Mapping Tacit Knowledge with "Epitomes"

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ABSTRACT

Many concepts are often used to clarify tacit knowledge. This article presents how these Epitomes of Tacit Knowledge (ETK) have been collected, systemized and how a method to map organization-specific knowledge has been created and tested. The results are based on a study in an asset management company in Finland.

Key-words: Tacit knowledge, Epitomes of Tacit Knowledge, Knowledge management.

RÉSUMÉ

Plusieurs concepts sont souvent utilisés pour caractériser la connaissance tacite. Cet article présente comment des Epitomés de Connaissance Tacite (ECT) peuvent être assemblés, systématisés et comment une méthode pour cartographier la connaissance tacite d'une organisation peut être développée et mise en œuvre. Les résultats sont basés sur une étude de cas d'une entreprise financière de gestion d'actifs.

Mots-clés : Connaissance tacite, Epitomés de connaissance tacite, Gestion de la connaissance.

I. INTRODUCTION

The articulation of tacit knowledge will probably still be a matter of discussion in the future and making at least some parts of it explicit is a constant effort. The intention of this article is to take part of these efforts.

In business culture the concept of tacit knowledge has not been highly valued (Beardwell & Holden, 2001; Lam, 2000). Not only due to its apparent lack of rationality (Zack, 1999) but also because of difficulties in the perception of the concept itself. Abstraction and lack of measurability are the main reasons of these difficulties. The concept may be more appreciated with methods for mapping it (measuring tacit knowledge is still considered unfeasible) and through a possible concretization of it.

In a knowledge-society like ours the value of tacit knowledge should be reappraised. The interest in knowledge has increased during recent years and although the interest in tacit knowledge has been somewhat less (Zack, 1999) it is also increasing (Augier & Vendelo, 1999; Holtshouse, 1998; Ropo & Parviainen, 2000; Wong & Radcliff, 2000).

Both scholars and managers encounter difficulties working with tacit knowledge but if the user acknowledges the use of at least some of the tacit knowledge, it becomes more explicit and therefore easier to study (Brockmann & Anthony, 1998), manage and share.

To counteract difficulties with tacitness a variety of expressions and epitomes are used. Epitomes, as typical expressions or symbols, are commonly used as elucidatory examples to understand tacit knowledge. They therefore form natural tools for the mapping of the concept. Epitomes of tacit knowledge (ETK) are concepts like *intuition, know-how, rule-of-thumb* and *gut feeling,* concepts that are widely used but without consideration for their meaning. This may result in misunderstandings and therefore such concepts need clarification. A sorting of these concepts into taxonomies facilitates their analysis and therefore their usage in both academy and business. However, mapping tacit knowledge locates it and therefore facilitates its management, sharing and study. The research problem addressed in this article is hence the lack of a method to study and manage tacit knowledge.

The aim of this article is therefore to consider how epitomes of tacit knowledge (ETK) can be used for mapping tacit knowledge in organizations, through focusing on:

- What an epitome of tacit knowledge is;
- How epitomes can be systemized;
- How they can be used for mapping tacit knowledge in an organization.

ETK card-interviews have been used to map tacit knowledge in an asset management company. The method will be described and some of the results of the study on the use and importance of tacit knowledge will be cursory discussed.

II. THE CONCEPT OF TACIT KNOWLEDGE

The distinction of explicit and tacit knowledge according to Nonaka & Tackeuchi (1995) is; explicit as the objective and theoretical knowledge of rationality, that can be stored after the use and tacit as the subjective and practical knowledge of experience, which only can be used in an actual situation. If we see knowledge resources in the metaphor of an iceberg, the structured, explicit knowledge is the visible top of the iceberg. It is easy to find and recognize and therefore easy to share. Beneath the surface, invisible and hard to express, is a momentous part of the iceberg, the tacit knowledge resources. As Michael Polanyi (1966), perceived by many as the "founder" of the concept, expressed it, "we know more than we can tell". It is hard to estimate tacitness of knowledge but it can be perceived rather like a spectrum where one extreme is seen as completely tacit and implicit knowledge and the other as completely explicit and codified knowledge (Leonard & Sensiper, 1998).

Current literature on knowledge emphasizes the importance of tacit knowledge not only as a form of competitive advantage (Birchall & Tovstiga, 1999) and strategy (Johannessen, Olaisen & Olsen, 2001) but also as related to learning and innovation (Lam, 2000). Structured, explicit knowledge is important to organizational core competence but to achieve excellence one has to master the unstructured tacit knowledge (Brockmann & Anthony, 1998, Lawson & Lorenzi, 1999). Tacit knowledge makes work go smoothly, increasing for example, the quality and efficiency of decision-making, customer service or production. (Brockmann & Anthony, 1998).

