

Enermet's premises, six by means of videoconferencing, and two on the telephone. The duration of the interviews varied from 30 minutes to one hour. I had sent the questions beforehand to the interviewees by e-mail approximately a week before the interview, so they were able to familiarise themselves with the topics to be discussed in advance and prepare for the interview by looking up examples, if necessary.

The first part of the interview questions dealt with the background information of the interviewees. The second part included questions concerning Enermet's technical documentation. Based on the definition of user-friendly documentation as defined for the purposes of this study (see chapter 4.4), I developed eight different themes that I found to be of relevance for user-friendly documentation in the case of Enermet's documentation. Then I came up with specific questions to cover each of these themes. Here are the themes with an example question under each theme:

- a) Purposes and functions of documents
E.g. "To what purposes do you use Enermet's customer documents in your work?"
- b) Availability and delivery format of documents
E.g. "How do you get information about new documents?"
- c) Document types
E.g. "Which type of document do you use most often and for what purposes?"
- d) Language, structure, and layout of documents
E.g. "Is the language of the documents easy to understand?"
- e) Correctness of information
E.g. "Is the information in the documents up-to-date?"
- f) Appropriateness of documents
E.g. "Is the information relevant to your needs?"
- g) Accessibility of documents
E.g. "Can you find the information you need easily from the documents?"
- h) Illustrations

E.g. “Are there enough pictures and other illustrations, such as graphs and tables, in the documents?”

The Appendix includes the interview questions. These questions provided the framework for the interview, but as explained in chapter 6.2, the method (the semi-structured interview) allowed me to change the questions along the course of the interview and also add new ones, when necessary. The questions dealt with three of the four document types at Enermet, including the Fact Sheet, the Product Description and the Manual for Installation and Use, but excluding the Presentation, which was explained to the interviewees before the start of the interview. The Presentation was ignored in the study mainly because it does not yet have as clearly defined structure as the other three document types. In addition, there can be different versions of the Presentations in different local companies since, unlike the other documents, not all the Presentations are necessarily produced in the Marketing and Sales department, so it would not have been possible to make reliable conclusions based on the views on the Presentations.

The interview questions were otherwise the same for all interviewees, but the questions concerning Pingu, i.e. Enermet’s Intranet, were left out from the interviews with employees in the Netherlands and the Czech Republic, as they do not have that facility yet. I recorded all the interviews with the interviewees’ permission and afterwards transcribed them word for word to facilitate analysing the results.

7 Analysis of the Results

In this section, I will describe and analyse the results of the study obtained through the interviews. The results have been divided into eight categories that correspond with the division of the interview questions into themes (see chapter 6.2.2). The examples have been numbered consecutively to separate them from one another. The respondents have been left unidentified to ensure their anonymity.

7.1 Purposes and Functions of Document Usage

Main Purposes of Document Usage
<ul style="list-style-type: none"> • Learning about the product • Creating new documentation • Aiding sales • Giving information to customers • Answering customer inquiries • Providing material for training and support

As this study deals with internal user groups of Enermet's technical documents, the purposes to which the documents are used and the functions of the documents are likely to differ from those of external users, i.e. customers. Nevertheless, in addition to needing information for their own purposes in their daily work, the internal users of the documents are important mediators of the documents and, more specifically, of the information in the documents.

The respondents reported on several purposes to which they use Enermet's customer documents. These purposes naturally varied depending on the respondent's position and work duties. Regardless of the position, however, the most basic purpose was to find out more and learn about the product. That is, the documents *served as information sources* about the products. This is how one respondent described the purposes he uses the customer documents:

(1) I guess I utilise the documents primarily for research of our existing product range. I also utilise the documents to better understand how I

should be implementing particular solutions myself and I also use it to copy from to create new sets of documentations for products.

Example (1) also illustrates another use of the documents, i.e. the way Enermet's customer documents are also used as a basis *to create new documents* for the purposes of each market. This purpose of use came up, in particular, in the interviews with German and Swiss employees. Here is how a German respondent described the way he uses the documents:

(2) The main use of the Finnish documentation is to have the basic information to make our own documentation. I use the documentation when I start making our own one. And after that we normally use the German documentation we made from it.

When asked why they need to make their own documents instead of using the existing ones produced by the Marketing and Sales department in Finland, he answered:

(3) We need to have different style of presenting, as different kinds of things are important to our customers. And the technical details are not always the same for both markets.

Another important purpose was to use the documents *to assist in sales work*. The following quotation from an employee involved with sales illustrates this purpose of use:

(4) Probably the most useful purpose is as sales aid when we're trying to promote and sell the products to the customer, we always need to have documents to go with them. [...] We use the documents also when we have tenders, when we present a tender, we put all the documents into the tender documents.

Other respondents who are involved with sales in their work gave similar answers. For example, a marketing manager gave this response:

(5) We need Enermet's customer documents to sell the products and to give information about some specifications and technical information to our customers.

Thus, the documents also have an important marketing function, as they *help to sell the products* to the customer. In addition, the documents are used when

Enermet employees who are involved with customers on a regular basis answer questions and inquiries coming from the customers.

(6) I use them [the documents] to refer to and to answer customer's inquiries and when I need some information for myself and quite often the customer will have a specific inquiry which you can answer and then follow up by sending him the document.

(7) I use the documents every time I need some details when I get questions from the customers.

The respondents also mentioned some other purposes to which they use the customer documents, such as *for training purposes*. That is, when planning training sessions for customers they can use the documents as a source of information and as a base for the training material. Some of the respondents were also responsible for distributing the documents to others in that particular local company and taking care of their translation, so their purposes of use was not so much focused on the contents but rather on the handling of the documents.

7.1.1 Frequency of Using Documents

How often the respondents used the documents varied a good deal. Some of them reported using the documents on a daily basis, whereas others used the documents much more rarely, for example, only once a month. The frequency seems to depend on the duties of the respondents. Thus, those who are involved with customers and making tenders on a regular basis also use the documents more often. Many of the respondents reported using new documents more frequently than old ones.

(8) RJ: How often do you use the documents?

Respondent: Two times a month nowadays. When a new document comes, I use it more frequently at first but afterwards not that frequently.

Those respondents who reported on using the documentation to make their own documents based on it said they use the Finnish documents usually only once. However, as one respondent commented, "sometimes the Finnish one

may have some details which we may need later on, but most of the time we use it only once”.

7.1.2 Conclusions about the Purposes and Functions of Document Usage

The purposes to which the respondents used the documents varied a good deal although there were some purposes of use which came up more often than others in the interviews, such as using the documents as a sales aid and learning about new products and solutions. In any case, the responses show that the documents are an important source of information about products for internal users of documents at Enermet. The documents are used for many functions, not only in sales and marketing, but also in, for example, product management, support, and training. However, the fact that the frequency of use varied to such an extent suggests that the documents are used more in some functions than in others.

7.2 Availability and Delivery Format of Documents

Problems with the availability of documents
<ul style="list-style-type: none"> • There is no systematic way of informing about new documents • You have to ask to find out if there is a new document • It is often difficult to know what the latest version of the document is • No information is provided about what has changed in the documents

The availability of the documents refers to the ease with which the users of the documents can find and use the documents, especially new documents. Thus, it contributes to the user-friendliness of the documentation. Closely related to the issue of availability is the delivery format of the documents, i.e. whether the customers should have access to the documents online via an Extranet system and what the usefulness of the recently developed Intranet system, Pingu (also referred to as the Product Data Bank), is.

Getting information about new documents does not always seem to be easy. Most respondents were not satisfied with the way they receive information about new releases of documentation. The ways in which they received this information also varied a good deal. These include getting information from the product manager of the product in question, receiving a release notification by e-mail from the Marketing and Sales department, and asking someone in the Finnish business unit. In addition, the respondents reported getting the information about new documents more and more from Pingu. Here is what some of the respondents had to say about the availability of new documents:

(9) RJ: How do you get information about new documents?

Respondent: I would say quite rarely. Sometimes I get mail from the person who seems to be involved with the documents but there is no systematic way of informing about new documents. Nowadays I look for information in the Pingu database.

(10) Often I get no information about new documents from Finland. I have to ask if there is a new document and if there is, he tells me that yes, there is a new version.

(11) Probably that [getting information about new documents] could be improved somewhat. Maybe it's that I don't take the time to look for the new documents. Usually it's when I really need a particular document that I'll go searching for it either in Pingu or asking some of the people I deal with at EFI.

The respondents criticised the availability of the documents, as they felt they often did not know if they had the most recent versions of the documents or not.

(12) I'm not sure if I get all of them [the new documents]. Sometimes I get one and wonder if that's everything I can get, but I hope so.

This respondent also suggested that there could be a list of all the existing documents available in Pingu, so that one could compare if one had all the necessary documents. Another respondent was of the opinion that it was difficult to know what had changed in the document since the previous version. This information would, in particular, facilitate the localisation process, as in this particular country the local company itself dealt with the localisation and translation of the documents.

When asked whether the documents are easily available, the respondents' opinions varied to some extent. Some were of the opinion that the new Pingu database had improved the availability of the documents.

(13) In the past, I had to really chase it [information about new documents] up myself but with Pingu it is a lot better. Really the first place I go looking for is Pingu.

(14) They [the documents] are easily available now that we have that Pingu database and everyone has access to it and can download the documents we need.

(15) It gets easier thanks to this database. Before the database existed, it was very hard to get documents. You had to ask someone to send the documents.

