An innovative approach to identifying knowledge management problems

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Keywords

Knowledge management, Organizations, Software prototyping

Abstract

The promised benefits from implementing knowledge management (KM) attract an increasing number of organizations. However, many organizations, face several difficulties when designing a KM system or implementing its initiatives. These difficulties, along with some unsuccessful KM initiatives worry many organizations interested in the concept. This paper investigates the reasons for these difficulties and discusses the issues that need to be addressed to develop robust KM systems. It then introduces a systematic approach for addressing these issues at the early stages of designing a KM system. This approach was developed within the cross-sectoral learning in the virtual enterprise (CLEVER) project and supports the definition of KM problems within a business context. The approach has been encapsulated into a prototype software system to make it easier to use. The paper describes in detail the operational level of the prototype. It also discusses the potential of the developed prototype, and concludes that it represents an innovative tool for improved KM.

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Engineering, Construction and Architectural Management
Volume 11 · Number 5 · 2004 · pp. 349–357

DOI 10.1108/09699980410558548

1. Introduction

Understanding and managing organizational knowledge is difficult and involves many resources. Knowledge relates to information and data. It is the actionable information that adds value to an organization. Information is data with meaning, which is added through conceptualising, categorising, calculating, correcting, and condensing. On the other hand data can be defined as set of discrete facts about events (McConalogue, 1999).

Knowledge management (KM) is a relatively new concept and there are many definitions. It is usually defined from two main perspectives namely; process perspective and outcome perspective. A process perspective definition considers KM as the process of controlling the creation, dissemination, and utilisation of knowledge (Kazi *et al.*, 1999; Newman, 1991). Another process perspective definition considers KM as the "...identification, optimisation, and active management of intellectual assets, either in the form of explicit knowledge held in artefacts or as tacit knowledge possessed by individuals or communities to hold, share, and grow the tacit knowledge" (Snowden, 1998). The outcome perspective, on the other hand, focuses on the benefits that an organization gets from managing its knowledge. An example is a definition that considers KM to be concerned with the way an organization gains competitive advantage and builds an innovative and successful organization (Kanter, 1999). Another example of an outcome perspective definition considers KM as the "management of organizational knowledge for creating business value and generating competitive advantage" (Tiwana, 2000). A third example defines KM as "the ability to create and retain greater value from core business competencies" (Klasson, 1999). A combined perspective defines KM by considering both its process and outcome. One example is that: "Knowledge management enables the creation, communication, and application of knowledge of all kinds to achieve business goals" (Tiwana, 2000). Another definition states that KM is any process or practice of creating, acquiring, capturing, sharing and using knowledge, wherever it resides, to enhance learning and performance in organizations (Scarbrough *et al.*, 1999). Regardless of the different perspectives for defining KM, all definitions focus on the fact that knowledge is a valuable asset that needs to be managed and that managing this knowledge is important to improve organizational performance.

KM can be simply defined, as a systematic process of capturing, transferring, and sharing

Engineering, Construction and Architectural Management
Volume 11 · Number 5 · 2004 · 349–357

knowledge to add competitive value (Drucker, 1993; Hjertzen and Toll, 1999; Scarbrough and Swan, 1999; Skyrme and Amidon, 1997) and to improve performance (Robinson *et al.*, 2001). KM provides several benefits such as facilitating staff training, problem solving, and decision-making. It also enables the intellectual capital of an organization (its skills, knowledge, and processes) to be used effectively, creatively, and consistently to improve business performance and customer satisfaction (TFPL Ltd, 1999). KM is therefore critical to an organization's survival in competitive markets and it is becoming a strategic necessity for organizations willing to lead the market (Cannon, 1999) and even to those just wishing to keep their places in the market. The number of organizations that are implementing or planning to implement KM initiatives is increasing exponentially because (Tiwana, 2000):

- companies are becoming knowledge intensive rather than capital intensive;
- unstable markets necessitate organised actions with regards to replacing old products and introducing new ones;
- KM allows companies to lead change;
- only the knowledgeable organizations survive;
- cross-industry amalgamation is already breeding complexity;
- knowledge supports decision-making;
- shared knowledge multiplies;
- tacit knowledge can be lost easily; and
- competitors exist worldwide.