Discourses on tacit knowledge tend to be fierce due to differences in interpretation of the concept in itself. Scholars do agree however, that tacit knowledge is highly personal, that it is created by experience and is difficult to express in words (Augier & Vendelo, 1999; Nonaka & Takeuchi, 1995; Polanyi, 1958). Due to these characteristics experts also agree on the difficulty of tacit knowledge diffusion (Bennett & Gabriel, 1999; Holthouse, 1998; Leonard & Sensiper, 1998; Nonaka & Takeuchi, 1995; Polanyi, 1966; Zack, 1999). Differences can be found in opinions on the possibility and need for externalization. On one hand Michael Polanyi do not discuss the existence of knowledge that is impossible to express. On the other hand, Wittgenstein claims its existence (Rolf, 1991). These differences are mainly due to differences in the perception of the concept it self and the ability to express tacit knowledge may be dependent on the use of language. There may be a gap between knowledge and the ability to use language to express it but this gap is individual and not general according to Polanyi (1966). Polanyi (1958) also asserts that it is possible to diffuse tacit knowledge without making it explicit while Nonaka and Konno (1998) in their SECI-model consider a conversion from tacit to explicit necessary for externalization. Nonaka (1995) asserts that to be able to share knowledge it should firstly be made conscious but Polanyi (1958) states that whether the distributor of tacit knowledge is conscious or otherwise of the

knowledge and the sharing is of no importance. Whether or not making tacit knowledge conscious is important, the process of making it conscious helps people to reflect on their work. Independent of varying perceptions of tacit knowledge, the existence of this concept has to be recognized for us to be able to study or manage it. Based on thoughts of personal and situational differences in ability to express tacit knowledge, language seems to have an important function and therefore it is a natural starting point to study tacit knowledge. The ETK used by the scholars on tacit knowledge provide a mean to do this.

III. TACIT KNOWLEDGE MAPPING

A common question scholars on tacit knowledge receive is on its measurability. It is still considered too difficult, if not impossible to measure tacit knowledge to accomplish quantification, like for example in accounting. If we use mapping and more qualitative information instead of measuring, to find out and localize the existing tacit knowledge in an organization, we get a more informative instrument to work with. In for example tacit knowledge sharing there is a need to know where the tacit knowledge is, not the measure of it. The most common way of sharing tacit knowledge is through face-to-face interaction (Polanyi, 1958) and for this we have to know the possessor of the required tacit knowledge.

It is easier to detect and manage explicit knowledge for example in databases but it is just as important to be aware of and manage the tacit knowledge. Discussions included in a mapping process increase consciousness of the tacit knowledge in use and this may increase consciousness of its sharing too.

Interviews are to be preferred to a questionnaire when we are mapping existing tacit knowledge in an organization. Due to the nature of tacit knowledge as personal and difficult to express, interviews provide the possibility to explain and discuss. This kind of mapping includes distinction of tacit knowledge used and a description of the work specific meaning in it and therefore offers profound information on it. A mapping localizes the tacit knowledge and shows the existence of similarities or differences in meaning of the concepts used.

The importance tacit knowledge has to the work is also discussed in this mapping and since tacit knowledge is the personal dimension of knowledge (Polanyi, 1958), the performing employee is the most suitable judge. The benefit of the discussion is not only to know what is used but also what makes the difference in performance.

There is not much value in an objective and general instrument to measure tacit knowledge, as a lot of valuable information on tacit knowledge is lost in the process. Hence a mapping serves the purpose better.

III.1. The development of a method for mapping

J. Horvath (1999) questions if identifying subtypes of tacit knowledge could be used to optimize our approa-

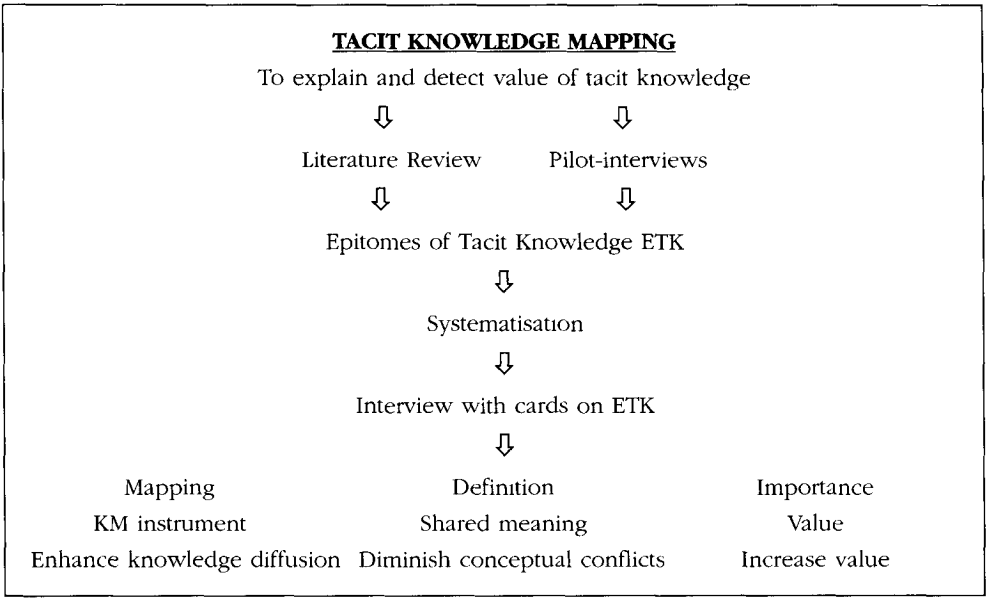

Figure 1: The process of developing the ETK mapping instrument.

ch to knowledge management. The following mapping method with interviews suggests that it can. Subtypes used in this method are epitomes of tacit knowledge (ETK) (figure 1).

