Knowledge Losses in the Capturing Process

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ABSTRACT

To be competitive organizations need to manage the knowledge resource. One aspect of doing this is to build IT-supported knowledge repositories. Successful knowledge repositories require that stored information is updated and relevant. The importance of the capturing process is obvious. To run the capturing process efficiently requires identifying "all" knowledge, evaluating it and sorting out knowledge which should not be stored, i.e. managing knowledge losses. Based on theoretical and empirical studies, this paper complements the capturing process in an existing framework with knowledge losses in order to take a first step to make the framework implementation-oriented. Furthermore, in order to show the potential usefulness of this approach, we present some initial guidelines for how to manage the identified knowledge losses.

Keywords: Knowledge repositories, the capturing process, knowledge losses, guidelines

1. INTRODUCTION

To be competitive organizations must reuse knowledge from earlier experiences and learn how to not do the same mistake over and over again. "*If failure is ignored, denied or repressed, the opportunity to learn from past mistakes is lost.*" (Chua and Lam, 2005, p. 7). One way to enhance knowledge reusing is to develop IT-supported knowledge repositories. A large number of Knowledge Management (KM) projects fail (e.g. Storey and Barnett, 2000; Senge, 1999), and the question is *how* organizations can implement and manage KM (e.g. Sena and Shani, 1999; Wong and Aspinwall, 2004). Aggestam (2006) proposes a framework for IT-supported KM (FIT-KM) from the perspective of knowledge repositories (Figure 1). FIT-KM shows *what* this is about, but lacks support for *how* to do it. This paper *aims* to take a first step to extend this framework to an implementation one.

One dimension of KM success is user satisfaction (Jennex and Olfman, 2006). This requires high quality in stored information, which in turn prerequisites capturing "all" knowledge, evaluating it and sorting out knowledge which not should be stored, i.e. reducing unwanted knowledge losses as well as increasing wanted ones. The *goal* for this paper is to complement *"Capture New Knowledge"* in FIT-KM with knowledge losses, and present some *initial* thoughts about how to manage them. These thoughts make no claims to be complete; but to show the potential usefulness of the approach. Little research exists that relates knowledge losses to knowledge processes, and to the best of our knowledge, this approach when developing a KM implementation support has not earlier been used. The *research method* is a qualitative analysis based on a literature study, and a case study performed through participation in a KM implementation project. One case study can be justified if it is purposeful and provides a large amount of information (Gummesson, 2001). While unwanted losses results from not running this process efficient, and wanted losses the opposite, we in both studies focused on success factors.

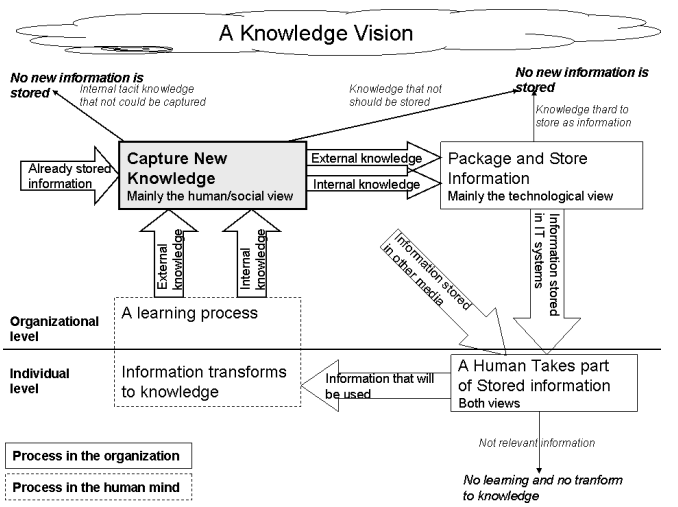
2. BACKGROUND

Focusing on the capturing process, 2.1 gives an introduction to FIT-KM, while 2.2 describes the case.

2.1 FIT-KM

FIT-KM, Figure 1, describes what IT-supported KM is from the perspective of knowledge repositories (Aggestam, 2006).

Figure 1. FIT-KM and the focus of this paper (from Aggestam, 2006)



The remainder of this chapter discusses the focused process, *Capture New Knowledge*.