The growing body of literature recommending how KM strategies could be developed (Bollinger and Smith, 2001; Storey and Barnet, 2000; Tiwana, 2000) is opposed by the fact that developing methods and strategies for KM is a delicate task that is dependent on many factors. This explains why these recommendations only describe KM strategies in very broad terms. Organizations' different cultures and different business goals make it impossible that one KM system or tool would suit every organization and developing methods and strategies for implementing KM needs the integration of several issues such as people, culture, and technology. This means that proper planning is required to design robust KM systems. This paper presents a structured approach to help organizations understanding their KM problems, at the early stages of designing the system. First, it justifies the need for the approach, and then describes its development and operation.

2. Need for a structured approach

Several cases of successful KM systems have been encountered during the literature review. However, many unsuccessful cases have also been observed where rectifying or altering the system was difficult, time-consuming, and expensive (CPN E0100, 2000) and failure resulted, in some cases, in the deterioration of the implementation of KM (Al-Ghassani *et al.*, 2001). Review of some unsuccessful cases (Al-Ghassani *et al.*, 2001) and semi-structured interviews with industrial collaborators in the cross-sectoral learning in the virtual enterprise (CLEVER) project show that better KM systems can be developed if the KM problem is properly defined at the early stages of designing a system. Many factors need to be considered to develop a proper definition of KM problems. These factors are as follows.

2.1 Proper identification of type and nature of knowledge that needs to be managed

Many organizations start implementing KM by gathering any knowledge they could codify and store. This makes organizations busy for some time during the creation of the knowledge base. After a while, organizations may find that much of the knowledge they gathered was not really important to the organization's business although it could be important in the long term. Organizations first need to identify the type of knowledge (e.g. best practices, lessons learned, etc.) that needs to be captured and shared.

2.2 Clear business goals for implementing KM initiatives

Organizations manage their knowledge to improve business performance and to stay ahead of competitors. This necessitates clear and explicit business goals that KM should deliver. Unclear business goals could result in managing knowledge that the organizations do not benefit from. It may also reduce commitment of top management to the system because business benefits are not clear. Unclear business goals could also lead to unclear, incomplete, and unsustainable KM strategies (McConalogue, 1999; Storey and Barnet, 2000; Tiwana, 2000).

2.3 Proper identification of the characteristics of knowledge

Organizations need to identify the characteristics of the knowledge of interest. Knowledge can take different forms, e.g. tacit or explicit and is located in different repositories, e.g. peoples' heads, organizational processes, supply chains, etc. In addition, knowledge is acquired in different ways, e.g. socialisation, internalisation, etc.

Knowing the characteristics of knowledge helps in designing efficient methods for capturing and sharing this knowledge. It also helps in strengthening ways in which existing knowledge is retrieved from its current repositories.

2.4 Clear understanding of the relationships between sources and users of knowledge and associated enablers and resistors

Relationships between sources and users of knowledge are sensitive and ambiguous as one source of knowledge can be a user of another. Poor understanding of the relationships between sources and users leads to further difficulties in understanding the relationships between the enablers and resistors associated with transferring knowledge from sources to users. This poor understanding eventually results in two main problems with regards to technology and culture. Technological implications can result in one of the two extremes; the focus on IT as the main tool or not dedicating an IT resource. Cultural implications, on the other hand, can result in systems that are not compatible with the environment within the organization and its structure.

The foregoing shows that several issues need to be identified at the early stages of designing KM systems and that a fundamental thinking about the KM problems is required. Senior management would be more committed to the system if they understand its nature and realise its benefits. KM teams would be more prepared if they fully understood the KM problem before implementation (Storey and Barnet, 2000). Likewise employees, provided that other cultural issues are addressed, would be pleased to contribute their knowledge and to use the contributed knowledge if they recognise that real KM problems are identified and addressed. An ideal way to help organizations to understand their KM problems is to develop a structured approach that supports an extensive exploration of the KM problem and clarifies the problem into specific issues of KM. The CLEVER project introduces such a structured approach that supports fundamental analysis of KM problems (Kamara *et al.*, 2001). This approach is discussed in the following section.

