



School of Economics and Commercial Law
UNIVERSITY OF GOTHENBURG
Department of Informatics
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Performance Indicators for Measuring Performance of Activities in Knowledge Management Projects

Abstract

As of today, the organizations has realized that to be able to compete on the fast-evolving market, there is a need to include competence and knowledge in what is offered to the customers. The purpose of the thesis is to study knowledge management projects and, by retrieving the performance indicators used for measuring their performance, create a list of performance indicators to recommend. In order to fulfill the purpose, the main question to be answered is "Which performance indicators should be used when measuring performance of activities in knowledge management projects?". We have studied literature to lay foundation for the theoretical part and by applying a qualitative method using semi-structured interviews and reading available case documentation, an exploratory study has been conducted for the empirical section. Conclusions show that there is a need for a measurement system, which integrates the qualitative and quantitative indicators and shows a changing by comparing results of previous measurement occasions.

Keywords:

knowledge sharing, knowledge management project,
performance indicator, performance measurement

Authors: Emma Orr & Marie Persson
Tutor: Andreas Nilsson
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1 INTRODUCTION

In this section the intention is to introduce the topic of the thesis. The chapter begins with a brief background to the topic, followed by the purpose and the problem statement. The section ends with delimitation and the disposition of the thesis.

1.1 BACKGROUND

Knowledge management is a concept, which has become widely spread. Managing knowledge in organizations has turned out to be a key to commence successful business, since the business environment is continuously changing and becomes increasingly competitive. Stemming from this situation, organizations need to adapt to new conditions and respond to change.

The current situation in for instance the industry is that usually the technology needed to produce the product is in place, but that the organization has realized that in order to compete on the fast-evolving market, there is a need to include competence and knowledge in what is offered to the customers.

To remain at the competitive edge, knowledge management projects exist, aiming to increase the knowledge sharing within the organization. Considering that the challenge with knowledge management lies in the ability to assess each person's individual knowledge and making sure this is fully taken advantage of, these projects fulfil an important purpose. However, it is not only about implementing the needed technology for knowledge sharing, it is also about creating an environment that encourages people to actually take part in the sharing.

To ensure an increased knowledge sharing it is needed to measure the performance of the activities in the knowledge management projects. When one is aware of the current performance, and whether it is increasing or not, it becomes possible to manage the project effectively and hence also control the status of the knowledge sharing within the organization.

1.2 PURPOSE

The aim with this master thesis is to study knowledge management projects and included activities to be able to identify performance indicators used for measuring performance. Based on these results, a list of performance indicators to recommend will be created.

1.3 PROBLEM STATEMENT

This thesis is based on the following questions:

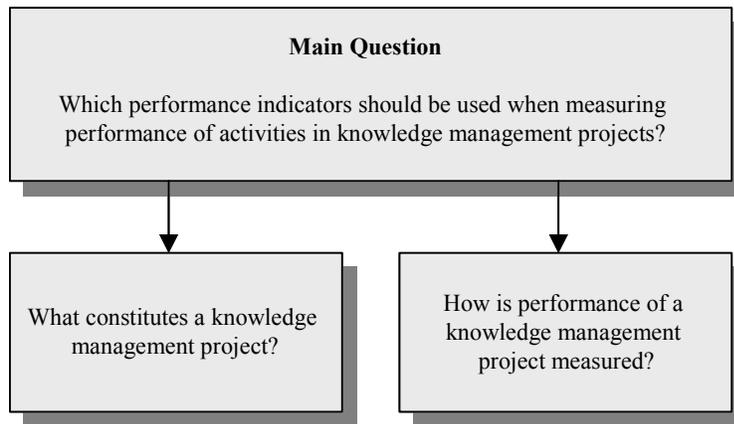


Figure 1: Questions to be answered in this thesis.

In order to answer the main problem "Which performance indicators should be used when measuring performance of activities in knowledge management projects?", we have chosen to make a division into two parts. The first part clarifies "What constitutes a knowledge management project?" and the second part describes, "How is performance of a knowledge management project measured?"

1.4 DELIMITATION

This thesis is based on knowledge management projects only, since those are the kind of projects the performance indicators are intended to measure.

We will neither suggest an ultimate way to carry out knowledge management projects nor success factors for these. We have studied these projects and the included activities solely to receive an understanding of what is important to focus on when choosing performance indicators for measuring the performance.

Also, we will not give any suggestions or recommendations for what actions to take after performing the measurement.

1.5 DISPOSITION

The structure of the thesis is described below:

Chapter 1, Introduction, intends to introduce the topic of the thesis. The chapter begins with a brief background to the topic, followed by the purpose and the problem statement. The section ends with delimitation and the disposition of the thesis.

