

Product Information, an upcoming IS Research Area

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Abstract. Our everyday world is being filled with an increasing number of technical products. The correct utilisation of all those devices is dependent on good manuals, i.e. Product Information (PI). In examining the production, dissemination, utilisation, and other relevant aspects of PI it is however found that the field is facing great problems and challenges at the same time that there does not exist any research specifically focusing on PI. Hence, the paper argues for the necessity to establish PI-research as an acknowledged field within IS-research. It is further concluded that the existing paradigm is product oriented while the paper finds a person or organisation oriented one more relevant.

1 Introduction

Our everyday world is rapidly filled with an increasing number of technical products or artefacts, may it be cell phones, dishing machines, or cars. The purpose of this “productification” is to facilitate our practical lives. The correct and beneficial utilisation of all those devices, however, is dependent on the availability of timely and context adapted user instructions (manuals), i.e. what we here with a generic term will call Product Information (PI).

The crucial problem facing current PI practice, however, is the apparent lack of organised and purposeful research focusing on this specific area. With other words, PI is not recognised as a research area of its own. Hence, the paper will start with a compilation of main PI problems.

Despite the lack of research on PI, however, there exists a considerable body of knowledge of relevance to the field. This knowledge is produced partly within other IS fields, partly within agencies and business firms working with PI. An examination of that knowledge base follows in the next section of the paper.

Based on those initial findings a coarse design for highly needed PI-research and PI development activities will be proposed in section four. The paper is finally closed with some general conclusions and comments.

Hence, our main purpose with this paper is to increase the understanding for the necessity of establishing PI-research as an acknowledged field within IS. Further, initial plans for such research and development will be ascertained.

2 Problems Facing Product Information

With the intention to start up and bring the research on PI systems further, a three-year research project called Technical Information Centre (TIC) has commenced in May 2008. TIC is a collaboration including Swedish Defence Material Administration (FMV), Mid Sweden University, and a number of companies that produce and manage PI.

During initial project phases a set of severe PI-problems has been identified and analysed (Öberg, 2007). Examples of those problems include:

- **Reuse**; Today it is difficult, or even impossible, to reuse whole or parts of existing information.
- **Retrieval/availability**; It is often difficult and time consuming to identify and retrieve existing information.
- **Standards**; There is no common and accepted standard for information management and information exchange within the PI-field. On the other hand, there are many candidate standards partly applied in an ad hoc manner.
- **Management of unique documents**; It is today difficult to meet the requirement that it must be possible to separately handle every single variant of documents, (or other forms of information).
- **Preservation of information over time**; Product Information must be kept and available throughout the products whole life cycle.
- **Products**; There is an increasing amount of information and information systems embedded in most new products. There exists, however, no common strategy within the PI-field concerning how to attack this new information challenge.
- **Tools**; New tools and techniques for producing PI are continually proposed. There exists, however, within the PI-community no common and accepted procedures and criteria for assessing and selecting new technical solutions for handling of PI.

- **Education and training;** Today there exist no education and training specifically focusing on work within the PI field.
- **Users;** Today there is weak connections between users and producers of PI. PI producers feel a lack of feedback. At the same time it seems, for example, to be an ongoing change in the user's ability to understand written information.
- **Language;** PI need to be produced in many languages. Manual translation is time and money consuming while automated translation is not yet fully operational. Some hybrid solution may be feasible but is yet not identified.

Most of those problems are to some extent already studied in general IS-research but both problems/questions and answers have to be adapted to the specific PI context. The problems observed in TIC where also approached in a recently finished project called SMEdoc. In that project, two small and medium-sized enterprises (SME) with large volumes of Product Information were studied. Examples of their product information are Service manuals, instructions, warranty information, lists of spare parts (Borglund & Sundqvist, 2007).

Both companies have to supply documentation in many different languages. When a product is, even slightly, modified, the documentation must be up-dated as well. However, the previous versions of documentation must still be kept, because the products have a fairly long life time, and the accurate documentation must be available at least as long as the warrant for the last sold product of a certain model is valid. Documentation may also be kept longer for practical reasons or good-will. When customers with the old products need spare parts they often refer to the original documentation, or if they have lost it they must be able to get a new copy.