Capture New Knowledge aims to capture already stored information, and different types of knowledge which has potential for being stored in the repository. Knowledge can not exist outside the human mind, thus the repository can only hold information that supports knowledge transformation. The capturing process includes an identification activity as well as a selection element. FIT-KM separates between internal and external knowledge. Internal knowledge is knowledge that people hold in their minds (Wiig, 1993), and knowledge that is held, e.g., in books and IT systems, is external knowledge, information (our remark). Information can be processed by IT, but knowledge requires humans (Swan et al, 1999). Another common distinction is between tacit and explicit knowledge (e.g. Gore and Gore, 1999). FIT-KM lacks this separation. Tacit knowledge is rooted in individual actions, experiences, ideals etc. (Gore and Gore, 1999; Nonaka and Takeuchi, 1995), and not easy to identify and express (e.g. Blodgood and Salisbury, 2001). Explicit knowledge is easier to express and can, in contrast to tacit knowledge, also easily be processed by a computer (Nonaka and Takeuchi, 1995). Table 1 summarizes this.

New in Capture New Knowledge refers to knowledge which supporting information not is stored in the repository, and/or not is conscious for employees. FIT-KM identifies here two potential losses, one wanted and one unwanted.

Table 1. Different types of knowledge

	Internal knowledge	External knowledge
Tacit knowledge	e.g. "know-how"	-
Explicit knowledge	e.g. Stockholm is the capital of Sweden	e.g. documented, "information"

2.2 Case Study

The project EKLär is in the area of health care, more precisely focusing on the treatment of leg ulcers. EKLär aims to develop an IT-supported knowledge repository for learning and sharing of best practices with respect to treatment and prevention methods for leg ulcers[1]. The approach used in EKLär, Enterprise Knowledge Patterns (EKP), combines Enterprise Modelling (EM) with organisational patterns (Stirna, Persson and Aggestam 2002). It is characterized by a strong emphasis on stakeholder participation and the use of Organizational Patterns in order to identify possible knowledge chunks and their content.

The project is carried out in three main phases: preparation, implementation, and evaluation, where the evaluation phase is in its initial stages. **The preparation phase** continued for approximately six months, and aimed to collect knowledge about the domain, and gain approval for the main purpose of the project. Data were collected during 19 interviews and 2 observations. **The implementation phase** continued for approximately fifteen months. It included daily works to develop the repository and hands-on-learning to teach the stakeholders how to manage knowledge. Data were mainly collected during project meetings. An average of one meeting a month lasted a half to a whole day. The meetings were documented through models and patterns developed, and also by detailed notes. The notes for each meeting were summarized and sent to the participants. Further collected data include relevant documents as well as similar projects from other hospitals. The aim of the initial meetings was to identify which knowledge area to focus on. The result was a compromise between the identified needs in the preparation phase and what the hospital staff regarded to be the most important knowledge to be taught. On this basis, the work proceeded to capture relevant knowledge, and package and store it. As work proceeded the nurses became increasingly autonomous and carried out more and more work between our meetings. One important issue was to decide which technical tool to use. The project decided to use an existing technical solution, which the hospital had already decided to invest in. A critical step is making the result survive after the project is finished. In EKLär this requires that the repository it is kept up-to-date. This work is still progressing, parallel with the evaluation phase. **The evaluation phase** has been going on for 4 months. So far, we have made 8 observations using "think aloud" protocols. The observations were taped and transcribed. In relation to the observation we asked questions based on Jennex and Olfman (2006) KM success model in order to identify the potential for the repository to being successful.

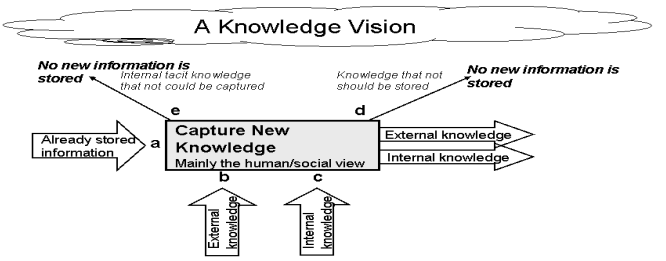
3. ANALYSIS

We have compared data with data, with existing theories, and previous results. This is a key to qualitative research analysis (Gummesson, 2005). In order to enable traceability we throughout the analysis kept empirical and theoretical data separated. We summarize what we have done, but not *how* our minds were thinking. Intuition is like a brother or sister to common sense (Gummesson, 2001), and not easy to describe. It is not possible to include all data that has been input to the analysis[2], but in order to clarify we give examples from both EKLär and literature.