Most of the respondents were of the opinion that the documents are in most cases available on time, also in the respondents' own language.

(16) My feeling is that yes, the documents are generally available on time. I haven't heard of documentation holding any project.

However, one respondent criticised the lack of documents in Dutch, as in the Netherlands the documents are delivered in English or German and not in Dutch at the moment, although customers would prefer to have the documentation in Dutch according to this respondent.

One respondent also reported that he would prefer receiving the documents on CD's instead of by e-mail as to this particular country, the connection is slow so receiving documents of several megabytes by e-mail takes a very long time.

7.2.1 User Experiences of Pingu

Opinions on Pingu
<ul style="list-style-type: none"> • A useful tool for providing accurate and timely product information • Needs still developing, e.g. implementation of search functions and improvement of user interface • Could be expanded to include more documents than just the customer documents

Pingu, Enermet's Intranet, was at the time of the interviews a fairly new system in most local companies and not available yet in the Netherlands and the Czech Republic. Therefore, not all of the respondents had yet had experience of it. The general opinion of all of those who had already used Pingu, however, was that it was a very good idea but still needed development. The following quotation represents the views of most respondents quite effectively.

(17) It [Pingu] is a very good tool, a very useful tool that provides timely, accurate information to all those people who have been missing it. I think it's only an infant now but it will grow. I think it will become an important tool for many departments.

Pingu had made the documents more easily available to the respondents and they found Pingu, on the whole, to be a useful tool that met a long-felt need. One of the good features of Pingu that the respondents mentioned was that the documents could be found in several different languages in Pingu.

(18) I use it [Pingu] especially when I'm looking for documents in a foreign language, which we don't have available here in our premises. Especially in English and sometimes in French, because we don't keep these documents here. That is normally the way I use Pingu.

The respondents also suggested a number of improvements that could be made to Pingu. Most often the respondents mentioned that Pingu should be made easier to use and find information by, for example, implementing search functions and improving the user interface.

(19) It [Pingu] is a step towards the right direction. It could be made easier to use. Actually it could be helpful if you could find new documents at the top of the database.

(20) I think it [Pingu] could be improved by implementing some search functions because it's a little bit complicated to get through this tree structure. Perhaps with a search function that could be more helpful. But you can find at the end what you're looking for.

(21) I think Pingu could be made easier to dig up the information. It is not obvious where to find separate documents. So, if we could make a flow chart or overview picture, a little bit more picture-wise, not only a folder layout but also some connections how the logic of the system is built, then it would be easier to find the correct document.

(22) I think the user interface needs to be considered very closely, there needs to be consultancy with all the people who use it to see what will best benefit everybody. But I think there needs to be things like a search engine attached, so you can search quickly for documents. I think we need the capability to search within documents as well, not just the document's name.

Some respondents hoped that Pingu could be expanded so that it would include not just customer documents but also other documents, such as requirement specifications and approval documents.

(23) I haven't given it a lot of thought, but I know that a tool, an online tool, would be very, very useful if all of our documentation was managed inside that tool. It would allow us to find things very quickly. [...] I think there needs to be an enterprise-wide documentation system. So that everything that we work on is in one single repository.

(24) Another thing about the Product Data Bank, these approval documents, that would be a nice improvement to the Product Data Bank.

Pingu also received some criticism from the respondents concerning its coverage of the documents at present.

(25) Pingu is an excellent idea. It must be complete, it's not yet complete. Quite often I go to find a document and it's not there. In lots of cases it is for the products that are specific to us here in Australia. So it must be complete, it must be up-to-date. If it is that, we can rely on it totally.

7.2.2 Advantages and Disadvantages of Extranet

Advantages	<ul style="list-style-type: none"> • It would save both the customer's and the company's time and resources • It would save money from printing • It would also be a strong marketing tool • Customers often prefer getting information electronically
Disadvantages	<ul style="list-style-type: none"> • The salespeople might not be able to follow up with the customer's inquiries adequately • All customers might not have the appropriate skills and readiness for using it

The respondents' views on creating an Extranet, an online environment where documents would be available to customers with restricted access, varied from very positive to slightly negative. Most respondents, however, were clearly in favour of the Extranet. Such a system was felt to be likely to improve the information flow to the customer and facilitate the version control of the documents. As customers would no longer need to phone the company to get the documents, it would save time for both the customers and the company. Here are some views on the topic:

(26) Any information that would find its way to the customer anyway, why not make it available online so it's much easier for them to get it, from anywhere. It would save a lot of time and money from printing and also they [customers] would always know if they have the latest version on the Extranet.

(27) I think that first of all, more and more customers will use electronic tools to gather documentation. We can see it already now that they don't want to have the brochure, they want to have a file. So we're actually sending them documents electronically. [...] I also think it's easier for the customer when they know where to go to find the documentation, so they can just check it out.

(28) The Extranet would give customers accurate and up-to-date information. That's very important to customers, not just for their own purposes but to our purposes as well. It can be a very strong marketing tool if they see documents for a product that is two versions later than theirs, for instance. They can then know that they should upgrade, purchase a new type of product. It would also reduce the resource requirements on the business units.

However, not all views on online documentation for customers were as positive as the ones quoted above. Some respondents were afraid of losing the opportunity to talk to the customer and not knowing anymore who is interested in the company's products.

(29) We prefer that the customers call us and we can send them the documentation. And then we know exactly who is interested in our products.

(30) It seems to be easier to call directly to us. [...] I think the customers would rather call us than try to look for information on the Extranet. Some of them might, but how many per cent of the total customer market, I don't know.

(31) I'm not really sure about that idea because if we have that information available in Pingu, if they would make contact with us and phone us to ask for information, we would at least then know that they have made an inquiry on our products. Then we need to go to Pingu and get a file and e-mail it to them, but then we have the chance to follow up with the customer when the customer needs it.

One respondent also brought forward a concern for the readiness and skills of the customers for adopting the Extranet and start using it as a means of getting information.

(32) I think it [whether the documents should be on the Extranet or not] depends on the skills of the customers. I think we have some very intelligent customers and they know how to find their way on their own. And then there are customers who really need help in explaining the documents and their contents and how they can use the contents of the documents.

Furthermore, one respondent was of the opinion that for those markets in which complex products, such as software systems, are sold the Extranet would be useful, but not to others where the products are relatively simple in their functions.

(33) I can imagine that customers can have interest in the Extranet technique when we are talking about complex products and you need to have a lot of information about configuration and other things. We do not sell those products in Germany because they are not according to German regulations, so if we take a simple meter, the people know how to use it, they don't need to look for information.

The respondents also had conflicting opinions on the topic of which documents should be available on the Extranet, if it was to be created. Some of the respondents were in favour of having all of them available there, whereas others were more inclined to include only sales documents, such as the Fact Sheet (FS) and the Product Description (PD). The FS could, in some respondents' view, be openly available on the Internet, too.

(34) When we are talking about Fact Sheets, in my opinion it should be so that they could be online in an open environment. Because that is information the customer or whoever is interested gets in other ways as well, from a stand on a trade show or if he asks for them on the phone, he can get them as well. So Fact Sheets, in my opinion, should be free for everyone on the Internet, not in Extranet. For the Product Descriptions and the Manuals it is something else, so that would be fine to have them in an Extranet.

One respondent also suggested that the most recent and frequently requested documents, "the so-called hot items", should be available on the Extranet but the older ones would not need to be.

7.2.3 Conclusions about the Availability and Delivery Format of Documents

The responses show that there is a clear need to improve the availability of documents at Enermet for internal users. However, with Pingu the availability has already improved in the respondents' opinion, but as these interviews were conducted when Pingu had only recently been created, its usefulness as a way of delivering the documents to internal users is still difficult to evaluate. Nevertheless, there is room for improvement as regards communication about new documents and changes in the old documents. The Change Notes in Pingu provides a good tool for this, but it seems that not many of the users had yet become acquainted with that tool. Another solution might be to include a "summary of changes" page at the beginning of each document. The changes that have been made in the document could be listed on that page, so the document user would see them immediately when reading the document and would not have to go searching for them in the Change Notes.

It became evident during the interviews that although Pingu was considered a useful tool, it needs to be developed further in order to serve the users' needs more efficiently. For example, search functions should be available so that users could search not only for separate documents, but preferably also within the documents. In addition, the user interface of Pingu could be made easier to use.

A lot of support for building an Extranet for customers was received from the respondents. However, not all respondents regarded it as useful. Yet none of them were totally against creating it even though they were concerned that they might lose the opportunity to talk to the customers as a result of the Extranet and some also doubted its usefulness and necessity. However, there were several advantages that the respondents mentioned which would appear to outweigh this concern. Extranet would, in the respondents' opinion, save money and time for both Enermet and the customers and improve the availability of the documents for customers, among other things. Furthermore, an important advantage mentioned by one respondent is that Extranet can also be used as a marketing tool since customers can see newer versions of the products than what they have themselves.

Thus, on the whole, it would seem justified to invest in an Extranet system for customers and possibly also for other interest groups, such as contract manufacturers. However, it should be carefully considered which documents to include in the Extranet. The respondents' views varied a good deal on this issue as some were in favour of including all of them while others were more cautious and objected having, for example, the MIU available on the Extranet. However, it may be that not all of the respondents realised that access to the Extranet is restricted, so users would not be allowed access without a password.