Chapter 2, Method, describes the work procedure used while writing the thesis, followed by general descriptions of research designs as well as criticism of sources.

Chapter 3, Theory, is based on authors' and researchers' viewpoints found in literature. The first part clarifies what constitutes a knowledge management project in order to present what kind of project is the basis for the thesis. The second part discusses measuring performance of activities in such projects and describes the concept of performance indicators. The chapter ends with a brief summary.

Chapter 4, Empirical Section, presents the results from the conducted interviews and collected information from case studies. The section is structured by each organization and the topics in the questionnaire. The chapter ends with a brief summary and a matrix showing a compilation of the identified performance indicators.

Chapter 5, Analysis, discusses the results of the empirical section, in conjunction with the theory section. The first part validates the knowledge management projects found in the participating organizations. The second part analyses the performance indicator matrix, motivates the selection of performance indicators to recommend and finally presents a list of the recommended performance indicators.

Chapter 6, Conclusion, presents the conclusions drawn from the analysis and gives recommendations for organizations and suggestions for further research.

2 METHOD

The following section describes the work procedure used while writing the thesis, followed by the research design as well as criticism of sources.

2.1 WORK PROCEDURE

The work in this thesis has been divided into four phases:

1. The initial phase has been based upon reading literature and scientific articles with focus on performance measurement for knowledge management projects to be able to define purpose and problem statement of the thesis. In the final stage of this phase the method to guide the work procedure was outlined.
2. The starting phase focused on collecting secondary data, which have laid foundation for the theory section. During this phase the theory section has been written and completed. Finally, a list of organizations to ask for participation in this thesis has been put together.
3. The performing phase started with contacting key people in the selected organizations. After finding those willing to participate interviews were performed and available case documentation was read. Based on this information, as well as previous complementing literature studies, a matrix with a compilation of the identified performance indicators was created.
4. The final phase started with interpretation and analysis of the data from the theoretical and empirical sections. Based on the performance indicator matrix and the gained information of knowledge management projects, a selection was made for creating a list of performance indicators to recommend.

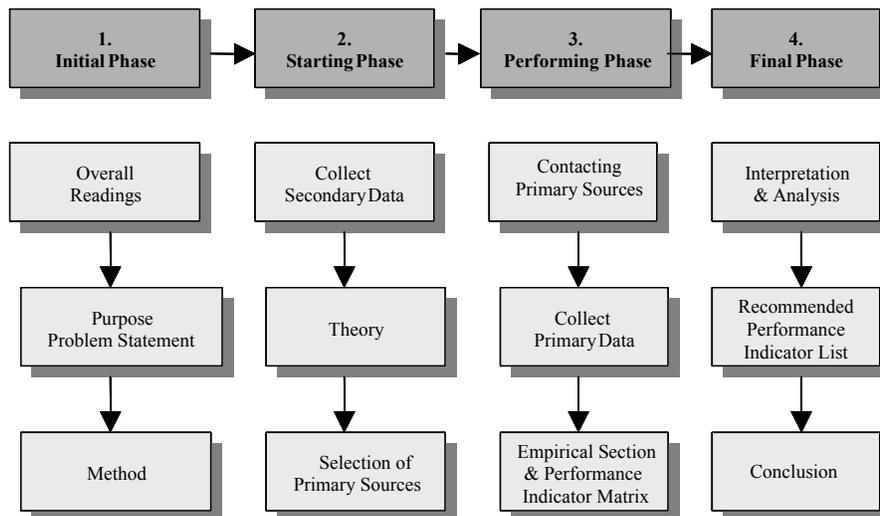


Figure 2: Work procedure while writing this thesis.

2.2 RESEARCH DESIGN

The design of research outlines what type of information is to be gathered, which sources are suitable and how the gathering of data will be conducted. A good design of research makes sure that the gathered information corresponds to the purpose of the study and depending on where in the process one is, the choice of design is crucial.

2.2.1 Types of Research

In light of the above mentioned, a division of three different designs can be done: exploratory research; conclusive research which may be divided into descriptive and causal; and performance-monitoring research.