III.2. Epitomes of Tacit Knowledge (ETK)

As earlier mentioned, the ability to express tacit knowledge depends among others on the used language and therefore the difficulty to express tacit knowledge perhaps lies in the lack of appropriate words. Already in 1950 Gilbert Ryle asserted that in everyday life different concepts for "tacit knowledge" are used in communication but it was not until 50 years later that someone made an attempt to study these kinds of concepts. Epitomes of tacit knowledge (ETK) were the first time presented by the author at the 4th World Congress of Intellectual Capital (Haldin-Herrgard, 2001). It was the result of an extensive literature review on tacit knowledge. ETK offer means of a "vocabulary" of tacit knowledge and a conceptualization of them serves as a language tools-box for mapping tacit knowledge. These concepts are symbols used for the tacit dimension of knowledge and ETK helps us to articulate and understand the abstraction of tacit knowledge. Although ETK are created for pragmatic use, academia has made use of them in the scientific work. Scholars not only use them as part of vocabulary when they discuss their research but also when they collect information on tacit knowledge[1].

1 See examples in Giunipero, Dawley & Anthony, 1999, Somech & Bogler, 1999

In a review of literature on the field of knowledge and especially tacit knowledge, concepts clarifying the definition of tacit knowledge were picked out and used in the method. As an example in the definition of Saint-Onge (1996) – "Tacit knowledge includes the **intuition**, **perspectives**, **beliefs** and **values** that peoples form as a result of their experiences"; we then define the ETK as a set of four items: intuition, perspective, belief and values.

According to the literature review the most frequently used epitomes were as follows[2]:

- *Intuition* expressed as directly knowing or learning without conscious reasoning or making choices without formal analysis. (Behling & Enckel, 1991 in Brockmann & Anthony, 1998) Related expressions to intuition are *non-analytical behavior, automatic knowledge,* or *flashes of inspiration* or *insight*;
- *Skills* used as such but also with specifications like *management, people, inductive, negotiation, physical, coordination* or *cognitive skills*. This is the ETK that is most used without any form of definition. Some other terms such as *ability, crafts and practical knowledge* are closely related and often used in the same meaning;
- *Insight* used as understanding, often in a sudden form but also as "glimpses" into self or other individual knowledge;
- *Know-how* often expressed as the ability to put know-what into work which is to a great extent the product of experience (Seely Brown & Duguid, 1998). Know-how is mostly used as such but also with specifications as *practical* and *collective know-how*;
- *Beliefs* used as a set of understandings that reflect our perspective of the world. Beliefs are also expressed as *opinions* (Giunipero et al., 1999) and sometimes even as *attitudes* (Leonard & Sensiper, 1998; Brockmann & Anthony, 1998);
- *Mental models* are cognitive structures formed by the abstractions of experience. They reflect our perspectives of the world around us. (Giunipero et al., 1999) Other ETK like *cognitive schema, mental maps* and *schemas* are used with the same meaning;
- *Practical intelligence* expressed as "a persons ability to apply components of intelligence to everyday life" (Somech & Bogler, 1999).

A variety of other epitomes relating to those mentioned-above, as well as more focused forms were identified. In total 149 ETK were collected and a pilot study with interviews on ETK reduced them to 92 ETK[3]. This decrease was due to either no answer from the respondents or a close proximity in meaning that resulted in clusters. An example is *gut feeling* that includes *gut instinct* and *gut reaction*. A systemati-

2 Find the complete list of ETK in Appendix 1

3. In the survey 99 Swedish ETK was used as the translation produced additional meanings in Swedish

zation of ETK can elucidate their meaning and facilitate their usage.

III.2.1. Taxonomies of Epitomes of Tacit Knowledge

There have been few classifications on knowledge and tacit knowledge. Knowing has been classified into two dimensions: the intellectual ("knowing what") and the practical ("knowing how") (Polanyi, 1966; Ryle, 1950). Tacit knowledge has mainly been classified into technical and cognitive dimensions. The technical dimension can be viewed as expertise "at ones fingertips" and it encompasses information and expertise in relation to "know-how", whereas the cognitive dimension consists of mental models, beliefs and values and it reflects our image of reality and vision of the future. (Nonaka & Takeuchi, 1995; Gore, & Gore, 1999).