7.3 Document Types

As explained earlier, Enermet's documents have been divided into four distinct types: the Fact Sheet, the Product Description, the Manual for

Installation and Use (MIU), and the Presentation. However, the Presentation was left outside the scope of the study, so the answers deal only with the first three document types.

7.3.1 Use of Document Types

Product Description	<ul style="list-style-type: none"> • The most often referenced document type • Used for learning about the product and for giving technical information to the customer
Manual for Installation and Use	<ul style="list-style-type: none"> • The least often referenced document type • Used for getting practical information
Fact Sheet	<ul style="list-style-type: none"> • Used mainly when giving introductory information to customers

The majority of the respondents reported using the PD most. The FS was also mentioned as being used quite frequently, although most often that document was only given to customers and not used for the respondents' own purposes. The MIU was the least frequently referenced document in this user group.

When dealing with customers, the FS is the document that the respondents usually first send to the customer and after that they send the PD. The following responses clarify typical ways of using the different types of documents by the respondents.

(35) I use the FS most regularly because I send that to any customer or any person who is interested in the product. The PD I would probably use the next most because once I've determined that it is a genuine inquiry, I will send out the PD. The MIU we usually only provide to a new customer who is just starting to use our products, or when we're doing a training session to the customers.

(36) I use for my own purposes most often the PD and the MIU. The purpose is either to get specific information, then it's the PD, or to know the practical side of it, then it's the MIU. [...] I only use the FS when I give information to the customers, not for my own purposes.

(37) Basically the FS and the PD are the only ones I use. The FS is an introductory marketing brochure. Sometimes I send it to customers when they ask me to send something before they want to meet with me. And the PD is more for technical information when they ask for more information and also for tenders when they have to get in a lot more technical detail.

Thus, the FS is only an introductory document to the customer, whereas the PD gives more specific information about the product as regards its general features. The MIU is used for practical purposes, not for sales or research purposes.

There were also a few respondents who called the usefulness of the MIU into question as regards simple products.

(38) Today in Germany we sell only household meters and ripple control receivers, so we need the PD, and also the FS, but we don't need so much this MIU. Because meters are so easy and everybody in Germany knows how to connect the wires with the meter.

7.3.2 Division of Documents

The respondents also came up with ideas to develop the division of the documents. One of these was to combine the FS and the PD, as explained in the following quotation:

(39) So, in my work, I think it's a question of do we need all three or is it possible to reduce it two by dropping the FS. Because the FS is actually only a picture and a very general text, some basic data. And often you need a little bit more information than that in order to understand the product. So I think it would be possible to make an FS which contains a little bit more information. And then you move the rest of the information in the PD to the MIU.

As regards the division between the different document types, the respondents' opinions varied a good deal. For some respondents, the division was clear and they reported having no problems in, for instance, knowing to which document to turn when they were looking for some specific piece of information.

(40) I think it [the division between different document types] is very clear. I think it's a very good structure between the FS, the PD and then the MIU.

(41) For me it [the division between different document types] is quite clear. The FS is more like an information leaflet, which is the first contact for the device. The PD is more detailed and explains the functions of the meter and the MIU gives more practical information. So I think for all three levels the division is quite well adapted to me.

However, there were quite a few respondents who found the division of the documents more problematic and were of the opinion that there was too much overlap between the document types. This overlap caused confusion for the respondents and made it difficult sometimes to know which document type included the piece of information they were looking for. The overlap was considered to be a problem in the PD and the MIU, in particular.

(42) Sometimes I think there is a lot of information twice in the documents. In the PD and the MIU especially, so perhaps it could be clearer what is in the PD and what is in the MIU.

(43) It is not always clear [what information is included in which document]. For example, I have this E700 meter, I have the PD and the MIU. And for me, it's not always quite clear when to use the PD or when to use the MIU. Because I'm not quite sure where I can find the information.

In the literature on technical communication, there are opposing views on the matter of overlap in the documents. For example, Weiss (1988:181) recommends that documents should contain overlap, i.e. repeat some information in order to reduce the need for page flipping and facilitate finding the information. However, this also causes problems for maintenance, as the same information has to be updated to several places and this may cause confusion, which also came up in the discussions with the respondents.

There were also a few respondents who thought that combining the different document types, especially the PD and the MIU, would reduce the overlap in the documents and remove the problem of not knowing which one to use.

(44) From the beginning I wondered why you make a difference between these documents [the PD and the MIU]. I would like to see only one document and that's all. Because the information in the documents, you can find in each document some different information but sometimes the information is double or triple. I'm not very happy

with that. [...] I am quite sure that if the overlapping is eliminated, we could make a more efficient manual, which is cheaper to maintain, easier to maintain and easier to translate.

There was one suggestion from a respondent that could improve the problem of overlap in the documents to some extent, that is, to have a description of the documentation in Pingu, which would explain what the purpose of each document type basically is and what its contents are.

(45) There's a lot of information that is available in both the PD and the MIU, for example. So it might be either in the one or in the other document. Maybe an explanation should be also on the Pingu server to make it easier for new users to look for the right document the first time.

7.3.3 Contents of Documents Types

Main Findings
<ul style="list-style-type: none"> • Value for the customer is not adequately explained in the documents • More sales arguments could be added to the FS in particular • The key facts about the products should be presented more clearly

When asked about the appropriateness of the contents for the purposes of each document type, the opinions once again varied. Some respondents were satisfied with the contents and had no suggestions for improvement, whereas others were quite dissatisfied and found many defects in the contents of particular document types. For example, quite a few respondents remarked that the documents, especially the FS, do not sufficiently explain the value of the product or service to the customer. Here are some examples of the respondents' opinions:

(46) I think we could improve on the contents of the documents. For instance, the FS is quite good but because it is used as a sales document maybe it should focus a little bit more on the reasons for using our products. The things that make us different to our competitors. If our products have some advantages, we should focus a little bit more on those things.

(47) I think that the benefits for the customers and the benefit of our way of solving different solutions should be more clearly stated in the

FS together with a few technical details. You can never be too good, or good enough about the benefits.

(48) The documents are written with a functionality, they help you with the functionality but maybe the documents should be more providing the benefit of that functionality.

However, one respondent was of the opinion that the value for customer is something that does not need to be stated in the document but it is rather left to the sales person to explain for the customer.

(49) It [explaining what value the product gives to the customer] is important but I don't know if it's so important to have it written on paper. I think it's more the job for the sales guys to do, so they are the guys who are on the market and need to understand the market and have the right arguments. So it's a question of whether we are going to develop a more, let's say, stand-alone marketing material or not. I think if we were, for example, working into an Internet store, selling commodity products through the net and reducing our sales staff, then it's extremely important to get the right approach in the documentation and what we have written there. But if we don't, I think it's just as good as letting the sales guys do the argumentation and just be objective about the products and the technologies in the documentation.

There were also a few respondents who were otherwise unsatisfied with the contents of the FS and felt that this document did not meet the needs set for that document.

(50) When I look at, for example, a new FS which I got yesterday, the E320, I'm not quite happy with the structure of it. We have the front page with a figure of the device, and then we have very prominent text on the upper left and I think there's nothing about the product. There's something "bla-bla" but there should be the key facts. Especially the FS should provide more facts than poetry.

There were also one suggestion to improve the contents and presentation in the MIU.

(51) I think we can always improve. We can struggle in order to, for example, for the MIU, to really try to explain ourselves as simply as possible. Maybe draw more pictures, have less text and be very clear in statements. So that it is easy for the customer to understand.

One respondent felt that there could be a separate document to help users get started by giving advice what to do first for those who are using the product for the first time.

(52) There is need for a document called, for instance, “Getting started” or something like that. So if you work with the device for the first time, the documents are not very nice because they don’t go step by step. So if I have a meter, I should have facts to try very easy functions. I’m missing something like “Getting started” with practical examples and troubleshooting.

7.3.4 Conclusions about the Document Types

The importance of the Product Description for the respondents became evident during the interviews. Most respondents reported on using it the most of the document types and the fact that they generally had more comments to make concerning the PD than any other type of document implies that it is the most relevant document for them. The respondents also reported on using the FS although not so much for their own purposes but as an introductory leaflet that was given to the customers, whereas they used the PD more for their own purposes of, for example, learning about the product. The MIU was the least frequently referenced document for them but this is most likely due to the fact that most respondents were involved with marketing and sales, in which there may not be such a great need for detailed information about how the product is installed and used in practice. Thus, the MIU is probably a more important source of information to customers than to internal users of documents.

Several respondents made suggestions to improve the division of documents although generally the division was considered successful. Some were satisfied with having distinct document types, whereas others did not find the division worthwhile. However, although it might make sense in the case of some simple products to reduce the number of documents by combining the information into only one or two documents, for more complicated devices or systems, it would not be reasonable. This is because the documents would become unnecessarily long and information would be difficult to find from such thick documents. Nevertheless, the division between the PD and the MIU

ought to be clarified as several respondents mentioned that they had difficulties in knowing which document to use in which case due to overlap in these documents.

When comparing the respondents' work experience at Enermet and whether they found that there was unnecessary overlap in the documents or not, an interesting pattern seems to form. Those who had worked for Enermet for the longest period of time tended to regard the division between the document types as clear and reported having no problems with knowing which document to use. However, those who had been at Enermet for a shorter period of time clearly had problems with the overlap in the documents. This is probably due to the fact that with experience the document users learn to use the different document types more efficiently, whereas for a novice user of the documents it is more difficult to know which document has which information. In any case, information could be made available about the types of the documents in Pingu, for example, as one respondent suggested. Each document type could be explained and its main contents described to make it easier for new users, in particular, to know which document to use in each case.