Problems that occur today are that documents/information reside in different systems and are therefore difficult to find. It is much easier and less time-consuming to ask another person than to try to find the document. There is of course a risk connected with such personal dependence. As the companies manufacture products with slightly different design it is efficient to reuse the documentation. As it is difficult to find the appropriate document/-s (drawings and technical descriptions) it is often easier to start all over with the documentation. There is a need for version management and temporal data management. Other needs that are crucial are to be able to manage images and video using simple meta data marking and to manage compound documents.

3 Research activity within the area

There are a lot of interesting examples of research that concerns the area of PI. One issue that has gained some focus the last year is standards. Within this area the XML-technologies seems to be well-spread and there are nowadays examples

of standards that are built upon different XML-technologies. In Finland there are example of implementation and evaluation of XML-technologies since 1994 (Salminen, Lyytikäinen & Tiitinen 2001). The Finnish research groups have experiences of both SGML and XML and the research settings have been in the Finnish parliament. The application independency of XML creates possibilities to exchange and save information (Varlamis & Vazirgiannis 2001) is of course one of the strengths. According to Salminen (2005) the research group has experienced problems with metadata when implementing XML. Meanwhile metadata is defined so differently. Another problem that has been identified by the Finnish research group is changes within specifications and software. XML-technologies are today often used when other types of standards are built. One example of this is the S1000D-specification. S1000D was first used by the military aircraft industry. The specification is extensive and includes management for structure, content, storage and exchange of technical information (Greenough & Williams, 2007). S1000D is built upon a module-concept, which means that the documentation should be divided into modules that can be re-used. A module is defined as “the smallest self contained information unit within a technical publication” (S1000D-specification 2007). The specification is based upon several communication standards (ISO, CALS and W3C) which makes the information is created in a natural format. Greenough and Williams (2007) argument in their article, that S1000D could be useful also in other settings. They have focused on machine tool industry. The machine tool industries make today little use of the features of electronic formats. One example of an ISO-standard that is of interest within the area of product information system is PLCS (Product Life Cycle Support). PLCS is intended to make it possible to exchange information between all phases within the product life cycle. The key concept is by Dunford and Bergström (2007) described as; “to create one source for the truth”. Both when it comes to S1000D and PLCS there are few examples of implementation test and evaluation, which should interesting research questions.

One of the identified problems within the field of PI is to retrieve information. There are several techniques to meet this problem. Nowadays “to google” is a concept and there is a risk in believing that a google-search-engine will solve this type of problems. Paganelli and Mounier (2003) has made the conclusion that retrieval system must be adapted to technical information and the fact that general information search differs from information search made in work situations. One problem with google-search is that it is impossible to know if the search shows all available information (Tough & Moss 2003). Nowadays when producers of technical information often make specific manuals for one customer it is important to find the right manual and not a similar one. Within for example information, library and archival sciences techniques like metadata, vocabularies, ontology’s (Garshol 2004) are seen as solution. This kind of solutions would then make it possible to build and make better retrieval systems. One interesting

example within this area is Topic Maps. It is a form of mind maps where the information object is described by metadata and by relationships to other object and information resources (Garshol 2004, Siegel, 2006).

Another of the identified problem that has been presented is huge expense to translate technical information to other languages. An ideal that has been mentioned in the interviews and at the seminars is IKEA. IKEA use symbols in their instruction and thereby avoid the translation problem. Schünemann, Best, Vist & Oxman (2003) has made an attempt to find research that compare and evaluate the efficiency in communicate with symbols. They did not find any such examples but conclude that if symbols are used they have to be simple to understand too many different cultures. The symbols, the limitations of the symbols and the order of the symbol must be intuitive. There is some interesting research going on within the field of E-learning. Bluemel. Et Al (2003) has developed a model that is based on scenarios. Instead of using individual animation the scenario will keep track of where in the scenario the user is. The user can use between follow the scenario or taking the commando. Further example of adjacent research is Stock & Weber (2006). They argument that Augmented Reality can be used to produce technical information that will be easier to understand. Besides those examples of making use of graphical elements within the documentation it is a fact that a lot of documentation includes text. Simplified English (SE) one of the most used restricted language. SE has been used since 1970's and is developed by Boeing (Spyridakis 1997). The use of SE has been seen as a tool to produce more understandable information and also to make it easier to translate the information. But even though SE is well spread there are few examples of studies that show that the positive effects are reached. According to Bernth (2006) all restricted languages should be developed and for example includes text rhythm, which include long and short sentences for example. There are examples of machine translation that has been developed to replace manual translation. Llitjós & Carbonell (2006) present a method, which is based on a feedback loop. The person who makes the manual corrections should make them input in the system so that it could make a better translation next time.