If we group the concepts of ETK[4] by the natural relationships in the meaning that scholars put in them, in their texts, the mapping of tacit knowledge will be facilitated and improved. When ETK are used in interviews the shared meaning attained during the interviews can help the respondents to externalize tacitness of knowledge as well as the interviewers understanding of the information given to them.

ETK are sorted into two taxonomies according to:

1. The how abstract the concept is in **abstract** and **concrete** terms –, and according to the actors that can be involved in it **individually,** in a specific **team** or **collectively**;
2. The activities that are affected by the use of the concept in **mental, sensory, social** and **practical** terms.

1. Taxonomy based on abstraction and actor(s)

– *Abstraction in ETK*

A distinctive feature of ETK in the literature is difference in abstraction. Although the main characteristic of tacit knowledge is tacitness as abstraction, it can be seen that extents on abstraction vary from completely abstract to quite concrete in the concepts used. This is supported by Leonard & Sensiper (1998) in their thoughts about a spectrum of tacitness in knowledge.

Several of the ETK concepts can be considered abstract in the sense that they cannot be conveyed to others. This is often expressed in the interviews by "I cannot explain it but...". These are often tacit in the most genuine sense and they are therefore almost impossible to explain by articulation but also through other expressive forms, like behaviors. *Intuition* as well as *hunch, gut feeling, "feeling",* and *mental-model* are included in this group. An example is how one of the respondents in the survey explained *intuition*:

> "*Intuition*. You have it within you, you can't explain it to someone else only act on it in this way because

4. See Appendix, 2 for examples of taxonomies on ETK

you believe in it." (Referent no.1, Author's translation)

Other ETK may in themselves be considered abstract but lead to more concrete results expressed in our behavior or in the result of our work. Examples are *insight, talent, judgment, practical intelligence* and *rule-of-thumb.*

"*Talent.* People here may have the same level of knowledge. They have the same education and so on but then there are some programmers. What is it that makes some programmers twice as good as the others? What makes them three times better than the others? It is only that some have an inbuilt ability to do things. You can't put your finger on what it is, it is only there" (Referent no.7, Author's translation)

Culture and *know-how* consist of both explicit and implicit forms of knowledge but can be recognized by an outsider or an inexperienced person. In spite of difficulties in articulating tacit knowledge many of the used ETK have high visibility both for actors and outsiders. Some even to the extent that they are easier to be recognized by an outsider than by your self. Examples are *best-practice, skills, improvisation, genres* and *instinctive reaction.*

Tacit knowledge management is facilitated by awareness of the level of abstraction as it indicates what form of method should be used in for example tacit knowledge learning.

– *Actors included in the ETK*

Another distinctive feature is based on the actors involved. Although tacit knowledge is usually perceived as highly individual (Bennett & Gabriel, 1999) and personal (Boisot, 1995; Polanyi, 1966) many ETK refer to more collective tacit knowledge. In a study this is often expressed in form of "I feel..., We improvise... or All know.....". Only an individual can feel *intuition* or *gut feeling* and it is impossible to transfer it to other actors. ETK as *mental models, attitudes, know-how, judgment, skills* and *improvisation* include not only individuals as actors but also teams and groups of actors. Individuals have *mental models* and *know-how* and teams have *shared mental models* and a *collective know-how* developed by former and present members. *Best-practice, common sense,* and *culture* are exclusively collective; they do not exist without a group. These ETK are socially or functionally based and represent collective forms of tacit knowledge.

Actors included indicate the possibility of tacit knowledge sharing and show that a lot of tacit knowledge is in fact possible to share.

2. Taxonomy on affected activity

ETK are also grouped according to which form of activity is affected by tacit knowledge. Earlier scientific work has been done on cognitive/technical dimensions of tacit knowledge but the literature review showed that these dimensions do not illustrate ETK completely. Activities used in the literature and in this taxonomy are **mental, sensory, social** and **practical.**

Some ETK are related to cognition and affect actions taken in **mental processes** such as problem solving.

We use our *intuition, insights* and *judgment* as we detect, analyze and solve problems. Cognition can also be sorted as a mental process and our *mental models* have an influence on our *cognitive skills* as well as our *creativity.* A respondent expressed creativity as tacit knowledge in the following way:

> "*Creativity* is simply idea creation and so on. I understand it as when we put your ways of working into question all the time. Are we working with the right things and in the right way? It is in this process that the creativity shows" (Referent no.10, Author's translation)

Other ETK used include **sensuous processes**. We often use epitomes including feelings, both physical and mental feelings. We have *"feelings"* as well as *gut-feelings* or we *"know in our body"*. Other forms of affection such as *artistic vision* and *taste* are also included in sensuous ETK

> "*Gut feeling* is important. You have a feeling, it is this knowledge you have and the experience. You can't pinpoint what it is that makes you feel uneasy when everything, all analysis shows that you should do something but yourself think that you should not do it" (Referent no.4, Author's translation)

Tacit knowledge influences and is influenced by our **social processes**. For example *norms* and *communication skills* that control our relationships and interaction with other people are tacit. The most extensive form of social tacit knowledge can be found in *culture.* Irrespective of the scope of culture (national or organizational) the foundation of it is tacit concerning behavior, *values* and language, etc.