As regards repetition and overlap in the document types, one should take into account that, unlike internal users, customers do not receive all of the document types at the same time. They usually get the FS first, then the PD and only when the product is delivered they are given the MIU. Thus, from the customers' point of view, it might be beneficial to have overlap in the documents as they may have misplaced the PD by the time the device is in their hands.

The respondents had quite conflicting views on the appropriateness of the contents for their needs. The fact that the opinions varied to such an extent implies that different users have different needs and expectations as regards the documents. Thus, the problem is how the needs of all the users can be taken into account when writing the documents. There is no simple answer to this question but probably the best way is to try to accommodate the different

needs and find some kind of middle course. In practice, this means that in the case of the FS, for example, it might be worthwhile to add more sales arguments and explanations of the value for the customer, as requested by several respondents, but also to include technical details and precise information about the features, as requested by other respondents.

7.4 Language, Structure, and Layout of Documents

Main Findings
<ul style="list-style-type: none"> • The language was considered relatively easy to understand • The language gives an impression of “Finglish”

The language in technical documents should be as clear and unambiguous as possible in order to be user-friendly. However, when the documents are used also for marketing purposes, there are other criteria as well which are more important for delivering the marketing message, i.e. the language should be persuasive and attract the attention of the reader. Yet, what both instructions and marketing material have in common is that the language ought to be easy for the reader to understand. The use of terminology should also be consistent as inconsistencies confuse and frustrate users (Henry 1998:208).

When asked about the language in Enermet’s documents, most respondents were of the opinion that the language is relatively easy to understand and they had no major criticisms to make regarding it.

(53) Yes, it [the language in the documents] is very clear. I think the documentation is very clear and good.

(54) The English documentation that I have referenced has been of a suitably high enough standard.

What needs to be taken into account is that the respondents are used to reading technical documents and that the subject matter is in most cases very familiar to them, which naturally makes it easier to understand what has been written in the documents. However, it may not be as easy for an inexperienced reader. This point also comes up in one respondent’s answer.

(55) I don't have problems in understanding it [the language in the documents]. It's very much dependent on the customer. If the customer is used to handling these kind of meters, they can easily understand the language in the documents. If they're working for the first time with the meter, or the type of meter, then he will have some problems of course. That is a general problem that you can't have a document that would fulfil the needs of everyone.

A few respondents, however, criticised the language used in the documents. One respondent did not find it very easy to understand but mentioned that it may be due to a lack in his own language skills in English as he was not a native speaker of English. Then there were also a few respondents, both native and non-native speakers of English, who thought the language was not sufficiently fluent and in their opinion, it could be detected when reading the documents that a native speaker of English had not written them.

(56) I think the language is quite often in Finglish, which is not too bad for internal use. [...] It's not grammatically incorrect, but it's a little bit Finglish and sometimes the message gets a little bit lost.

7.4.1 Use of Terminology

Main Findings
<ul style="list-style-type: none"> • There are no major inconsistencies in the use of terminology in the documents • Different markets sometimes use different terms for the same thing

As regards the consistent use of terminology in the documents, most respondents had not found any major inconsistencies. However, one issue that came up in some interviews was that different markets use a different word for the same thing. This was sometimes considered a problem even though the respondents found no inconsistencies between Enermet's documents in the use of the terminology.

(57) We sometimes have this problem that we have two items, two LEDs, which have a different abbreviation. It is not clear when we have different names for one object. But this is not a problem for product documentation, this is maybe a problem for several markets.

(58) When I say there are no inconsistencies, there are none within document to document within the Enermet system, but there are inconsistencies between the use of language in different subsidiaries and in different market areas. So what we call a widget here, might be called a thingamy in Australia. So, I've noticed that type of inconsistency in the market, but not from document to document.

There was also one respondent who thought there are inconsistencies in the use of terminology in Enermet's documentation.

(59) In principle the terms are not used consistently. As I told you, there is the software, and the software has some names for some functions. And there are three different manuals, for instance, for E700. And some words are used in different meanings.

7.4.2 Organisation of Information

Main Findings
<ul style="list-style-type: none"> • Organisation of information is made from the technical point of view, not the customer's point of view • Documents are written with an emphasis on the Nordic market • There is a need for more localisation to fit the needs of different countries

The respondents' views on the organisation of information inside the documents varied to some extent. Some were satisfied with the current organisation, whereas there were a few respondents who found defects in the organisation of information.

(60) It [organisation of information] is very traditionally made. It is made from the technical point of view, and not from the customer's point of view. We already talked about this with the example of tariff control. There are different things that belong together and should be showed as one item.

(61) One thing about the organisation of information: from reading the papers coming from Jyskä, I have a feeling that the arguments that are important for the Nordic customers are not the same as the arguments that are important for the Central Europe.

The viewpoint stated in the previous quotation came up in some of the other interviews as well and it is worthy of attention. Writing for different markets is always challenging, especially when the markets are as diverse as in the case

of Enermet. Some of the respondents, especially the ones from Central Europe, Germany in particular, felt that the documents are too Nordic-centric, i.e. written with a focus on the market in the Nordic countries, which is relatively homogeneous but differs in some respects from the Central European or Australian market. The following comment by an Australian respondent sheds some light on this matter.

(62) Also the marketing message is a little bit different for different markets. For example, I find Switzerland and Germany have very technically focused customers, so the information needs to be technical. I think Australia it's certainly a mix of the English and the U.S. So it's a lot more on financial benefits and the end results of the products that they're looking for. [...] They [the documents] need to be reviewed for the English market. Maybe we can use the same base but just to reword them a little bit. It doesn't have to be totally rewritten for a different market.

One respondent remarked that sales arguments vary from country to country, so documents, especially the FS, ought to be adapted to the needs of each country separately.

(63) When it comes to the market message and the FS, it's quite difficult or let's even maybe say impossible to use the right arguments in the FS for every country. Because the argumentation is different. If you're going to have a real market message, then you need to write it differently for each market. You can't just translate it.

The differences between countries also come up in the following comment in which the respondent emphasises the need for localising the documents to fit the needs of each culture.

(64) One thing which is important, because we are working here with more or less ten different international markets, the communication then depends very much on the culture of the country. And taste is something that is very different in different countries. And sometimes you have to adapt, make some localisation. And it's very often that the taste and the style here in Central Europe is quite different from Scandinavia. I don't say it's better or worse, it's just different.

7.4.3 Layout of Documents

Main Findings
<ul style="list-style-type: none"> • Layout was considered mostly good and effective • More graphical elements and colour could be used

As regards the layout of the documents, most respondents appreciated the layout and described it with such adjectives as “clear” and “effective” and did not have much else to comment on it.

(65) In my opinion it has quite a good and professional layout. It’s very good.

(66) Yes, I actually like the new layout that came in I think a few years ago. It’s just my opinion but I like the white space around them and the way they are laid out.

There were a few respondents who thought the layout could be improved and have the documents made to look more modern by, for example, adding colour to the documents.

(67) I’m sure we can change the layout a little bit to make it very simple, clear, easy to understand. I think we should start to incorporate colour a bit more than we do now. To me adding colour to a document makes it look much more professional and easy to understand.

(68) For my taste, the layout is rather old-fashioned. For instance, the format, somehow it’s a lot of text. I need to have a kind of structure on paper, some element that comes again and again. I also need some graphical elements. That would make the page a little bit more attractive. Now we just see letters after the title. Somehow it doesn’t look very professional to the customer.

7.4.4 Conclusions about the Language, Structure, and Layout of Documents

The respondents were fairly satisfied with the language and the use of terminology in the documents. However, there were a few respondents who thought the language was not adequately fluent or, as one respondent called it, the documents are written in “Finglish”. What needs to be taken into account,

however, is that not all the readers of the Enermet's English documents are native speakers of English, so the language has to be simplified. In addition, such sophisticated linguistic features as phrasal verbs, for example, which add to the impression of a text written by a native speaker, should be avoided in technical documentation as they can be difficult for non-native speakers to understand.

As regards the organisation of information in the documents, the respondents' opinions once again varied, but there were only a few who could find something concrete to criticise. It might be that the respondents, especially those who have been at Enermet for several years, are so used to the way information is organised in the documents that they cannot pinpoint many defects. Nevertheless, what some of them did mention was that the documents tend to be quite Nordic-centred in their focus and do not serve the needs of customers in all markets equally. Thus, when writing the documents the fact that the needs of customers vary in different countries and markets should be taken into account. Culture is one factor that contributes to the differences but it might also be that there are different institutional practices in use in different market areas. This explanation also coincides with Hackos and Redish's notion that corporate cultures can have an effect on how people use information (1998:48,108).

Another issue in which habit may play a part is the layout of the documents. The layout did not give rise to much discussion and most comments regarding it were positive. This might again be due to the fact that the document users have become accustomed to the layout of the documents, so they regard it as familiar and acceptable. However, some respondents suggested adding more graphic elements to the layout of the documents. This view is corroborated by Lewis (1988:241) who states that graphic cues help readers to find the appropriate sections more easily and thus increase the accessibility of documents.