1. *Analyzing data from the perspective of Capture New Knowledge.* This results in two lists of success factors; one list originates from theoretical data, and one from empirical. This step also shows factors, not specific for capturing, but important to manage from the beginning of the project, and throughout the whole. Some of these concern things that must be done *before* the project start. For example, the project must convince the users (e.g. Chua and Lam, 2005), and the needed participation from employees require teaching (e.g. Davenport and Prusak, 1998). With regard to the focus of this paper we decided to exclude these factors. Other general factors concern passing knowledge to "Package and Store Information". In EKLär we discussed who are responsible for this, and how would it be done. From a maintenance perspective this is crucial if the repository will be successful in the long run. These factors we placed in an own group called "Other factors". For clarity reasons, they are described in the next step.
2. *Grouping success factors in accordance with FIT-KM* (**a–e** in Figure 2)
   - ***a.*** *Already stored information:* We must separate between information already stored *in* the organization, and information stored *outside*. In the literature this is to our knowledge not explicitly mentioned, but in EKLär this was obvious. Examples of information stored outside are a Danish net based knowledge repository, and films distributed from the material suppliers. EKLär also high lightened legal aspects, what information are we allowed to reuse? This legal aspect impacts if knowledge could be stored or not, and we concern them to influence the already identified wanted loss in FIT-KM. Furthermore, in EKLär there was information as different types of programs and recommendations that no one in the beginning relates to EKLär. The used EKP approach enhances the work to identify this information. It is a good idea to start with a review of existing external knowledge (Gore and Gore, 1999), which lightens that there could be information no one knows about. To scan potentially relevant information is time-consuming. Asymmetry of knowledge is a problem (Davenport and Prusak, 1998), and managing knowledge only within silo-oriented communities represent great risks that business-critical knowledge is neglected (Chua and Lam, 2005).
   - ***b.*** *External knowledge:* There is external knowledge which the knowledge knower does not want to share with others. Political processes between different stakeholders, e.g. IT and media affairs, must be managed (Chua and Lam, 2005), and individuals must overcome imperatives as wanting to be where they are (e.g. Sun and Scott, 2005). There must be a knowledge sharing attitude (e.g. Busch and Richards, 2004). The quickest and easiest ways to affect the culture are changes in the reward and punishment system (Schein, 2004). The willingness to share knowledge was not a problem in EKLär, possible with regard to the fact that they are use to share knowledge. External knowledge is the same as information, and we argue that this process is included in the former one. Both are about willingness to contribute, and prerequisites that the information is known.
   - ***c.*** *Internal knowledge:* The analysis clears the need to differentiate between internal *tacit* and internal *explicit* knowledge. KM should include both because if it only concerns explicit then it could be difficult to distinguish it from *information* management (Loermans, 2002). Comparing to tacit knowledge, explicit knowledge is easy to capture *if* the knowledge owner wants to share it. Success factors for capturing explicit knowledge concern the same thing as discussed in the former groups. A key in KM is the degree to which tacit knowledge can be captured and transformed into explicit knowledge (Gore and Gore, 1999). Nonaka and Takeuchi (1995) identify four knowledge conversion modes. With regard to the strong emphasis on participatory design, to our experience the EKP approach enables these:
     - Socialization (from tacit to tacit): In accordance with EKP we have develop the repository together in the project group. In this group we have share experiences, mental models etc. which enhance socialization.
     - Externalization (from tacit to explicit): Using patterns we have in the project group had successive rounds of meaningful dialogue in order to reveal hidden tacit knowledge.
     - Combination (from explicit to explicit): In the project group concepts have been combined with existing data and knowledge, both in the hospital and outside, in order to create more shareable specifications.