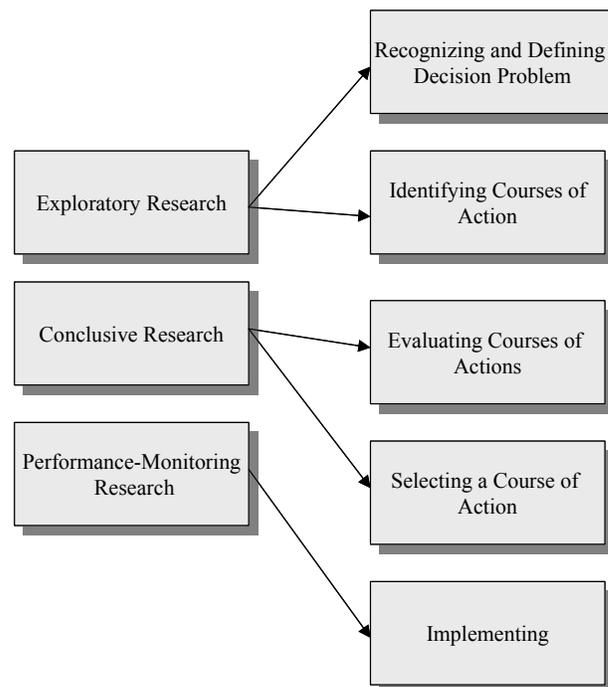


Figure 3: Types of research designs
Source: Kinnear & Taylor (1996), p. 127.

2.2.1.1 Exploratory Research

Exploratory techniques are most suited in the initial stages of a decision-making process, when the researcher does not have complete knowledge of the topic. By using these techniques, one can broaden one's knowledge and come to an understanding of the problematic areas of the topic. By performing a preliminary study, which, from a resource perspective, does not require much time or money, the real focus of the study is mapped.¹ The exploratory technique does not follow any particular pattern, and its main purpose is to identify and clarify any problem/possibilities, generate ideas and suggest hypotheses.² Since

¹ Kinnear, T.C. & Taylor, J.R. (1996), p. 127.

² *ibid.*, p. 130.

the exploratory technique solely explores the surroundings, it is difficult to draw any definite conclusion. Interviews, case studies, observations and literature studies are all examples of how information may be gathered.

2.2.1.2 Conclusive Research

Conclusive research is meant to facilitate the evaluation of different alternative actions and may be divided into two groups: descriptive and causal.³

Descriptive Research

This is the most common type of research and is quite different from the exploratory techniques. Descriptive research is used when one wants to find information regarding specific questions, which one wants to describe more specifically. The problem to be solved must be clearly defined, the goals of the study must be specific and the need for information must be detailed.⁴

Causal Research

Causal techniques are relevant when the researcher already knows a great deal of the problem in question and solely wants to verify the gathered information. The goal is not only to find facts about a problem or a possibility, but also to find the origin of it.⁵

2.2.1.3 Performance-Monitoring Research

Performance-monitoring research gives information and indicates whether any problems or possibilities exist. This type of research functions as a tool with the purpose to find and identify changes, actions and problems.⁶

2.2.1.4 Our Choice of Research

Our choice is to perform exploratory research by exploring the surroundings in order to answer the main problem of this thesis; “Which performance indicators can be used when measuring performance of activities in knowledge management projects?”.

2.2.2 Qualitative vs. Quantitative Methods

A study may be qualitative or quantitative, described below.

2.2.2.1 Qualitative Methods

Qualitative studies are suitable when a deeper understanding for the area of research is aimed for. Such methods are flexible and do not follow a rigid plan. The result comes from few units of research and is not focused on determining universal validity.⁷

³ Kinnear, T.C. & Taylor, J.R. (1996), p. 131.

⁴ *ibid.*, p. 132.

⁵ *ibid.*, p. 134.

⁶ *ibid.*, p. 135.

⁷ Holme, I.M. & Solvang, B.K. (1991), p. 13.

2.2.2.2 Quantitative Methods

As opposed to qualitative studies, its quantitative counterpart is more formal and aims for statistical results gained from a wider field of research.⁸ Quantitative data is measurable and is put together by a large number of, for instance, interviews.⁹

2.2.2.3 Our Choice of Method

For this thesis we have chosen a qualitative method. By performing interviews we are looking for an understanding of how each organization measure performance in their knowledge management projects, which, in combination with the background studies, will lay foundation for the following analysis.

2.2.3 Collection of Data

The data collected for this thesis is a combination of primary and secondary data. These two types of data will be described briefly.

2.2.3.1 Secondary Data

To lay foundation for the theoretical framework one needs to conduct a literary study as part of the collection of secondary data. By studying literature one can receive an idea of concepts within the subject area as well as how they are specified and applied. To review what has already been done within a field of research gives an overview and a historical perspective that may facilitate getting the main idea across to the reader. It also indicates any contradictions in the field and may emphasize the alternative interpretations that have been made prior to the study in question. However, one must not neglect a careful selection of literature when performing the literature study to make sure the sources are reliable and avoid incorporating biases.¹⁰

2.2.3.2 Our Collection of Secondary Data

In this thesis the literature study consist of books, articles, research reports, dissertations and case studies. The purpose of the study of literature is partly to display what other researchers have written and presented within the chosen topic and partly to display knowledge of the area of research.