7.5 Correctness of Information

Main Findings
<ul style="list-style-type: none"> • Information is generally up-to-date • Only minor mistakes were found in the documents • There are problems with the version control of documents

The correctness of information is essential for technical documents and an important aspect of user-friendliness. Particularly, instructions on how to use a device should be as accurate as possible because errors might cause severe problems for the user. On the whole, the respondents found that the information is up-to-date in Enermet's documents and there are only minor mistakes, if any, in the documents. However, several respondents reported that they had often had an incorrect version of the documentation, or that the customer often has the wrong version. Thus, there can be outdated information in the documents due to the fact that the user has an old version of documentation. Several respondents found this a severe defect in document management.

(69) I haven't found documents that are lacking or have incorrect facts. But I have had issues when customers have contacted me because they don't have the correct documentation or the correct version for the product they have. [...] So the control of the documents, I think, is a big issue, not so much the content. It's pointless to have a manual that's three versions old if your product is the latest.

(70) The latest documents are not available. So if you ask for a document, somebody sends you a version and you don't know to which product that version is part of.

(71) I have found that some people use old versions of the documents because they don't know that there is a new version of it. That's a problem which I think could be improved.

As one respondent pointed out, the problem of version control is, however, improving with Pingu, which only includes the latest version of each document, so that within Enermet, everybody who has access to Pingu can check if they have the latest version of a document.

(72) I found the documents weren't up-to-date before Pingu because often there would be a new document out and we weren't using it here, but with Pingu that problem should be fixed I hope.

There was also one respondent who thought the information is not maintained adequately up-to-date in the documents themselves.

(73) If there are changes or improvements made to products, I don't think the information is always updated to the document. The information might be old, or in the worst case, there is wrong information in the document.

However, one respondent had a completely opposite view to the matter saying that sometimes the information comes too early in the documents and the customer may thus get information about features that cannot yet be used.

(74) I have remarked it several times that it seems you or your customers accept that you should try some dreams or wishful thinking. Sometimes the information comes not too late but too early in the documentation. You are describing something which is not possible or realistic.

The mistakes that the respondents reported having found in the documents were most often described as minor ones and concerning only small details. Thus, mistakes were generally not considered to be a serious problem in the documentation.

(75) RJ: Have you detected any mistakes in the documents?

Respondent: Only small mistakes but now that our communication has improved so much in recent times I think I can very quickly point that out to somebody that the mistake was there.

(76) I haven't detected any dramatic mistakes. It always comes down to spelling mistakes. But also in that case, that does not happen very often.

7.5.1 Conclusions about the Correctness of Information

The problem regarding the correctness of information was to a greater extent due to the fact that the users did not always have the correct version of the documents than incorrect information in the documents. Thus, version control issues should be taken into closer consideration. Pingu is a partial answer to

this problem, as internal document users can always check if they have the latest version from Pingu, but for as long as there is no Extranet for external users, version control continues to cause problems for customers.

There were opposite views on whether the documents are up-to-date or not. Nevertheless, there would not appear to be any major defects in the documents in this sense. The respondents had not detected very many mistakes in the documents either, which implies that the co-operation between the technical writer and subject matter experts works well as mistakes occur rarely in the documents.

7.6 Appropriateness of Documents

Main Findings
<ul style="list-style-type: none"> • More information for sales purposes could be added to the documents • More adaptation of information for different markets is needed • The User Interface Manuals should be improved

Appropriateness has to do with how well the documents serve the user's needs, which is a key criterion of user-friendly documentation. The documents can be otherwise well-written, accurate, and easy to use, but if the documents and the information in them are not relevant to the user, they are not very useful.

The respondents' views on the matter of appropriateness varied a good deal. Of the separate document types, the FS was criticised the most and the MIU the least. However, most likely the reason for the MIU receiving the least criticism is that these respondents are not the main user group of the MIU and reported themselves that they used it least of the document types.

(77) RJ: Is the information in the documents relevant to your needs?

Respondent: As a Product Manager, my answer would be yes for the PD, yes for the MIU, and for the FS, as I mentioned before, I think no, I don't think we adequately understand the customer's use of a FS. We have a features list in the FS, but we don't translate that to the

customer what that means in value. And I think we need to address that.

In addition, one specific type of the MIU, the User Interface Manual, was severely criticised by one respondent.

(78) User Interface Manuals are, I believe, not a useful tool. There is absolutely no benefit, well, there is marginal benefit in the document we produce at the moment. There is no information inside that document that explains anything about the features of the program. All it does, it says that “if you click this, this menu will come up”. Well, you can do that with the software, so where do you need the manual?

On the topic of the contents of the documents, there were a few respondents who thought the documents did not include enough factual information regarding the products, and thus were of the opinion that the documents did not fulfil their needs or the customer’s needs for information.

(79) The documents tell a lot about general things but not really what the customer is interested in. The customer is looking for facts and the features and added value and if they get a brochure with too much “bla-bla”, they stop to read and throw it away.

One respondent mentioned that there is perhaps too much technical information in the documents for his needs.

(80) Sometimes we in Germany think, sometimes we discuss this that these documents are a little bit too full with technical explanations so these documents are very technical. But it’s only a discussion, it’s not bad to have this information.

There were also others who were in favour of more information for sales purposes in the documents.

(81) RJ: Is the information relevant to your needs?

Respondent: So far I think it is relevant to our needs. Again, I should mention that for my needs, we need more sales arguments. Obviously we’ve come up with some here in Australia but it would be nice to share some of it with other countries, some other sales people.

A few respondents mentioned that sometimes the documents contain information that is not relevant for their customers, as, for example, the device regulations vary in different countries and the systems or devices described in

the documents are not available in all countries. Thus, these respondents thought that showing this information might cause confusion for the customer.

(82) We sometimes have problems when there is a lot of information there which we really don't need here for our purposes. When I think about the modem M100 series, there was a lot of stuff for the heat metering devices as well and in the translation I delete all those parts from it and then make a shorter one. Because that's a problem that you don't have in all countries the same product range. But it confuses the reader if he sees some information that does not concern him, I think.

7.6.1 Adequacy of Information

Main Findings
<ul style="list-style-type: none"> • Some technical details could be added to the documents • There could be more examples and practical experiences of using the devices • More documents concerning systems and software are needed

When asked whether there was enough information in the documents, the respondents had only a few suggestions to make of things which could be added to the documents. Most of these concerned minor additions of some technical details, such as error codes and information on spare parts. A few respondents also mentioned that the documents could include practical experiences on using the devices for internal purposes of use. In addition, in Germany there was a need for more specific approval information but as that information is country-specific, the respondents did not find its lack a major problem and were of the opinion that they could add that information themselves to the documents.

(83) Information missing from the documents, again just one little thing that I can think of: error codes. Customers have asked me on a number of occasions what's the interpretation of the error code that is on the equipment that we've sold them. When they have a problem, it will come up as "error number 275". Yet we've provided them with nothing that tells them what those error codes are.

(84) If I miss some information in the document, it is most often details which I would want to be there, but which are not there. For example,

these specific technical checkpoints for a product, it might be these limit values for current, voltage, temperature, that kind of things.

(85) Sometimes we have a little problem to find the documentation in our office about spare parts. So the documentation for the product is very good, there's no problem, but sometimes I miss a good document about spare parts.

(86) I think the documents could contain more practical experiences on the use of certain products. I think that knowledge could be shared at a much larger scale within the company.

One serious lack that some respondents mentioned concerned the documentation of the Systems and Services business line. The respondents were of the opinion that there is a general lack of information about the systems and software of that business line, and this information would be vitally important to have.

(87) On software and on system solutions we definitely don't have good documentation. We have manuals but we don't have good marketing documentation or support presentation for contracts. And it is very important that when we sell a system which has a lot of facilities to it and with a lot of money involved, it's very important to document the functionality of the system, we need to have a system description. But I haven't seen that yet on Avalon.

(88) I must say that in the system solutions side of things there's not that many documents available, I think there could be a lot more. The metering devices side of things has a lot more already.

7.6.2 Level of Details

Main Findings
<ul style="list-style-type: none"> • Level of details was generally considered adequate • The documents fulfil basic needs for information, whereas more specific information is received via personal contacts

The level of details was generally considered to be adequate in the respondents' view. They tended not even to expect the documents to fill all their information needs but seemed to accept that not everything can be written down in the documents.

(89) There is enough information to fulfil our needs at the moment. And like I already told you, it's more like teamwork. It's not only the documents from which we get the information we need. There is also some communication between Finland and Germany and whatever, Switzerland. So, in the question "how detailed should the information be" I think it's more that the document information fulfils some basic needs and some additional information still would be provided by telephone or something like that, or e-mail.

(90) There's always some questions we don't get information about in the documents, but if that is something you have to put into the document, I don't know.

(91) RJ: How detailed should the information be?

Respondent: Not too detailed. Not everybody needs so detailed information. And for me, it would be more important to have references where I can get more information and who can give answers.

There was also one opposite view by a respondent who wanted more details to be added to the documents.

(92) There are some details that are not described in the documents. You have to ask about them afterwards. So if the documentation is for my own purpose or for an experienced customer, I would expect it to be more detailed.

One respondent also mentioned that it would be helpful if the documents included more examples.

(93) Concerning E700, you have described the functions but you have no example. You know there is the configuration but there is no configuration example in the document and that's not nice.

On the whole, the respondents could not think of much information that would be totally useless for their needs.

(94) RJ: Do the documents contain information that is useless for your needs?