3. Developing the approach

The problem definition template (PDT) introduces a structured approach that assists in defining KM problems within and across organizations. This approach, which was developed within the CLEVER project at Loughborough University, facilitates the identification of the overall KM problem within an organizational business context. Four aspects were considered in the development of the approach namely: type of knowledge that needs to be managed (including the business drivers for KM); its characteristics; its sources and users; and the current processes of managing knowledge. Figure 1 shows the first section, "type of knowledge". Each of these sections comprises a set of questions that address relevant KM issues. Figure 2 illustrates the system architecture of the developed approach.

The approach is designed to address issues that need to be considered in order to develop a proper identification of a KM problem within an organization. The first section, "type of knowledge that an organization needs to manage", investigates the type and classes of that knowledge and the categories of drivers underpinning it. The second section, "characteristics of knowledge", consists of a set of dimensions that explore the characteristics of the knowledge of interest, its location, and how it is acquired within the organization. The third section, "sources and users", investigates sources where knowledge is generated and/or currently stored and user types for each source. It then explores the enablers and resistors involved in the transfer of knowledge between sources and users. The fourth section, "current processes for managing knowledge", investigates the ways and methods that already exist in an organization to manage its knowledge. Four processes of KM are considered: obtaining new knowledge, locating and accessing existing knowledge, propagating or transferring knowledge, and maintaining and modifying knowledge.

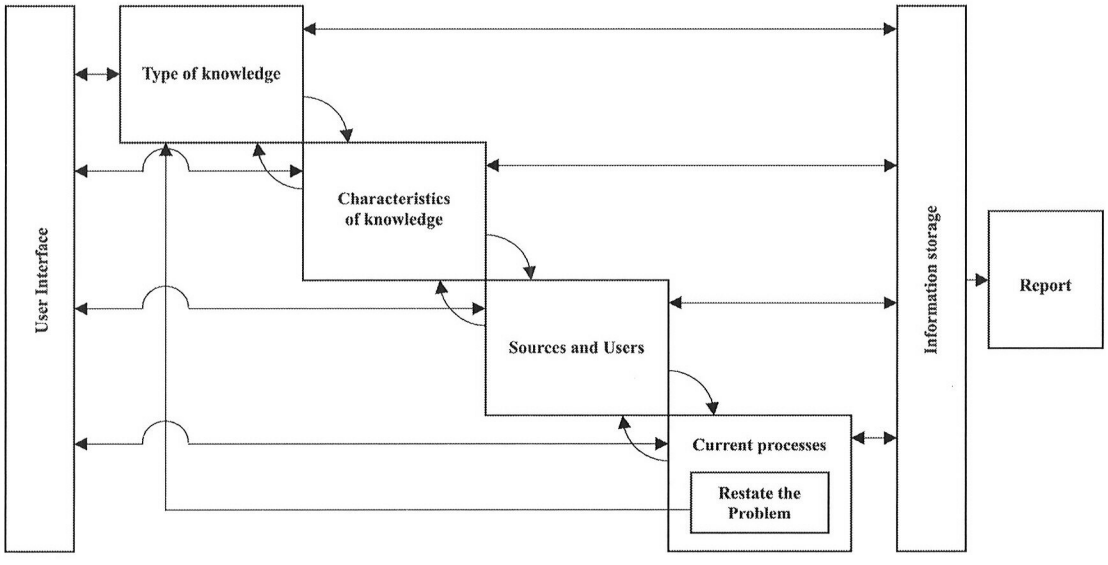
Answering all the questions enclosed in the developed approach allows organizations to identify their specific KM problems and to be aware of what these problems are. It also allows adequate reflection into the factors that affect the implementation of KM and relates the identification of KM problems to organizational business drivers. This new approach of gathering information for the identification of KM problems is simple to use and cost-effective. It is equally applicable to large organizations as well as small-to-medium-sized organizations.

The paper version of the developed approach was evaluated using four industrial collaborators at individual workshops. The evaluation workshops included directors, senior managers, and site personnel. Based on the comments received from the evaluation workshops, it is evident that the developed approach provides a very useful way to structure thinking about KM problems.