> "*Management skills* are what I understand as listening to people, discussing with them, speaking about things that perhaps are not always are so nice, you can convince people." (Referent no.2, Author's translation)

A common opinion on tacit knowledge is the practicality of it. This is reflected in a great variety of ETK used in **practical processes**. Most commonly used are not only different forms of *know-how* and *skills* but also ETK like *techniques, experience, best practice, rule-of-thumb* and *practical intelligence* fit into this group.

> "*Techniques* in our job are only ways of doing things. You have to create your techniques to do things but you also have to learn them to be fast in certain things, like reaction" (Referent no.1, Author's translation)

In some ETK the expressed meaning of the concept in different situations results in a different classification. *Ability* for example, can be considered as both a mental and a practical epitome depending on the meaning given to the concept. Ability as endowment may be grouped as a mental ETK whereas ability as skillfulness belongs to practical ETK. An important tacit knowledge is the ability to grasp a holistic perspective. This can also be found in the ETK. The holistic ETK are difficult if not impossible to sort into only one group; they belong in some way to all groups. Examples of this are *inner* or *personal competence* that includes all four different competencies.

The two taxonomies of ETK put the traditional view of tacit knowledge as

– abstract, difficult to explain, individual and practical – into question. In the first taxonomy, the systematization of ETK that scholars have used shows that much of tacit knowledge is made explicit in other forms than articulation or by articulation in images presented by epitomes. It also shows that only some ETK are individual and that many epitomes are used to express knowledge in teams or even general knowledge. According to the second taxonomy, the practicality of tacit knowledge is not to be interpreted as only physical but rather as the ability to get things done irrespective of the type of activity involved.

III.3. Cards on ETK to map tacit knowledge

ETK serves as tools to identify and reflect on the tacit knowledge used in work but the interview situation benefits from further formalization to maintain the focus on tacit knowledge. To do that, one simple, small card is created for each ETK. Every card consists of only one numbered ETK. In an interview 92 cards are used as triggers to the discussion and as they are processed one at the time, each constitute the topic of discussion and the focus (figure 2).

III.3.1. Mapping-interviews with ETK cards

Mapping tacit knowledge with "Interview cards on ETK"

1. Create cards and scales
2. Face-to-face interviews
3. Basic information
4. Sorting cards
5. Focus questions on each card
6. Text analysis to taxonomies
7. Other analysis
8. Organizational map of Tacit knowledge

Figure 3: The mapping process.

The mapping process is done as follows:

1. Start with creating the needed tools; as ETK are culturally based the ETK has to be adjusted to the surrounding culture. This concerns mainly the local language used in the culture and it may be needed to translate the ETK into the language in use. Other tools that are needed for the aim of the study can be different scales or schemes.
2. The cards are preferably used in face-to-face interviews and as they tend to be long and contain narratives the use of an audio tape recorder is recommended.

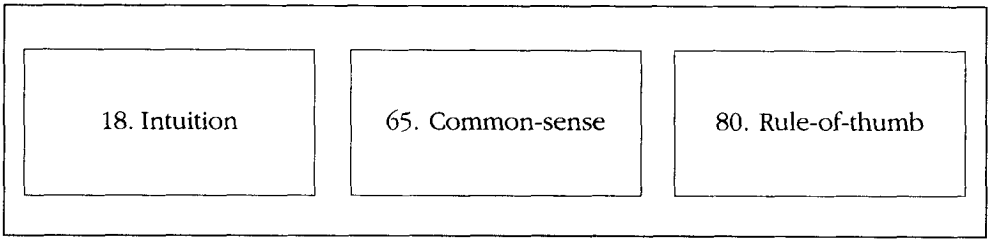

Figure 2: Examples of cards on Epitomes of Tacit Knowledge (ETK), nr. 18, 65 and 80.

3. Needed basic information like; department, work assignments, gender, age etc. are recorded. The respondent is informed of the topic of interview, the process and that it is recorded.

4. All the cards are handed over to the respondent and he/she is asked to sort out the cards applicable to his/her work. The respondent is asked to relate to their way of doing their work. After the sorting the interviewer collects the cards. Those not chosen are put away and the chosen cards form the basis of the interview.

5. The interview starts and the interviewer hands over one card in turn to the respondent with the questions of interest. For example in our casestudy the following questions are posed, for the **intuition** card:

   - What meaning has **intuition** to you in your work?
   - How important is **intuition** to the end result of your work on a scale 1-5?

   The interviewer can pose additional questions to guarantee understanding and to create a discussion on the ETK in question. To be able to systemize according to the taxonomies a discussion of the meaning should always be included.