Respondent: Again I don't think so. I think they're quite well written and you can just find what you're interested in. And some other people might be interested in some information so I wouldn't take any information out.

7.6.3 Conclusions about the Appropriateness of Documents

The questions concerning the appropriateness of the documents gave rise to a lot of discussion and it was clearly an important issue in the respondents' opinion. The responses imply that the documents do not include enough information for sales purposes. In addition, documents on software, such as User Interface Manuals, were considered by some as being poor in quality and not useful. A few respondents mentioned that there is an overall lack of documentation in systems and software. This lack is probably due to the fact that these are quite new types of product at Enermet, so more documentation on these areas is likely to be produced in future.

One important thing that some respondents thought were missing in the documents was examples and this is something that could be addressed. In most cases, examples facilitate the understanding of complex issues, and they are thus very useful especially for new users. Therefore Enermet's documents could have more examples of, for example, configuration or in the instructions for using the software. In addition, the documents could try to take the needs of new users, in particular, more into account by, for example, explaining in the document what needs to be done before a certain procedure and help them get started with using the device in this way. As Price and Korman (1993:162) point out, information on what to do first will also help impatient readers who want to get started with using the product quickly.

On the issue of details in the documents, most respondents were satisfied with the level of details, although there were also deviating opinions. For several respondents it seemed to be more important to know whom to contact for more information than to have all the relevant information in the documents.

In addition, as regards the level of details in the documents, it is sometimes problematic to know exactly what the intended audience for the documentation is. If the documents are intended for experienced users, then the level of details should be greater and the information could be elaborated

on, whereas if the main audience of the documentation is novice users, too much elaboration can be confusing and even discourage the reader.

7.7 Accessibility of Documents

Accessibility in this context refers to the way information can be found in the documents, i.e. whether the document user has to browse through several different documents or jump from one page to another within a document to find the information he or she is looking for.

7.7.1 Ease of Finding Information

Main Findings
<ul style="list-style-type: none"> • In general, information was relatively easy to find • The overlap between the PD and the MIU caused some problems • Links and cross-references could be added to improve accessibility

The majority of the respondents reported that they generally have no major problems in finding information in the documents. Some respondents also seemed to think that it was not a problem if they did not find the information immediately since they could ask someone else where to find it.

(95) RJ: Can you find the information you need easily from the documents?

Respondent: Yes, normally you have the list of contents in the front pages and they are detailed enough to find the things I think.

(96) Generally yes. When we're doing a major tender, I do find there's a lot of technical questions that is still not covered in the documents. And I need to refer back to the Product Manager. But that is fine, I'm happy with that.

One respondent suggested adding an index to help finding information from the documents, especially in the case of long documents.

(97) I know we have the table of contents in the front, which is fine, but if you're in a hurry, then that could take a few minutes just to find the part that you want. So if in the back we had an alphabetical listing, it would make it much quicker.

Some respondents had found ways to go round this lack of an index by, for example, using search functions provided by text processing programs.

(98) If I have the right documents, it's easy to find what I'm looking for. I use the option Find in Word application, so I can make a search task within Word and then I can find the words which I'm looking for.

One respondent mentioned that if the documents were written in hypertext, it would make finding the information easier.

(99) I would think the documentation for the future should work a little bit like hypertext. So to be written in HTML, which allows for instance that you can skip very easily from one chapter to another. And if you want to go to details, you can just click and have detailed information.

When the respondents were asked specifically about whether they have to go through several different documents to find the information they are looking for, the overlap between the PD and the MIU came up once again. Some respondents stated that they had at times had trouble in knowing whether to look for some particular piece of information in the PD or in the MIU.

(100) RJ: Do you have to go through several different documents to find the information you need?

Respondent: Sometimes but not very often. I think it's only if I'm drilling down some specific technical information for a tender, sometimes I go and look in the PD instead of the MIU. But sometimes I have to go right into the MIU to find the information that we need.

One respondent also remarked that sometimes in support tasks he needs to use an older version of a document because the customer does not have the newest version of the product and in those cases, he has to go through several documents.

(101) RJ: Do you have to go through several different documents to find the information you need?

Respondent: Yes sometimes I have to. Because for support needs, for example, it is not clear when or when not to use the most accurate manual.

RJ: What do you mean by accurate?

Respondent: Well, questions which come from the field are not always questions about our latest products. And for the MT33, for example, we have quite a lot of generations and also quite a lot of document

versions. So it is more a question of which version do I need related to that product.

At the moment, Pingu includes only the latest version of each document, so for such a purpose of use as mentioned above, it can be difficult to find older versions of the documents. Thus, it might be worthwhile to consider having some kind of an archive on the Intranet where older versions of the documents would be stored.

Generally, the respondents did not regard jumping from one page to another within a document to find information as problematic. Most of them reported on doing that from time to time, but for them it was more a way of using the documents, i.e. to learn about the products, than the fault of the document.

(102) RJ: Have you ever had to jump from one page to another within a document to find the information you are looking for?

Respondent: Yes, sometimes. But I think you always have to do that, you jump around when you're trying to learn about the product.

(103) I'm thinking about the way I use the documents as a Product Manager and if I looked at their intended use for the customer, I don't see any problems, but for the way I use it, yeah, I do move backwards and forwards in the document. But I don't think that's the fault of the document. I'm not using it for its intended use.

There were also other reasons for page flipping, for example, a respondent did not always know under which category some information was located. He suggested that adding links and references to related information in the documents would improve this problem.

(104) It might be so that sometimes I think I will find the information I look for on the chapter six. Because it's written, for example "Register structure". But I don't find it there, I find it in another chapter, it's under "Tariffs". That's a question of how you understand the categories. So I don't think it's a big thing. But you could of course, if it was obvious that you could have those misunderstandings, you could write underneath, for example, "Register structure" and then add "for tariffs, see chapter seven" so that you're actually showing where related text is written.

Furthermore, another reason for having to jump around within a document was reported by one respondent. He was of the opinion that the documents include so much repetition that one has to jump over some sections because of that.

(105) Especially I noticed that in the M100G, there are the same things, I think, three times in one document. All the same, again and again. You have to jump over it when you read.

7.7.2 Conclusions about the Accessibility of Documents

The accessibility of documents is something that is usually more effectively examined in usability tests, by, for example, giving the users a task and observe how they find the information for solving it in the document (Atlas 1992:140). Nevertheless, users' own perceptions are also valuable when evaluating accessibility. In this study, the respondents generally found the documents to be accessible, in the sense that they had not experienced any major problems when trying to find information.

However, there were some suggestions for improving accessibility by adding what de Jong and van der Poort (1994:236) call access aids, i.e. features that help locate specific information in the document. In particular, a few respondents suggested including an index at the end of the documents and more links and references within the documents. However, creating an index is costly and time consuming, so it might not be worth the effort, especially when most documents are only some twenty or thirty pages long. Also, if hypertext links are added, they are likely to be difficult to maintain, as when the chapters change when the document is updated, the links usually no longer work. However, more cross-references from one chapter to another could be added to the documents in order to improve accessibility, as keeping them up-to-date is not so troublesome, only something that needs to be remembered each time the document is updated. In addition, as suggested by Reddout (1992:126), the table of contents should be designed to work as a reference for the user by anticipating the user's needs of information. Therefore, more attention should be paid to the design of headings and their hierarchy.

In addition, as mentioned earlier, the clarification of roles between the PD and the MIU would help users in knowing which information is included in which document. In turn, it would make finding information faster by reducing the need to go through both of these documents. This conclusion is corroborated by Nielsen (1993:153) who suggests that each document type should be as self-contained as possible. That is, users should not have to go through several different volumes to find the information they need to solve a problem.

7.8 Illustrations

Main Findings
<ul style="list-style-type: none"> • More illustrations could be added to the documents • The existing illustrations were found useful

Illustrations, such as graphs, tables, and pictures, often make the documents livelier and more readable and also some information easier to understand. However, the respondents were somewhat divided in the question of adding more illustrations to Enermet's documents. Some of them thought there were enough illustrations already and were reluctant to include any more, whereas others were strongly in favour of adding more illustrations without any hesitation. The PD, in particular, was mentioned as lacking in illustrations.

(106) No, graphs and tables, I don't think there is [enough], there is almost nothing. So there should be more graphs and tables, pictures and illustrations. It is always good. Especially the PD could do have more pictures in it.

(107) Actually thinking about it now, I don't think there are [enough illustrations]. I think it's a lot easier to demonstrate something with a picture than writing it in words. For example, flow charts and those sorts of things for procedures are very good. And in the software manuals, the screen shots are very good to use.

(108) I don't think we use visualisation enough, and I think we say a lot of things that could easily be replaced with concise pictures, illustrations and so on. It's rare in our documents to find graphical representation of something, about anything.

(109) I think there are sufficiently pictures and illustrations to give a complete overview and detailed information about the product itself. I think the only need might be that for sales we could use a little bit more illustrations or pictures. I need some more fashionable pictures to get the attention of the customer.

(110) It is generally enough if there is a picture of the device in the document. Pictures are not so important.

Some respondents were in favour of also using more colour in the documents.

(111) To me, the more that we can have colourful pictures, diagrams, graphs, etc. the better. For instance, a wiring diagram in black and white can be extremely complex. Add some colour to it and it's extremely simple.