Figure 1 A section of the paper version of the approach

A1. What knowledge are you interested in?									
A2. Please select from the adjacent list, the class(es) of knowledge that best describes this knowledge.	(a) Best Practice			(b) Equipment/tools					
	(c) Product knowledge			(d) Quality standards/processes					
	(e) Operational process/procedures			(f) Domain/function knowledge					
	(g) Support process/procedures			(h) Human resources					
	(i) Strategies/policies			(j) Other (please specify)					
	(k) Control procedures								
A3. What are the business drivers for this knowledge problem?	Category of Driver	Business Driver	KM Process						
			Knowledge Generation	Knowledge Propagation	Knowledge Transfer	Knowledge Location & Access	Knowledge Maintenance/ Modification		
	Structural Change	Expansion							
		Restructuring							
		Merger & Acquisition							
		Down-Sizing							
	(Other)								
	External Change	New Market							
		New Technology							
	(Other)								
	Continuous Improvement	Performance Improvement							
	(Other)								

Figure 2 System architecture of the developed approach



Furthermore, it was agreed that very little else exists to assist companies in structuring their thinking in this way.

However, in its paper version, the approach had problems that needed to be addressed. These related mainly to the format and the need for a facilitator. The format was seen as uninviting and not easy to use without guidance. Users also thought that the guidelines included in the approach need to be much slimmer, simpler, and automated for the approach to be a readily usable tool. Without this, users could view its completion as a trivial exercise. These comments have been taken into account and a software prototype system was therefore developed.

4. Encapsulating the approach into a prototype software system

The developed approach contains a range of question types that need to be answered by organizations interested in identifying and exploring their KM problems. One difficulty found

Engineering, Construction and Architectural Management
Volume 11 · Number 5 · 2004 · 349–357

in using the developed approach in its "hard version" is the duplication of information input and the relatively long time required to answer the questions and to finally create a clear overview on the KM problem. To make the use of the developed approach easier and less time-consuming a "soft version" has been developed through encapsulating the approach into a prototype software system using Microsoft Access. The system displays the questions in "forms", which the user can complete easily. While completing the forms, the user can return to any previous form to modify or change the input. The operation of completing these forms is described in the subsequent part of this paper.

First, the type and nature of the knowledge problem is explored (Figure 3). Here, the user is asked to describe the KM problem that needs to be managed. This is a general statement, which does not need to be very specific at this stage and the user will be allowed to revise and refine the statement later. Establishing a general statement helps the user to start thinking about the KM problem. It also ensures that one KM problem is treated at a time. After the general statement has been specified, the user is required to select, from a set of given tick boxes, the classes that best describe the knowledge of interest. Several classes of knowledge have been built in the prototype, e.g. best practice, product knowledge, operational processes/procedures, etc. Other classes of knowledge may be added. The user is then required to identify the business drivers that relate to this knowledge. Several categories of drivers are considered, e.g. structural change, external change, etc. The business driver(s) for every category should then be identified. These vary from one organization to another for example, business drivers that can affect structural change can be expansion, re-structuring, merger and acquisition, etc. while those that can affect external change can be new market, new technology, etc. The system also allows the user to add other business drivers. To ensure that KM is linked to the organizational business drivers, the user is required to relate them to the relevant KM processes i.e. what are the business drivers for every KM process, e.g. knowledge generation, propagation, etc.

The second form (Figure 4) investigates the characteristics of knowledge, its location, and how it is acquired within the organization. The identification of these three dimensions is important because this defines the organization's current status and therefore helps in recognising the required status. Identification is done through selecting from a five-point scale the position that best describes the current status. For example, knowledge can be tacit, partly tacit, mostly tacit, explicit, etc. Definitions are given for every dimension. The system also allows users to add more dimensions that reflect more specific characteristics of knowledge in a particular organization.