6. A text analysis of the respondent meaning of each chosen ETK is performed according to the taxonomies. As the meanings of the ETK are related to the person and the work assignment, this analysis may result in different sorting of the same ETK for different respondents. Intuition for example can be perceived as a social activity to a manager but a mental activity to a financial analyst in the same organization.

7. Additional analyses needed for the aim of the study are performed. If quantitative data has been gathered, quantitative analyses like descriptive statistics or cross-tabulation are also possible to perform.

8. To create a map of tacit knowledge the data for each respondent is related to for example a department, work assignments or other variables of interest. By connecting all the individual results we have a map of the tacit knowledge in the organization in the form of ETK. This information can be used as a knowledge management tool to localize competence and as a trigger to the discussion of meaning or to assess the value employees' attribute to their tacit knowledge.

The taxonomies of ETK facilitate analysis of the mapping irrespective of the purpose of the study. The choice of a method of analysis can differ and is of course depending on the data collected and the purpose of the study. In the following study the information has been analyzed both quantitatively and qualitatively.

IV. A STUDY ON MAPPING TACIT KNOWLEDGE USING CARDS ON ETK

Next a study of tacit knowledge will be cursory presented to show the applicability of the method. ETK were used in a study of an asset managing

company in Finland. The aim of the study was to map **use**, **meaning** and **importance** of tacit knowledge in this organization. An additional aim was to test the **suitability** of using ETK as a mapping instrument for tacit knowledge in a work organization.

IV.1. The case firm

Referents in the study were 22 employees in a small asset management company group in alternative investments. It is a technology-based company in the forefront of electronic trading and it tests and utilizes the latest IT technology. The respondents are from the firm's all four different departments; Market-Making (MM), Information Technology (IT), DOTcom sales (DOT) and Administration (Adm). Market Making is where the actual trading occurs and 8 of the respondents work at this department. The IT department creates and develops IT technology for electronic trading for customers as well as IT technology needed within the company. 6 respondents work at the IT department. DOTcom Sales handles customer relationships mainly for the IT instruments and Administration supports and controls the rest of the company. 4 respondents work at each DOT and Adm. In this study, there was also a differenciation between management and non-management tasks. The managers have also ranked the employees according to how difficult they would be to replace.

Audio-recorded interviews with ETK cards were used in this study as well as an evaluation form to assess the importance each specific ETK has to the end result of the work. The scale for evaluation was from 1 (of some importance) to 5 (of vital importance). The interview was conducted as mentioned earlier and the structure of the interview consisted of only two basic questions

- "What meaning does this ETK have in your way of doing your work?"
- "How important is this to the result of your work?"

As one of the aims of the study was to test the suitability of the method of data collection, the interviews were analyzed both quantitatively (descriptive statistics and cross-tabulation) and qualitatively (text analysis) according to the two taxonomies.

Parts of the results of the study are presented on:

- The use and importance of tacit knowledge in the organization;
- ETK as a mapping instrument.

IV.2. The use and importance of tacit knowledge in the firm

The number of interviewee choices of ETK cards indicates the use of tacit knowledge. For each referent the choice of ETK indicate the variety of tacit knowledge in use. For the group of participants the choices also indicate how common the use of the tacit knowledge is in this firm.

All 22 participants chose one ETK and that was *common sense*. The meaning in the concept varied according to departments and assignments from common sense in how to behave or invest to IT personnel using common

sense in the time usage in programming. The choice of ETK cards indicate the use of different forms of tacit knowledge. The mapping in this organization showed that employees in the IT department use and hold a great deal of tacit knowledge as they had an average of over 73 ETK cards chosen. The IT department was also more homogeneous in what tacit knowledge they use than the others. This is shown by 54 ETK that was chosen by more than 75% of the respondents of this department. Moreover, also in the other departments the use of tacit knowledge was high with an average of 53 cards chosen and 25 cards chosen by more than 75% of the respondents. It showed that commonly used ETK are for example *ability, skills, intuition, cognitive skills, know-how, experience* and *communication skills*. Others are subjects for specified assignments or groups like social ETK *managerial, people* and *negotiation skills, life examples,* and *emotional knowing* used by managers and sales personnel or mental ETK like *sense-making, common sense, creativity* and *inductive skills* used by market makers and IT personnel. In this mapping we also got a picture of the tacit knowledge used by those employees valued as most important to the company (high ranked), as well as the competence of the employees involved in personal development. The high ranked personnel used more *life examples, operational and social skills, non-analytic behavior* and *improvisation* and less *patterns of experience* and *common in experience* than the low-ranked.

The average and median value of the importance of the ETK for the end result of the work was used and each ETK is presented on a scale from 1 (some importance) to 5 (of vital importance).

