Spreadsheet End User Development and Knowledge Management

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INTRODUCTION

In the early days of computers, expertise was needed in order to use computers. As IT tools have become more powerful and user friendly, more and more people have been able to use computers and programs as tools when carrying out working tasks. Nowadays, it is possible for people without special IT training to develop Information Systems (IS) that only IT specialists could have done some years ago.

In this paper End User Development (EUD) using a Spreadsheet Program (SP) is discussed from a knowledge management perspective. *EUD* can be a part of an organization's effort to take advantage of existing, often tacit, knowledge or creating new knowledge. An end user is a person who acts both as a user and a systems developer. A typical feature of an end user is that he has a good (often unique) knowledge of the business and the work related to the IS in question, which is called the User Developed Application. It is the combination of these two sorts of knowledge which is the key to EUD as knowledge management.

The aim of this of this chapter is to relate EUD to knowledge management and, specifically, to describe how tacit knowledge can be audited when end users develop spreadsheet systems for their own domain of expertise. The main source is a set of qualitative case studies carried out between 1995 and 2005. (Avdic, 1999; Westin, Avdic & Roberts, 2005)

BACKGROUND

There are many reasons for professionals to use personal IT tools such as spreadsheet programs in their daily work. One is to increase their knowledge and understanding of their professional domain in a changing world. The use of spreadsheet programs in order to develop systems for decision making is an alternative to more traditional systems development, where IT specialists assist in specifying information needs and other requirements as a basis for a systems development process where the IT specialist is the developer. This "traditional" procedure is often the only option since developing the system, especially its technical parts, is complicated and not possible to carry out by non-IT specialists. When the technical dimensions are uncompli-

cated, there are some interesting benefits for professionals to develop their own systems.

End User Development is herein defined as "…the use of the adoption and use of information technology by personnel outside the information systems department to develop software applications in support of organizational tasks." (Brancheau & Brown, 1993) In our case studies, we have studied end users developing systems using spreadsheet programs. The end users have worked as controllers, administrators, civil servants, production planners, and managers in private companies and local government organizations. Some studies have been longitudinal, the longest one ten years. One thing they have had in common is that they are all professional experts in their domains. All of them have had the possibility, to a large extent, chose their own working situation and how to carry out the way they work.

Knowledge Management "is the name given to the set of systematic and disciplined actions that an organization can take to obtain the greatest value from the knowledge available to it." (Marwick, 2001) Focus here is more on "obtain greatest value" than "systematic and disciplined." The forms of EUD that are discussed here are often related to groups that could be described as *Communities of Practice* (Wenger, 1998) and whose development activities, to a large extent, are about making *tacit knowledge* explicit. (Polanyi, 1967) Among the practitioners' working situation and domain of expertise, there has been organized and disciplined activities in order to explore the knowledge domain by developing spreadsheet programs in various forms of cooperation with colleagues and peers. This is, to a large extent, an expression of social learning, which is a fundamental concept regarding communities of practice. (Wenger, 1998)

The knowledge management approach discussed in this chapter is more inductive than deductive in the sense that development activities are not planned or organized by the management but by the end user from his practitioner perspective. This is also a typical way for communities of practice to exist. The process of creating and sharing knowledge is complex, abstract, and subtle and, to a certain degree, a tacit process in itself. In accordance with Walsham (2001) we believe that knowledge management processes of the kind we discuss benefit from putting the human before IT.

Organizations where EUD activities take place are decentralized organizations where skilled practitioners have

the mandate and resources to independently develop various sorts of applications. Decentralization of decision making is a necessary condition "…when tacit and detailed knowledge is involved in opposite to explicit aggregated knowledge." (Grant, 1997)

The distinction between *tacit* and explicit *knowledge* is originally presented by Polanyi (1967) and is frequently used ever since. The notion of tacit knowledge refers to knowledge, experiences, and abilities that are not able to represent or codify, while explicit knowledge is possible to represent in, for example, books and computer programs. Some claim that most knowledge (50% - 95%) is tacit. (Awad & Ghaziri, 2004) Since tacit knowledge is not explicit, it is not possible to question. When end users make tacit knowledge explicit, it becomes, at the same time, open to inspection. This is an important part of EUD and the focus of this chapter.

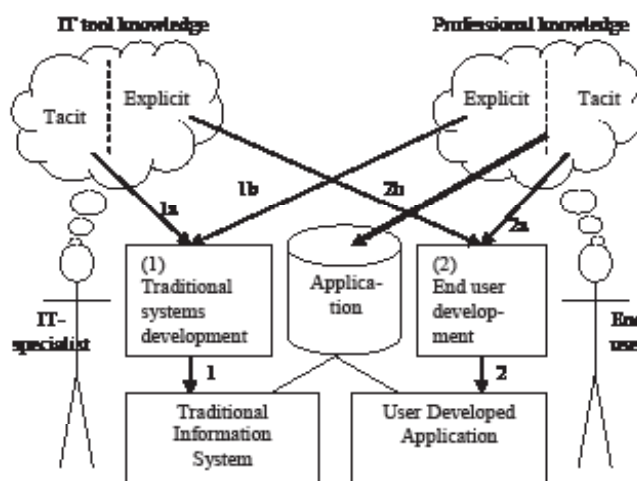## MANAGING KNOWLEDGE BY SPREADSHEET END USER DEVELOPMENT

Traditional and End User Systems Development

EUD is often compared to *systems development* carried out by IT specialists. This is not always relevant, but below we are applying the comparison in order to draw the attention to some central knowledge related properties inherent in EUD.

In Figure 1 the difference between traditional systems development (1) and EUD (2) is outlined. To the IT specialist, knowledge about systems development tools (e.g. methods, program languages) (1a) is in primary focus when developing an IS (1c). This is the core of his/her professional knowledge. Knowledge about business (1b) is, of course, essential but not primary. When the IT professional starts the next project, his/her basis is his/her IT specialist expertise but another business context is focused. To the end user, knowledge about business (2a) is of primary importance and knowledge about systems development tools (2b) is just a means to accomplish business-oriented tasks, eventually by developing user developed applications (2c). The IT specialist has access to knowledge about IS development tools that are hard to access for non-professionals, since they consist of tacit knowledge together with explicit knowledge. Some business knowledge is hard to access to the IT specialist, since this knowledge is not in the professional knowledge domain of the IT specialist. The end user, on the other hand, is the expert on business knowledge. His/her expertise depends on his/her knowledge about business. This professional knowledge also consists of tacit and explicit knowledge. No one can replace him/her in this matter. In order to perform EUD, the end user needs some knowledge about IS development tools. It is not possible, though, to have access to as much

Figure 1. The relation between knowledge and development

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