The third form investigates the relationships between the sources and users of knowledge (Figure 5). Two matrices are considered. The first investigates where the knowledge comes from and

Figure 3 Sample screen for identifying "type of knowledge"

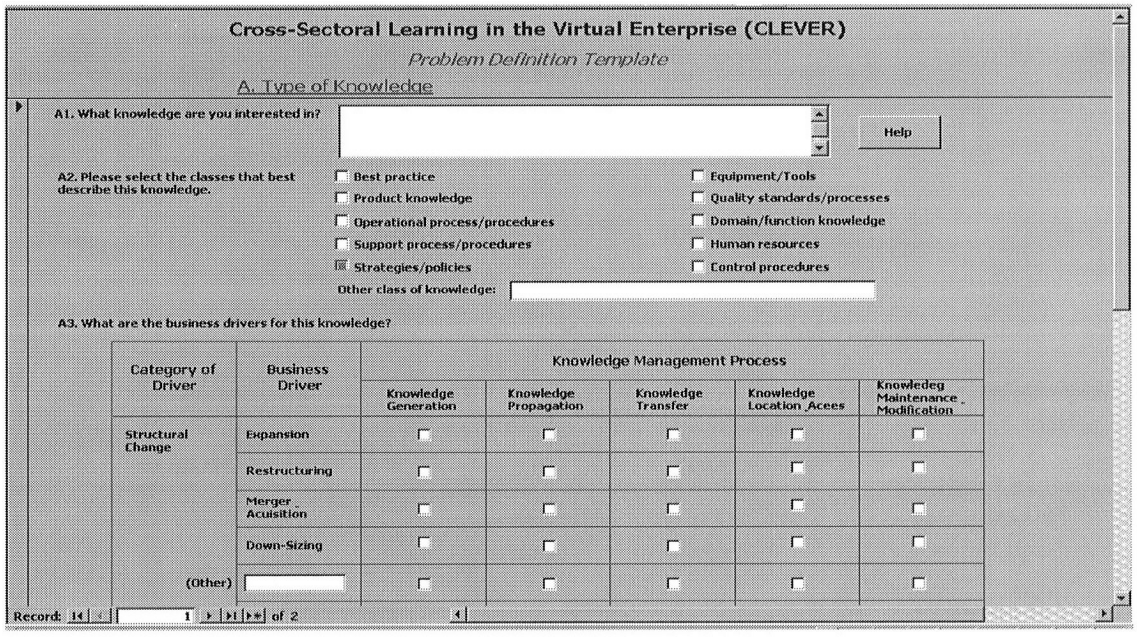
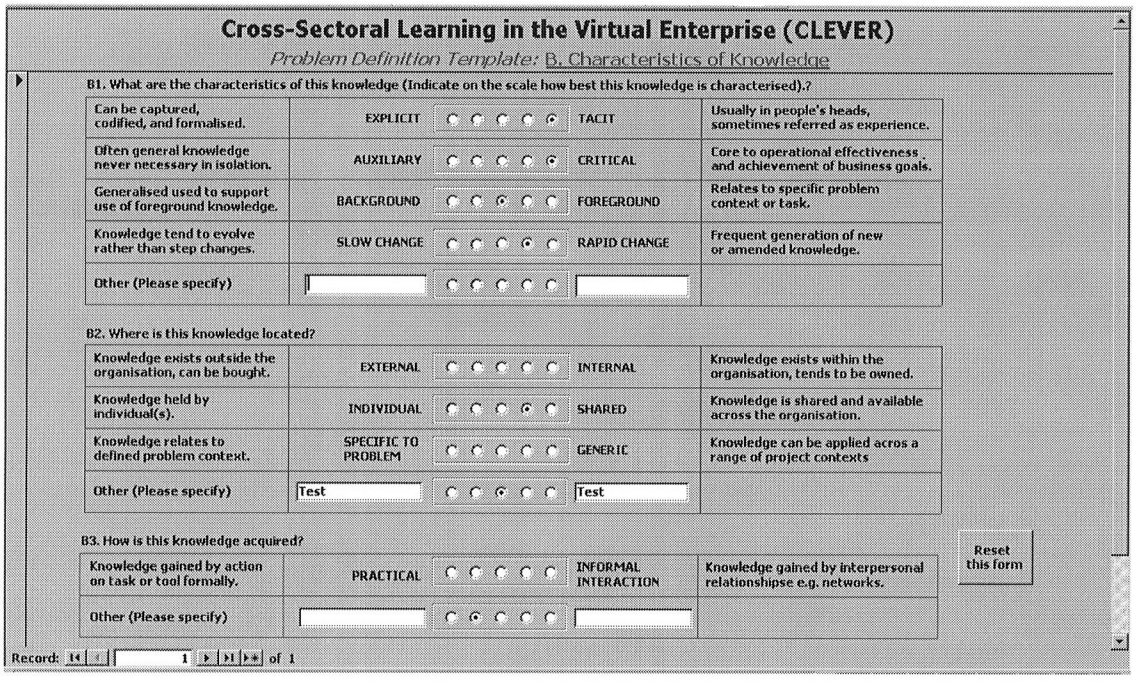