     The EKP approach also assists internalization (from explicit to tacit). Internalization is about *using* knowledge and outside the scope of this paper. Visiting each others working places is another way mentioned in EKLär aiming to identify tacit knowledge.
   - ***d.*** *Knowledge that not should be stored:* This is a wanted loss already identified in FIT-KM. The analysis strengthens its importance, and clari-

Figure 2. Analyze step 2



fies the critical role the vision plays here (e.g. Blodgood and Salisbury, 2001; Wong and Aspinwall, 2004). The analysis reveals the importance to differ between the knowledge vision and knowledge goal. The vision is strategic, but in line with this, for each KM project, there must be a goal to evaluate against. The importance of both becomes more and more obvious in EKLär as it proceeds. Should further knowledge areas be incorporated or not? What knowledge vision does the top management has for the whole hospital? Top management has responsibility for the vision. (Gore and Gore, 1999; Davenport and Prusak, 1998), and senior management support is critical. (e.g. Chua and Lam, 2005; Davenport and Prusak, 1998). Factors here also include the importance of updating. It is not only a question about putting in new information, it is also necessary to take away information. This concerns mainly the next process, "Package and Store Information", but often brings to the fore in the capturing process.

e. *Reducing internal tacit knowledge loss:* The key here is to convert tacit knowledge to explicit knowledge, and the discussion in point c is applicable.

Other factors: KM has to be adapted to business and knowledge processes (Remus and Schub, 2003). A lack of effective mechanism to distil knowledge from debriefs and discussions results in valuable knowledge remained obscured (Chua and Lam, 2005). In EKLär this work is in its initial phase, but we plan a lot of effort to identify capturing points, i.e. to find the link between new generated knowledge and the capturing process. For this the content, its structure and relevance, is important (e.g. Chua and Lam, 2005; Davenport and Prusak, 1998), and the method used to develop it. We argue that the EKP approach enhances this work by its structure of knowledge chunks.

3. *Analyzing each group from the perspective of knowledge loss*

The analysis reveals four new losses and embeds knowledge for how to manage them.

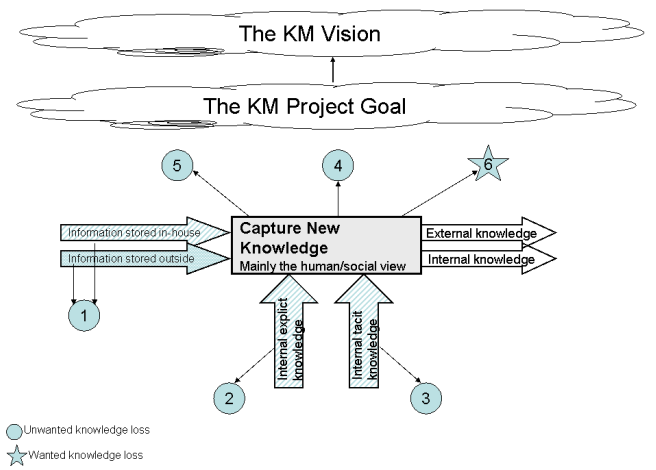
4. RESULTS

The analysis results in four unwanted knowledge losses and some further aspects to already identified losses in FIT-KM. It also reveals some lacks in FIT-KM as no

- separation between internal tacit and explicit knowledge
- knowledge goal
- separation between information stored in and outside the organization.

Furthermore, the input "External knowledge", is both wrong and overflow. It emerges from the individual level and concerns *internal* knowledge an individual has created when using information, and it is the same thing as information which is already covered in FIT-KM. Figure 3 shows the extended and updated version of Capture New Knowledge.

Figure 3. Knowledge losses in the capturing processes



Numbers 1-6 in Figure 3 refer to knowledge losses, where losses 1-4 result from the work presented in this paper. Number 1-5 concern unwanted losses, and number 6 a wanted one. Number 1-3 refer to losses meaning that knowledge does not even reach the capturing process, and the need of a structured approach to identify *when* new knowledge has been created is obvious. It is not enough that knowledge is known, and the knowledge owner is willing to share it, the KM process must also be integrated in organizational processes, and supported of the technical tool. With regard to the goal for this paper, the remainder of this section will elaborate the 6 losses.