However, having colourful illustrations in the documents is very expensive and adds a lot to the cost of documentation, so their use should be carefully considered. Illustrations themselves also take up a lot of memory, which was also pointed out by one respondent.

(112) It's not good to have too much pictures in the sense of nice and glossy pictures because then it's a hell of a problem of handling them in the Intranet because it takes capacity. It looks good but it's not efficient.

The illustrations existing in the current documentation were, in general, found useful and the respondents did not have much to say about them.

(113) There are not too much illustrations in the manuals, but the ones that are, are simple and OK

(114) I think what we have in there is useful. I don't think we have pictures that were not useful, so I would say what we have is being used to its best advantage.

7.8.1 Conclusions about the Illustrations

It is true that Enermet's documents do not include a great number of illustrations. Often they include only a picture of the device. Therefore, as several respondents suggested, it might be worthwhile to use more visualisation to make the documents more readable. Also, as regards marketing material, the addition of illustrations would make the documents

more attractive for the customer. However, illustrations should be kept simple so they would not take too much transmission capacity.

Furthermore, it is interesting to note that all the respondents who were in favour of adding more illustrations to the documents worked in Australia, Norway, the Netherlands or Switzerland, whereas all of those who thought there were enough illustrations already were either from Germany or the Czech Republic. Therefore, cultural differences between these countries might explain these differences in opinion to some extent, although the sample is too small to make reliable generalisations. Alternatively, the differences could be due to different institutional practices in these two groups of countries. In addition, the products that Enermet sells in Germany, for example, are more simple than in Australia or Norway. Therefore, as regards simple products, the users do not find that they would need illustrations to clarify matters for them and therefore, it may not be so necessary to include illustrations in the documents.

The fact that the respondents did not find any defects in the existing illustrations suggests that they are carefully designed and sufficiently effective in their representation.

8 Discussion

In this section, I will first summarise the main findings of the study and then proceed to discuss the implications of the results. In addition, suggestions for developing Enermet's technical documentation will be made. Finally, I will evaluate the study by discussing the limitations of the method, among other things, and make propositions for further study.

8.1 Summary of Main Results

To sum up, the respondents' views on Enermet's technical documentation varied to a great extent on several important issues. The respondents' document use also varied and there were many different purposes to which they used the documents. The most important purposes of use included learning about the product, creating new documentation sets, using the documents as sales aid, and answering customers' inquiries. Among the less frequently mentioned purposes was their use for training and support purposes.

The availability of the documents gave rise to several different opinions and the respondents generally detected defects in the documentation management and availability. In particular, getting information about new documents was considered inadequate. However, the respondents mentioned that since the implementation of Enermet's Intranet system, Pingu, information has been more easily available about new documents as well. There were also problems with the version control of the documents, as many respondents remarked that they did not always know which the most current document was and they mentioned that this was a major problem for some customers, too. In the respondents' view, the documents were generally available on time, so that was not considered a problem.

The respondents had mainly positive feedback to give concerning Pingu, which is nowadays the main storage place for the latest documentation. However, the respondents generally found that Pingu still needed a lot of development, as they felt that it was often difficult to find the right document

from there when there are no search functions available. Also the user interface of Pingu needed developing in several respondents' opinion.

The possibility of creating an Extranet for customers was generally regarded as a good idea although there were some respondents who were not entirely certain whether it would be useful or worth the effort. The benefits of the Extranet mentioned by the respondents included, for example, saving the time of both the customer and the company and providing information in the format the customers prefer. The respondents also pointed out some drawbacks, such as the risk of losing the opportunity to talk with the customer.

Of Enermet's different document types the respondents generally reported using the PD the most, whereas the MIU was used the least. Some did not use the MIU at all. The division between the document types was, on the whole, considered rather successful. However, several respondents felt there was an unnecessary overlap between the documents, as the same information was repeated in, for example, the PD and the MIU. Some respondents regarded this as confusing.

The language used in the documents was generally considered to be easy enough to understand and the terminology reasonably consistent, although there were some exceptions as well. What was interesting was that the opinions on the structure of the documents varied to a great extent. Some were completely satisfied with the structure, whereas others had a lot to criticise about, for example, the organisation of information.

The documents were, in general, considered to be up-to-date, with only a few exceptions, and the information in them correct. Whether the respondents felt that the documentation was appropriate for their needs or not, varied a lot. This was an issue that probably caused the greatest differences of opinion. Some respondents mentioned that the way the documents were written (e.g. as regards their structure and style) did not meet their needs or the customers' needs, whereas others thought the documents were relevant to their needs.

As regards the lack of information, the respondents did not mention any great deficiencies in the documents, and only suggested some minor additions to be made. However, the documents could include more sales arguments and explain the value of the product or service more clearly for the customer. Furthermore, the respondents felt there was not enough information available on the software-related systems and solutions.

Finding information in the documents was not generally considered to be a problem, although the overlap of some documents caused difficulties at times especially for those respondents who had not been working for Enermet for very long.

Including illustrations in the documents was another issue that divided opinions. Some respondents were clearly in favour of adding more illustrations to make the documents more attractive and the information easier to understand. However, there were others who thought that there were quite enough illustrations already. Cultural factors may explain these differences in opinion to some extent.

Thus, on the basis of this study Enermet's documents can be considered, in general, relatively user-friendly. However, areas in which defects were found and which are in need of development include, in particular, document availability, management, and appropriateness. Improvement in these areas would in turn improve other aspects of user-friendliness, such as ease of understanding and use.

8.2 Implications of the Results

This study contributes to the study of technical documentation by examining the documents from the user's point of view and taking into account also cultural factors. Although the respondents' views varied in many topics a good deal, the study was useful in recognising the problematic areas in Enermet's documentation. It could be detected from this study as well as from the

previous studies mentioned in chapter 5 that personal factors also play a part in how users relate to the documentation, which may explain the divergence of the opinions to some extent. In addition, there are factors on many different levels that have an effect on users' views on the documentation, ranging from their expectations for the genre of technical documentation to cultural issues. When writing the documents, attention can be paid to some factors that contribute to the user-friendliness of the documentation, whereas others are clearly more difficult to take into account.

The results show that it is important to know the context of use for the documents. This includes knowing the intended audience, their needs, and the tasks they need to perform with the help of the documentation. To achieve this aim, more research needs to be done by means of, for example, usability tests. In addition, this study suggests that in order to be appropriate and thus user-friendly, the documents need to be written from the user's point of view, not from a technical point of view. This view is corroborated by Hackos and Redish (1998:412) who state that the focus of documentation has to be the users performing their work instead of documenting the functions that are used. Thus, the organisation of information, for example, should be based on the tasks the users need to accomplish.

Furthermore, when we compare the results of the study with Weiss's (1991:20) notion of errors that can occur in technical documentation (see page 28), it seems that the errors in Enermet's documentation concern the strategic and structural level of documentation, but not the tactical level. Thus, audiences and tasks are not sufficiently well defined, and there is a lack of reviewing of the documents, but the documents are carefully written and edited. In consequence, more attention ought to be paid to defining the basic strategy of documentation, i.e. what is it that the company wants to communicate about its products, how, and to whom. After this basic message has been defined, it is easier to start planning concrete steps for improving the documents in practice.

8.3 Implications for the Development of Enermet's Documentation

As regards Enermet's technical documentation, the results of this study give several practical ideas for improving the user-friendliness of the documents. Some of the problems that came up in the study could possibly be solved by implementing changes in the documentation practices and process in use at Enermet. I have gathered here the main points that in my opinion could be developed further.

1) Increasing the availability and management of the documents

At the moment, there are no specific documentation tools used in documentation management at Enermet. The lack of proper management system causes problems for version control and the availability of documents. Thus, *implementing a structured documentation system* would make documentation more effective. Structured documentation entails that the document consists of separate structural elements which have been defined beforehand and which can be created and managed independently from one another. Structured documentation enables more effective data retrieval and more uniform structure and layout (Anttila 2001:81).

In addition to implementing structured documentation, version control could also be improved by *providing users with more information of the changes* that have been made in the documents since the previous version. Thus, as suggested in chapter 7.2.3, information about changes that have occurred between different versions of the documents could be given at the beginning of each document. Also, communication about new documents should be made more effective.

2) Adapting the documents for different markets

Users in different markets and countries have different needs for the documentation. This should be taken into account when designing and writing the documents, so that the documents are adapted for different markets. Then there would be no need for local companies to make their own versions of the

documents and thus waste resources. In my view, there are two alternatives to achieve this. The first alternative is that *the documents are reviewed for each country* separately, so that the technical writer in Finland and a contact person or persons in the local company go through the document together when it is in a draft stage to make it suitable for that particular market. In other words, they localise the documents so that they are appropriate for each market. One way to do this, as Hoft (1995) suggests, is to keep core information that is common for all users and international variables separate, so that these international variables are the parts of documents that are localised. This could be a useful way of doing localisation at Enermet, too. In particular, if structured documentation would be taken into use, it would be relatively easy to manage the international variables and core information.

Or, alternatively, the aim could be to *develop a standardised model of documentation* that would be as universal as possible. This could be achieved by taking into account the needs of users in different countries but making the document useful throughout the world. This standardised document would be as independent from culture as possible and universally acceptable. This process is what Hoft (1995:24) calls globalisation. The idea is that a global product can be used in several markets in the same form without modification (Hoft 1995:24). However, in the case of Enermet, more information is needed about the users of the documents to achieve globally suitable documents. Therefore, an audience analysis regarding all user groups of documents ought to be conducted first, in which the needs and expectations of users would be clarified in more detail.