Figure 4 Interface for identifying characteristics of knowledge



who/what uses it, while the second investigates the enablers and resistors that influence the transfer of knowledge from its sources to its users. A source can be an individual, software, or paper. The user first needs to specify the sources of knowledge i.e. if the source is people then these people need to be specified, e.g. technicians, engineers, sales staff, etc. while if the source is a software then the type of software needs to be specified, e.g. a database, email system, etc. Users of each source also need to be identified, e.g. knowledge in the drawings (source) is used by the technicians (user). In the second matrix, the user is required to identify the enablers and resistors that enable or disable the transfer of knowledge from its sources to users. Using this matrix promotes a wider thinking about the enablers and resistors of every type of knowledge transfer. The next question asks the user to elaborate issues arising from these two matrices. This allows users to develop an overall view with regards to the key sources of knowledge, their intended users, and the potential enablers and resistors. Help buttons explain to the user how the form could be completed.

The last form (Figure 6) investigates if the organization currently uses any processes to manage its knowledge and asks the user to describe how those processes are performed. This allows organizations to properly understand their existing infrastructure so that new systems are deigned to be compatible with existing ones and to prevent conflict. Four processes are considered but again; users are allowed to add new ones. After the four forms are completed, the user can click on the "Restate the Knowledge Problem" button, which re-states the KM problem and asks the user to confirm the input or modify it. This allows a revision of the general statement that was first entered. Finally, the system produces a report containing a clarified KM problem and a refined set of KM issues. This report can be used as a reference point for the organization when developing methods and strategies for KM. Figure 7 shows a screen-shot of a report created by the system.

5. Discussion

The developed approach introduces a structured way for identifying KM problems within the context of organizations. The approach whether used in its paper or electronic format, is useful because of several reasons. First, it questions the main concerns that have an affect on any KM problem. Secondly, it is applicable to different types of organizations because it covers a wide range of issues and also allows users to add to the already built-in information. Thirdly, it allows for subjective answers thus ensuring that any type of KM problem can be individually considered. The system is simple to use, requires a relatively short time to complete, and contains a guide that provides help during each stage of its operation. Finally, it can be used by any one who wishes to implement KM, e.g. top management, business