1. There is information stored in other media as documents, books, protocols etc. This information can be found inside the organization, in the actual department or in another one, or outside. If no one knows about this information, or thinks about it from the perspective of the actual KM work, it will never reach the capturing process. Furthermore, there is also information which is known, but the knowledge knower does not want to disseminate it. This information is already stored somewhere else, but if it is not integrated and related with other organizational knowledge it will probably be hard to find and reuse.
2. This is about willingness. The knowledge knower is the knowledge owner. With regard to the fact that actual knowledge is explicit it must be known. However, one further problem can be that the knowledge owner does not think about it as relevant for the repository.
3. Like number 2 the knowledge knower is always the knowledge owner, but it varies if the knowledge owner is conscious about the knowledge or not. If the knowledge is known, reasons for losses are willingness or unconscious about the knowledge.
4. An important part is to pass captured relevant knowledge to the next process. If this not is integrated in daily processes, or supported by IT-tool, there is a great risk that the knowledge never is stored.

Table 2. Supporting knowledge losses

Initial Guidelines	Knowledge loss
G1. Use an approach, e.g. EKP, that forces employees studying information from other perspectives comparing to how it is stored and structured. This also enhances combination.	1
G2. Increase employee's reserved time for searching and evaluating information.	1
G3. Introduce reward system that encourage willingness to share knowledge	1,2
G4. Disseminate early successes as success stories (Chua and Lam, 2005).	1,2,3
G5. Stimulate networks, both formal and informal, to create relationships. Relationships increase the flow of information (Sun and Scott, 2005).	1,2,3
G6. Try to identify points in organizational processes which indicate that knowledge has been created.	1,2,3
G7. Visit each others working places and learn by sitting on in a class.	1,2,3
G8. Base discussions on a tool, e.g. EKP, to force thinking from another perspective in order to enhance externalization.	3,5
G9. Structure the content in such way that it enhances updating, e.g. knowledge chunks.	4
G10. Pay attention to the employees who should maintain the repository when choosing technical support.	4
G11. Store information about knowledge owners	5
G12. Describe the goal in adaptive ways so employees understand what it is about.	6
G13. Relate knowledge that is identified as relevant to the knowledge goal.	6
G14. Study captured relevant knowledge from the perspective of legal aspects.	6

5. There is internal tacit knowledge that not could be captured. Comparing to number 3, the knowledge owner is conscious about it and wants to share it, but there is a lack of methods, processes etc. to capture it. An alternative could be to store information about the owner.
6. There is knowledge that not should be stored. Reasons for this are for example that it does not contribute to the knowledge goal, or that it is illegal to store it.

The analysis embeds knowledge for how to attack these losses. In Table 2 we present some initial thoughts concerning this. The leftmost column presents the thoughts in form of guidelines, and the rightmost its corresponding knowledge loss/es.

Some unwanted losses depend primary on organizational culture, e.g. if a member in the organization wants to share knowledge or not, while some would get concrete benefit from tool support, e.g. to reveal already stored information in the organization. Work aiming to influence the culture is a long time work. However, even losses caused primarily of culture will get benefits from more directly activities as for examples reward systems (G3) and reserved time in regular tasks (G2). Even different types of tool and method support have the same effect, e.g. EKP (G1, G9) and how the repository is build and structured (G10, G11). If it is easy to share knowledge the willingness to do it will increase and this will have positive effects on the knowledge sharing culture.

5. CONCLUSION AND FUTURE WORK

In this paper we have complemented the process *"Capture New Knowledge"* in FIT-KM with four knowledge losses, and presented some initial thoughts for how to manage knowledge losses. Furthermore, the results show the potential usefulness of this approach when developing a KM support. This is in accordance with the goal for the paper, and a first step to extend FIT-KM to an implementation one has been taken.