The interviewees felt tacit knowledge had a significant role to play in the results of their work. On the scale from 1 to 5 the mean value of all ETK for all 22 participants was 3.24 (between important and very important). No single interviewee had an overall mean value under 2.82 and median under 3. Furthermore, 30% of the ETK were valued 4 or higher (very or vitally important). Of highest importance was *know-how,* but also *collective know-how, foreseeing, skills* and *emotional knowing.* The respondents reflections during the interviews resulted often in their surprise of how important this dimension of knowledge is.

A notably finding was that the use of tacit knowledge and the importance of it *do not correlate with each other.* As an example, although the use of ETK at the IT department exceeded the other departments, the employees did not perceive it as more important. On the contrary, the general perception in this organization was that the more an ETK was used the lower was its perceived importance, and that an ETK considered highly important was less commonly used. This did not apply to the group of high ranked employees however, where the use of tacit knowledge was more common than in low ranked employees and who appreciated tacit knowledge more highly.

By this mapping the organization can localize the different forms of tacit knowledge needed and utilized in different departments and tasks. It may

perhaps also explain what it is that makes their high ranked employees differ from the rest. As an example the knowledge of the use and importance of social skills in the IT department can be useful next time they recruit a new programmer. The mapping shows also what kind of tacit knowledge those who for example trade use. By making tacit knowledge development possible the skills of the organization's employees may develop towards the skills of the high ranked. As the mapping clearly shows *who* possess *what* kind of tacit knowledge and *where* in the organization he/she works, learning that enhance tacit knowledge internalization like mentoring, pairing, tutoring etc. is facilitated.

IV.3. ETK as a mapping method

As a technique this offered an excellent instrument to collect information on a topic otherwise difficult to access. The difficulty with articulating tacit knowledge was dealt with and the interviews were much more focused by the use of ETK cards. The gap between language and tacit knowledge was narrowed as the respondents were presented with familiar concepts to discuss. This resulted in vivid stories of their use of tacit knowledge in everyday activities at work. As many of the respondents were not aware of the concept of tacit knowledge before the interviews, the ETK were a necessary concrete aid for them to understand the concept it self. The physical cards helped the respondents to focus on each of the ETK but also to recognize connections between them. Some did it by building actual ETK structures of the cards. The cards reduced the interviewers bias but more importantly they simplified the questions. As the cards are quite many the interviews tended to be long, 60-120 minutes. This showed in sense of fatigue at the end of the longer interviews both in the interviewer and the interviewee and may have had influence on the results. In a reduction of cards there is a risk of loosing variation and therefore important information. In the choice between fewer cards and easier interviews or many cards and variation the aim must guide the choice but it can never be bad to do a work properly.

Linking all the personal ETK maps to variables of interest, for example department or assignments, we get a map of tacit knowledge in forms of ETK in the organization. The map showed the conceptual differences but also forms of tacit knowledge that was perceived collective and concrete and therefore easier to share. The visualization of the map depends on the needs and may vary in different organizations. A map should be simple and clear and a mapping with ETK shows where and with whom we find what kind of tacit knowledge. A manager's task is to utilize this information to create the knowledge management system needed.

V. CONCLUSIVE DISCUSSION

To answer questions posed in the beginning of this article, about what an ETK is, how they can be systemized and used for mapping tacit knowledge in an organization following conclusions are drawn.

V.1. Summary

Epitomes of tacit knowledge (ETK) are concepts like *intuition, mental models, culture* and *hunch*. These concepts are used to elucidate tacitness in knowledge. The ETK concepts are a natural part of our use of a language but they have not been consciously related to tacit knowledge in this way earlier. When we use them we are often not even conscious of talking about tacit knowledge. Also the experts on tacit knowledge, namely scholars on the topic, use ETK in their writings. The concepts are therefore a good base in collecting a "vocabulary of tacit knowledge".

ETK were collected and systemized by natural relationships into two taxonomies: the first taxonomy according to abstraction and actors and the second one in relation to activities that they affect. The first taxonomy showed that ETK differ in the degree of abstraction from *abstract* to *concrete* and in actors involved from *individual* and *group* to *collective* tacit knowledge. The second taxonomy showed four activities affected by the ETK, they are *mental, sensory, social* and *practical* activities.

Cards on ETK were used in mapping organization specific tacit knowledge in an asset management company in Finland. The use of ETK in this mapping helped employees to identify and reflect on tacitness in their work. The analysis according to the taxonomies offered an opportunity to localize existing tacit knowledge both on organizational level as in the extensive use of tacit knowledge in the IT department and on individual level as in what kind of tacit knowledge the highly ranked employees use. It showed the extent of shared meaning and emphasized the magnitude of tacit knowledge in the organization as being high. Therefore this kind of mapping can facilitate tacit knowledge diffusion and influence the perceived importance of it in the organization.