Figure 5 Interface for identifying sources and users of knowledge

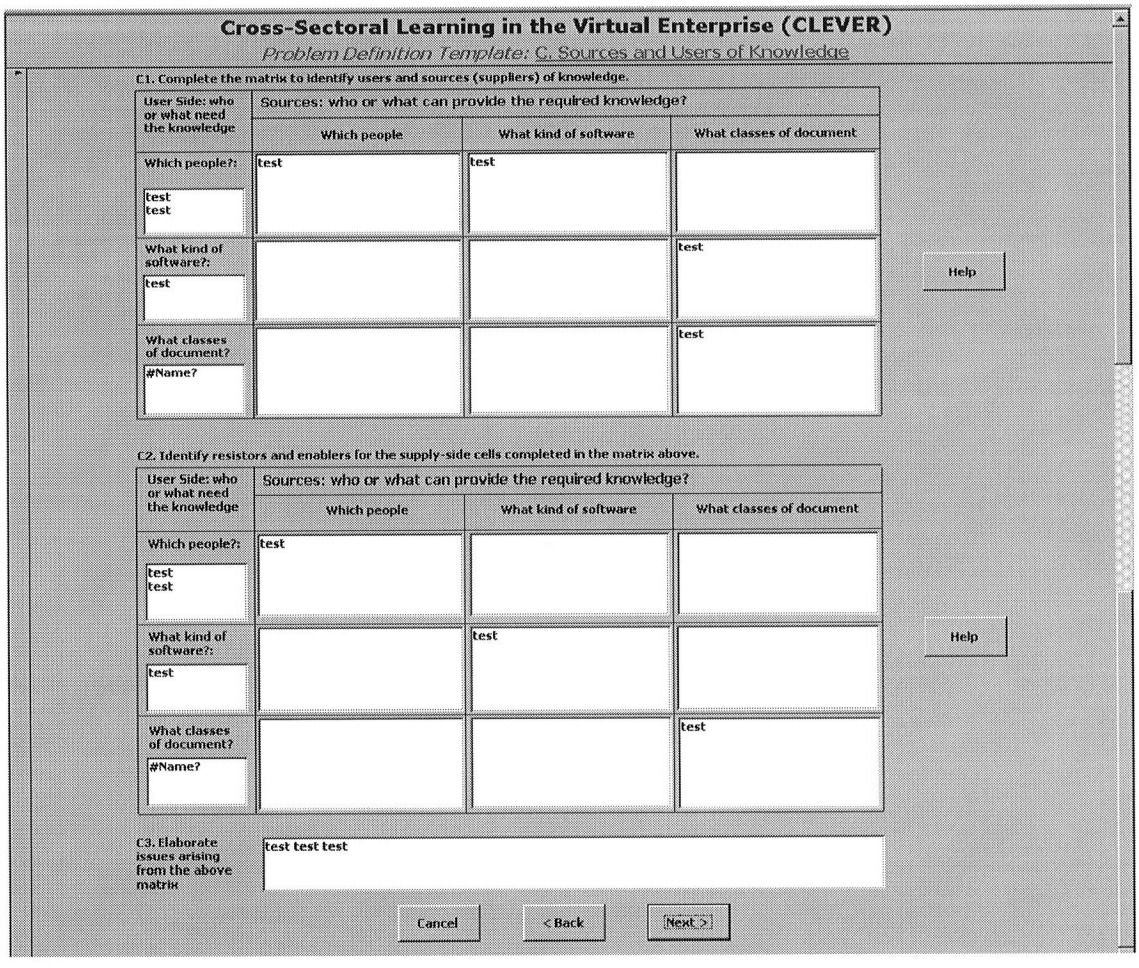


Figure 6 Interface for identifying KM processes being used in the organization

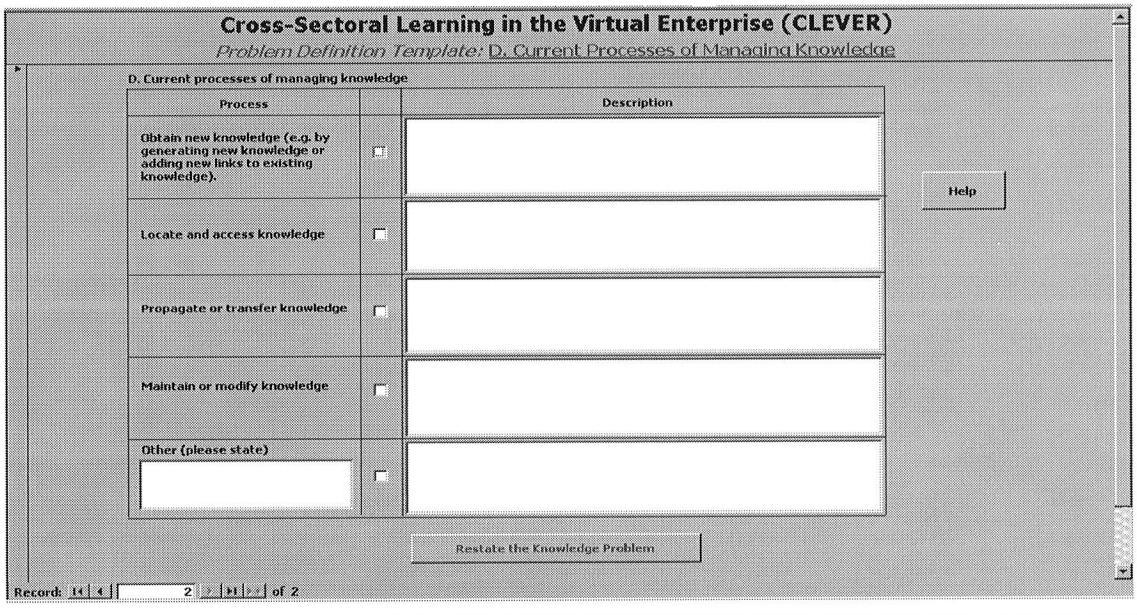
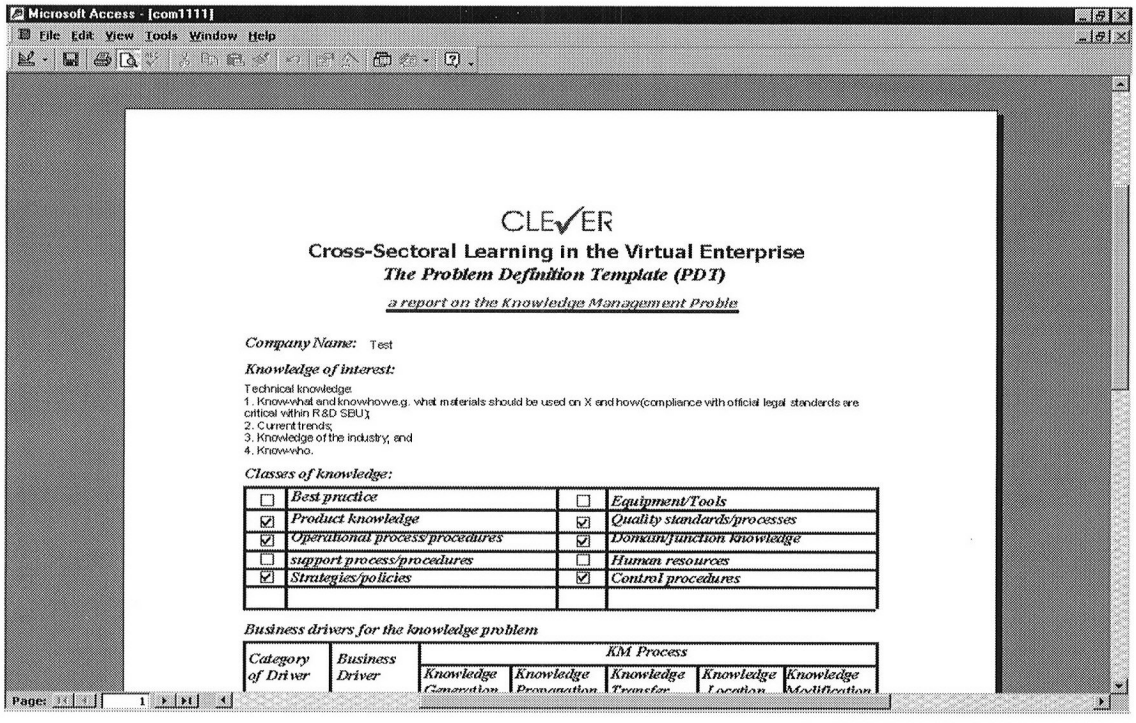


Figure 7 A screen-shot of a report created by the system



departments, IT departments or chief knowledge officers (CKOs).

The rationale underpinning this approach is based on a number of issues arising from literature and semi-structured interviews with industrial collaborators. First, KM aims at adding competitive value and improving business performance (Drucker, 1993; Hjertzen and Toll, 1999; Kanter, 1999; Klasson, 1999; Robinson *et al.*, 2001; Scarbrough and Swan, 1999; Scarbrough *et al.*, 1999; Skyrme and Amidon, 1997; Tiwana, 2000). The approach was therefore linked to the business drivers for change within an organization. Secondly, most problems associated with the implementation of KM initiatives are a result of inappropriate understanding of the KM problems within the context of organizations (Storey and Barnet, 2000). What is required therefore, is a methodology that supports the understanding and clarifying of KM problems within the context of organizations (Al-Ghassani *et al.*, 2001; Kamara *et al.*, 2001).

6. Conclusions

This paper has described a structured approach to the identification of KM problems, which was developed within the CLEVER project to assists organizations in identifying their KM problems within a business context. The paper version of PDT was encapsulated into a prototype software system to make it easier to use. The output is a report containing a summary of the KM problem and a distilled set of specific KM issues.
This report forms an appropriate platform for the development of methods and strategies for KM in any business organization.

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