Presented guidelines are initial thoughts which must be refined and complemented. This future work must pay attention to demands as

- if the capturing process is a start one in a new KM project or if it is a process in ongoing KM
- strategic and operative levels
- different roles in KM work

Systematic effort to track and measure success of KM projects is needed (Chua and Lam, 2005). From the perspective of the KM success model presented in Jennex and Olfman (2006) the capturing process mainly influences the Knowledge Quality dimension. We argue that this dimension is valuable when evaluating the further developed guidelines.

6. REFERENCES

Aggestam, L. (2006). *Wanted: A Framework for IT-supported KM* Proceedings of the 17:th Information Resources Management Association (IRMA), 21-24 May 2006, Washington, USA, pp.46-49.

Blodgood, J.M. and Salisbury, W.D. (2001) *Understanding the influence of organizational change strategies on information technology and knowledge management strategies* Decision Support Systems 31, pp. 55-69.

Busch, P and Richards, D (2004) *Tacit knowledge and culture* The Proceedings of the First International Conference on Knowledge Management (ICKM'04), 13-15 December 2004, Singapore.

Chua, A. and Lam, W. (2005) *Why KM projects fail: a multi-case analysis* Journal of Knowledge Management, Vol. 9, No. 3, 2005, pp. 6-17.

Davenport, T.H. & Prusak, L. (1998) *Working Knowledge* Harvard Business School Press Boston.

Gore, C. and Gore, E. (1999) *Knowledge management: The way forward* Total Quality Management 10 (4,5), pp. 554-56.

Gummesson, E (2001) *Are Current Research Approaches in Marketing Leading us Astray?* Marketing Theory, Vol. 1, No.1, pp.27-48.

Gummesson, (2005) *Qualitative research marketing Road-map for a wilderness of complexity and unpredictability* Euorepean Journal of Marketing Vol. 39, No ¾, 2005, pp.309-327.

Jennex, M. E. and Olfman, L (2006) *A model of Knowledge Management Success* International Journal of Knowledge Management, 2 (3), 51-68, July-September, 2006.

Loermans J. (2002) *Synergizing the learning organization* Journal of Knowledge Management, Vol. 6, No. 3, pp. 285-294.

Nonaka I. and Takeuchi, H (1995) *The Knowledge-creating Company* Oxford University Press 1995.

Remus, U. and Schub, S. (2003) *A blueprint for the Implementation of Process-oriented Knowledge Management* Knowledge and Process Management, Vol. 10, No. 4, pp. 237-253.

Schein, E.H. (2004) *Organizational culture and Leadership (3rd edition)* John Wiley & Sons, Inc. (2004) ISBN: 0-7879-6845-5.

Sena, J. A. and Shani, A. B. (1999) *Intellectual Capital and Knowledge Creation: Towards an Alternative Framework* In Liebowitz, J. (Eds) (1999) *Knowledge Management handbook*, Boca Raton, FL: CRC Press.

Senge, P. (1999) *The Dance of Change* ISBN 0-385-493223.

Stirna, J. Persson, A. and Aggestam, L. (2006) *Building knowledge repositories with enterprise modelling and patterns – from theory to practice* in the Proceedings of the 14:th Conference on Information Systems, 2006, Gothenburg, Sweden, June 12-14, 2006.

Storey, J. and Bernett, E. (2000) *Knowledge management initiatives: learning from failures* Journal of Knowledge Management, Vol. 4, No. 2, pp. 145-156.

Sun Yih-Tong, P. and Scot, J. L. (2005) *An investigation of barriers to knowledge transfer* Journal of Management Vol. 9, No 2, 2005, pp. 75-90.

Swan, J. Scarborough, H. and Preston, J. (1999): *Knowledge management – the next fad to forget people* Proceedings of the 7th European Conference on Information Systems: Copenhagen Business School Copenhagen, Denmark, pp. 668-678.

Wiig, K.M. (1993) *Knowledge Management Foundations – Thinking About Thinking – How People and Organizations Create, Represent, and use Knowledge* Schema Press LTD.

Wong, K.Y. and Aspinwall, E. (2004) *Knowledge Management Implementation Frameworks: A Review* Knowledge and Process Management, Vol. 11, No. 2, pp. 93-104.

ENDNOTES

[1] The link to the developed repository is www. vgregion.se/skassarwebben

[2] For further information about the data, contact the author.