V.2. Conclusions and limitations

As everyone use ETK every day to facilitate the explication of tacit knowledge, they also are suitable in mapping tacit knowledge. These are familiar concepts although they are so self-evident which leads to lack of reflections on their meaning. The interviews during the development process and in the test study show that data collected with ETK is more comprehensive, focused and vivid than data from traditional deep-interviews on the same topic without the use of ETK. The respondents were able to narrate their tacit knowledge using already known words to them. But to be able to do this there has to be a cultural aspect to the language used in the method. The ETK has to be adapted to the cultural setting, for example there was several different Swedish translations of the ETK ability or that the ETK common sense in Swedish correspond more to "sensible mind". Mapping tacit knowledge with ETK has offered a unique method to learn about and localize tacit knowledge in an organization.

The taxonomies facilitate scientific work on tacit knowledge as well as its everyday use in professional work-life. A clarification of concepts prevents mi-

sunderstandings and facilitates the discussion on tacit knowledge. These two taxonomies indicate that the concept of tacit knowledge often defined as "abstract, practical, individual and based on experience" is defined too narrow to illustrate all different forms tacit knowledge can take. Both according abstraction and actors included as well as according activities affected. The taxonomies also proved to be helpful in analyzing the data on the use and importance of tacit knowledge.

A further development of this method could be to formalize and use the ETK cards to structure processes of tacit knowledge as some of the respondent spontaneously did already. This is preferably done when the interest is in for example the relationships between the parts of the personal knowledge. To be able to use the structures of ETK cards in a study photographing or sketching could record them. Encouraging the respondents to tell more stories could also develop the method to be an excellent base for story telling on tacit knowledge.

A generalization of the use and importance of tacit knowledge is perhaps not justified based on this study but the ETK instrument can be generally used for mapping organizational specific tacit knowledge and this may be valuable both for the individual and the organization.

The intention was not to explain all the tacit knowledge, as that still is perceived as a mission impossible. This technique has however made it possible to move the barrier of what of our knowledge we can tell. We have taken one step into a part of the silent world of tacit knowledge.

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Appendix 1: Numbered Epitomes of Tacit Knowledge

1.	Ability	47.	Attitude
2.	Skills	48.	Beliefs
3.	Embodied knowledge	49.	Common beliefs
4.	Collective ability	50.	Opinion
5.	Capability	51.	Perspectives
6.	Crafts	52.	Predictions
7.	Bodily skills	53.	Judgment
8.	Cognitive skills	54.	Estimation
9.	Communication skills	55.	Percept
10.	Coordination skills	56.	Personal experience
11.	Inductive skills	57.	Common in experience
12.	Managerial skills	58.	Pattern of experience
13.	Negotiation skills	59.	Best practice
14.	Operational skills	60.	Knowledge base
15.	People skills	61.	Masters sureness of action
16.	Physical skills	62.	After-the-fact awareness
17	Social skills	63.	Artistic vision
18.	Intuition	64.	Care-why
19.	Intuitive knowledge	65.	Common sense
20.	Insight	66.	Creativity
21.	Flashes of insight	67.	Culture
22.	Non-analytical behavior	68.	Embedded knowledge
23.	Flashes of inspiration	69.	Get a feel for
24.	Unconscious norms	70.	Emotional knowing
25.	Hunch	71.	Genres
26.	Shared beliefs	72.	Group's sense
27.	Automatic knowledge	73.	Improvisation
28.	Mental models	74.	Inexplicable mental processes
29.	Organizational memories	75.	Inner competence
30.	Shared meaning	76.	Instinctive reactions
31.	Cognitive schemes	77.	Personal competence
32.	Organizational mind	78.	Routines
33.	Thinking in practice	79.	Routinized knowledge
34.	Know-how	80.	Rule-of-thumb
35.	Expertise	81.	Sense making
36.	Collective know-how	82.	Shared values
37.	Practical intelligence	83.	Talent
38.	Life examples	84.	Taste
39.	Oneness of body and mind	85.	Techniques
40.	Know in ones body	86.	Tricks
41.	Feels as...	87.	Thoughts
42.	Looks as.... .	88.	Understanding
43.	Feeling	89.	Values
44.	Gut-feeling	90.	Sounds of
45.	Norms	91.	People knowledge
46.	Shared norms	92.	Shared code

Appendix 2: Examples of the use of taxonomies

Taxonomy 1/ Map of respondent 2

Collective		Shared meaning Group's sense Shared values Values	
Individual/Team	Know-how Feeling	Communication skills Beliefs Knowledge base Emotional knowledge	Automatised knowledge Shared norms Opinion Percept Knowledge base Care why Sense making
Individual	Intuition Gut feeling Experience Talent	Management skills Norms Common sense Creativity Inner competence Understanding People knowledge	Attitude

Taxonomy 2/ Map of respondent 2

Mental	**Sensuous**	**Social**	**Practical**
Intuition Automatised knowledge Opinion Experience Knowledge base Common sense Creativity	Feeling Gut feeling	Communication skills Management skills Shared meaning Norms Shared norms Attitudes Beliefs Opinion Percepts Care why Emotional knowing Group's sense Sense making Shared values Understanding Values People knowledge	Automatised knowledge

Holistic
Know-How, Inner competence, Talent