The last problem to discuss is how to manage the information that is created within a project and thereby during a product life cycle. During this time there could be a lot of different actors involved, but the information must be shared and maintained. This information has to be managed from the point where it is created to a preservation phase. Hall et. Al (2006) presents in their article a tool that has been used by the defence in Australia. Since 2002 they use a tool that is called CMIS (Configuration Management Information System). In CMIS it is thereby possible to link information from different systems; such as MRP (Management Resource Planning, CAD-systems, different kind of publication tools (like Framemaker). The basic concept within the S1000D specification is to divide information into modules that could be re-used. To be able to re-use and manage

all the modules it is recommended to something called a common source database. There are also examples of different kind of tools to manage all the information. A problem with both this types of solutions is that they are expensive and not adjustable to SMEs.

4 Research directions

The Swedish defence have about 1 500 000 products/objects that they utilise and every year there will be another 20 000. To most of the products there are more or less product information. The existing paradigm is product oriented, i e the product information supplier starts out from the product and tries to reckon what kind of information is needed to show all aspects of the product. Another view would be to have a person-oriented paradigm. Person orientation in this sense means that you look upon the different roles and situations that a person can have or be in and form the product information out from that.

The overall research objective will be to form a general system model for product information within a person oriented paradigm (see figure 1). The model must be able to handle product information objects and deliver required information adapted to the personal needs.

Subordinates to the overall research objective, but as a step in building the model are the aims of the TIC project. The aims are to develop methods and tools for identification, test and evaluation of new techniques within the area of Product Information Systems and to develop teaching materials to provide competence within the area. The project will also create a platform for Product Information Systems including a centre for research and competence development and a network for the dissemination.

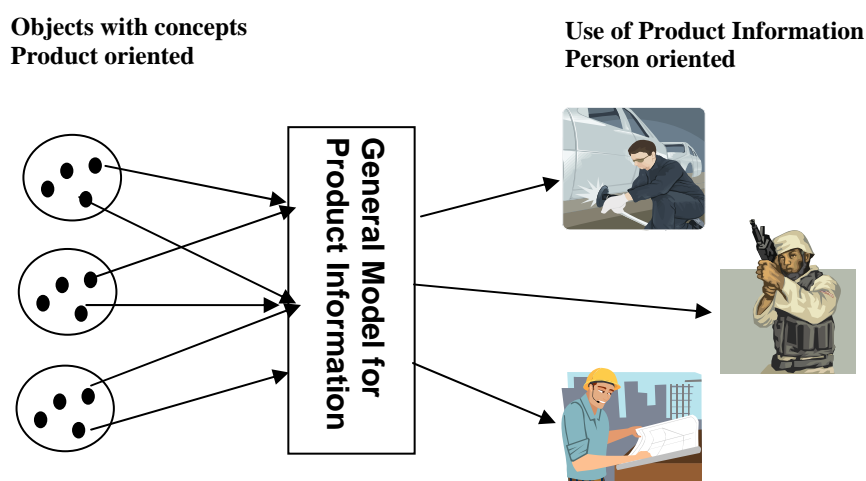


Figure 1. Overall research objective

5 Conclusions

Obviously our living environment is more and more filled, or even dominated, by man made artefacts. In order to live successfully in that artificial environment we need accurate and timely information. Today the production, dissemination and, utilisation of that information, however, is filled with great problems and challenges. A first step to consider in order to improve the situation would be to shift from a product oriented view to a person or organisational one. Further, research of relevance for PI is scattered all over the vast IS field. In order to better manage our artificial environment in the future, however, it is found that research of relevance for product information ought to be organised into a specific IS field, i.e. PI-research. A solid platform for such research is already established within other IS niches.

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