In any case, it would be beneficial to *have more extensive co-operation* between the local companies abroad and the marketing communication personnel in Finland in matters related to documentation. This co-operation could, in the long run, improve the appropriateness of the documents for different markets and help the technical writers in designing the documents for both internal and external users.

3) **Improving the contents and division of document types**

Related to the standardisation of the documents is the issue of *creating more specific guidelines for each document type*. This is particularly important as regards the Manual for Installation and Use and the Product Description since the respondents reported problems in knowing which of these two document types to use. If the document types had strictly defined contents with minimal overlap between them, it would be easier for the user to know which document is intended for which purpose. Furthermore, to make the documents more user-friendly, there should be clear guidelines for the structure of each document type. In other words, the roles of different document types ought to be clarified. For example, having written *templates* for each document type would be a useful aid for the writer. *Checklists* could also be used to ensure that all the relevant information to that particular document type has been included in the document. In addition, to help readers, there could be a *description of the documentation* available in which the purpose and contents of each document type would be explained.

As regards the contents of each document type, the results of this study suggest that they could be improved to some extent. For example, the Fact Sheet should include more sales arguments and explain the value of the product or service to the customer in more detail to serve the users' needs more appropriately.

4) **Making the documentation process more effective**

The documentation process could be made more effective by, among other things, *implementing a review procedure* in the process, which in turn would contribute to the user-friendliness of the documents. In the review, participants would include the in-house technical writers, product and project managers, in addition to subject matter experts. Although severe defects were not found in this study as regards the correctness of information, such a procedure would help eliminate errors from the documents. The review would also increase co-operation between people who are involved in the documentation process. In addition, the co-operation could be more extensive so that technical writers

would, for example, have regular meetings with the technical support personnel. As they are in regular contact with customers, technical support personnel would be able to provide information about the users' needs and the problems they have encountered. This information would be beneficial to share with the technical writers.

What also could be implemented in the documentation process is *creating written specifications* for all the documents during the planning phase. These specifications would outline the contents of each particular document, which would facilitate writing and, if these specifications were reviewed, it would also help to make sure that the documents are free of errors.

In order to find out whether the documents are appropriate for users and serve their needs, the documents could also be *tested for their usability*. However, although testing is likely to improve the quality of documentation, it is usually time-consuming and costly. Thus, for Enermet's purposes, testing might be replaced with careful reviewing.

5) Aiding new users

An important aspect of user-friendliness that is also referred to in the dictionary definitions of the concept (see chapter 4.1) is that the documents are easy for novices, in particular, to use. However, it can be concluded from some respondents' comments that Enermet's current documentation does not take into account the needs of new users sufficiently. This lack shows on different levels. First of all, as mentioned above, it is often difficult for a new user to know which document to use. Secondly, the criterion of illustrativeness is not adequately met in the documents as they include relative little graphic representation and few examples. Thirdly, instructions for getting started when beginning to use a product are not adequately well given in the documents. Thus, as already suggested, the roles of different document types ought to be clarified and the document types explained for the user. *Illustrations and examples should be added* where appropriate in the documents. In addition, whenever instructions are given on how to perform a task, there could be a

section at the beginning regarding what the user needs to do before proceeding further. These improvements would increase the documents' ease of use not only for novice users, but also for more experienced users of the products.

6) Improving the accessibility of the documents

Improving the accessibility of technical documentation, i.e. making information easier to find, contributes to the ease of use of the documents. Access aids (see chapter 4.4.2) help users locate the information they need. One such access aid is the table of contents that is the starting point for finding information for many users. Thus, *the table of contents should be designed carefully* so that headings state clearly what each chapter is about and there is an appropriate number of heading levels. In addition, *more cross-references could also be added* to the documents from one chapter to another.

To improve accessibility and also the availability of the documents, there could be *a list of all the available documents* on the Intranet, for example. Then users could quickly check what kind of documentation is available for each product and whether they have all the relevant documents.

7) Developing the delivery formats of the documents

The study showed that despite some conflicting views, there is clear support for *creating an Extranet* in which documents would be available for Enermet's customers. The Extranet would make the delivery of documents for the customers more effective than what it is today. It would also save time and resources for local Enermet companies. One possible way of implementing the Extranet is to make it a part of the existing Intranet so that internal users would have access to both databases and external users only to the part where customer documents would be located. Then, there would be no need to develop a completely new system for the purposes of the Extranet. However, it needs to be considered carefully which documents to put on the Extranet, as the respondents' views varied a lot in this matter.

Regardless of whether the Extranet is implemented or not, the Intranet system, Pingu, needs to be developed further. *Search functions should be added* to increase accessibility. Furthermore, Pingu's *structure and layout need to be clarified*, which, in fact, has already been done to some extent after the interviews were conducted. Pingu could also be *expanded to include other documents* as well in addition to customer documents, so that it would serve users' needs in a more versatile manner.

8.4 Evaluation of the Study

There were some limitations to this study that should be mentioned. During the interviews, the respondents discussed the problems that they had encountered in the documentation on a general level and often they were not able to give specific examples, which would have been useful for the purposes of this study. It might have been worthwhile to ask them to think of such examples in advance or let them have a look at some material during the interview. Otherwise the semi-structured interview method worked well and provided a wealth of material to analyse for the purposes of this study.

Furthermore, interviewing also external users of documents for this study would have provided a more versatile picture of the user-friendliness of Enermet's technical documentation but it would have been too much for the scope of this Master's Thesis. Therefore, it was better to focus on one user group and thus get more detailed information from this one group.

Another possible limitation of this study is that its results are mainly applicable only to this particular company. However, they can be compared with the results of similar case studies, such as the study by Isohella (1998) mentioned in chapter 5.1, although the sample size of this study, 12 respondents, does not enable making extensive generalisations.

8.5 *Suggestions for Further Study*

Some possible areas for further study include the user analysis of Enermet's documentation, which would provide more precise information about the users of the documents, including customers that were left out of the scope of this study. In addition, a usability test could be carried out to find out how easy the documents are to use in practice.

As user-friendliness in technical documentation is a many-sided concept, it could also be examined by focusing on only one aspect of user-friendliness, such as appropriateness of the documents for users. This kind of approach would give more detailed information concerning this one aspect and might produce more precise suggestions for development.

9 Conclusion

Although the main user group of Enermet's technical documents is the customers, the needs of internal users should also be taken into account when designing and writing the documents as they are also an important user group. The aim of this study was to find out how user-friendly Enermet's technical documentation is and how well it serves the internal users' needs. User-friendliness is an important aspect of technical documentation as it largely determines the usefulness of the documents to users.

The semi-structured interview was used successfully as the research method in this study. The respondents were Enermet's own employees from different countries who work within sales, marketing, or product management functions. In the interviews they were able to explain their views in depth and thus a wealth of material was gained. The responses varied a great deal as document users have different needs and expectations for the documentation so that what is user-friendly for one user may not be that to another. Thus, when writing the documents, different needs and purposes of use have to be accommodated. In addition, the respondents came from different countries which have different kinds of products and cultures. However, the results helped recognise the main problem areas of Enermet's documentation, which are related to the availability, management, division, and contents of the documents. Suggestions for improvement were also given on the basis of the findings.

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APPENDIX

INTERVIEW QUESTIONS

The purpose of this study is to find out how user-friendly Enermet's customer documents (Product Description, Fact Sheet, and Manual for Installation and Use) are from the user's point of view. In order to improve the documents, information is needed about how well the documents meet the users' needs and whether the documents are easy to use and understand.

Background information:

Age?
Education?
Job/position?
Work experience (in present job)?
Duties (which Enermet's products)?

Enermet's customer documentation:

a) Purposes and functions

1. To what purposes do you use Enermet's customer documents in your work?
2. How often do you use them?

b) Availability and delivery format

3. How do you get information about new documents?
4. Are the documents easily available and on time in your own language?
5. Would your customers benefit from having the documents in an online environment with restricted access to customers only (=Extranet)?
6. Which documents should be available in Extranet and why?

c) Document types

7. Which type of document (Product Description, Fact Sheet, Manual for Installation and Use) do you use most often and for what purposes?

8. Is there some document type (Product Description, Fact Sheet, Manual for Installation and Use) which you never use? If so, why?

9. Is the division between different document types clear (what information is included in which document etc.)? If not, why?

d) Language, structure, layout

10. Is the language of the documents easy to understand?

11. Are the terms in the documents used consistently?

12. Is the structure of the documents appropriate?

13. What is your opinion of the layout of the documents? Could it be improved in some way?

e) Correctness of information

14. Is the information in the documents up-to-date?

15. Have you detected mistakes in the documents? If so, what kind?

f) Appropriateness of the documents

16. Is the information relevant to your needs? If not, why?

17. Is there enough information in the documents?

18. Is some information missing from the documents that you would like there to be? If so, what?

19. Do the documents contain information which is useless for your needs? If so, what?

g) Accessibility of the documents

20. Can you find the information you need easily from the documents? If not, do you have any suggestions how it could be made easier?

21. Do you have to go through several different documents to find the information you are looking for?

22. Do you have to jump from one page to another within a document to find the information you are looking for?

h) Illustrations

23. Are there enough pictures and other illustrations, such as graphs and tables, in the documents? If not, what should be added?

24. Are the illustrations informative and useful?