2.2.3.3 Primary Data

The primary data is data that is collected in order to supplement the secondary data. Primary data is firsthand studies, for instance interviews or observations. Interviews are common since they are an excellent source of insight into a specific situation and may enlighten critical areas useful for research. However, the interviewer must bear in mind that interviews may be subject to bias depending on the situation as well as the questions asked.

Observations on the other hand are records of what people actually do and how. Contrary to interviews, observations are somewhat more objective. However, when observing people

⁸ Holme, I.M. & Solvang, B.K. (1991), p. 13.

⁹ Ranerup, A. (2003)

¹⁰ Backman, J. (1998), p. 51.

there is a risk that they behave differently since they are aware of the observation.¹¹ A weakness with this method of collecting data is that it does not record the underlying reasons for a certain behavior.¹²

2.2.3.4 Our Collection of Primary Data

As a first step we looked into which organizations are prominent within knowledge management. We decided to use semi-structured interviews with knowledge managers in the selected organizations, they were contacted and after having agreed to participate each interviewee was sent background material and a questionnaire (see Appendix 1). The interviews were then scheduled at a convenient time and place.

However, even though the topic itself was generally thought of as interesting, many organizations had to decline participating due to the fact that their knowledge management projects are not yet being measured. Hence, they had no information to submit, since they are not currently conducting any performance measurements nor do they have any defined methods for doing so.

2.3 CRITICISM OF SOURCES

2.3.1 Validity

Validity is a measure for systematic errors during the study. The term is used to describe how well the theoretical and empirical data match. In a qualitative study there is no absolute way to evaluate the data. Instead, it is a question of showing its reasonableness and validity by providing information and interpretations of that information. This is possible if the person performing the study is able to show that the interpretations are valid in more than one situation, and that it is based on theoretical as well as empirical data.¹³

2.3.2 Reliability

The degree of reliability in a study is affected by random faults or temporary characteristics of, for instance, the person performing the interview or the surroundings. Intonation as well as choice of words may affect the respondent and his or her answers.

Reliability in collecting qualitative data has to do with whether the interviewer is able to show that the interpretation of the answers is not affected by presuppositions or stereotypical opinions. It is also important that the respondent feels free to answer the questions truthfully. Since a qualitative study often has to deal with new conditions every time, it must be taken into consideration that it is somewhat difficult to perform a reliable study in the traditional sense.

To enhance the reliability and credibility of the interpretations, the interviewee may be allowed to review the result of the interview. It is also of great importance to make sure that

¹¹ Faulkner, C. (1998), p. 122.

¹² Ranerup, A. (2003)

¹³ *ibid.*

the purpose of the study is clear to the interviewee in order for him or her to better be able to judge how credible the result is.

2.3.3 Our Criticism of Sources

Because of the difficulty to bring about a high degree of reliability in a qualitative study, there is a risk that we may have interpreted the result according to our own frame of reference. However, we are aware of the difficulty and have done our best to be objective.

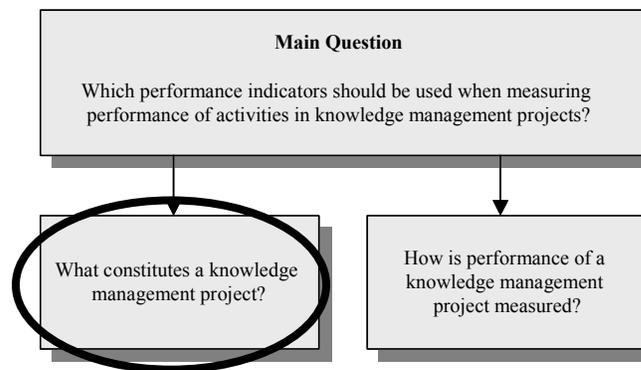
The validity of the questionnaire was enhanced by letting our tutor assess the questionnaire, before conducting the interviews. To control that the results are valid, our interviewees were knowledge managers at the selected organizations. Also, to validate that the studied projects are typical knowledge management projects we compare them to the result of the study found in the theory section (see section 3.1.4).

To enhance the reliability and credibility, interviewees were asked to review the compilation of data from the interview in order for us to find out if any revisions were necessary. We were both present at the interviews and, after agreed upon with the interviewee, we also recorded the interviews. In addition to this, we also took notes. After the interviews the recordings were transcribed and, in combination with any notes taken, used as reference material for the analysis.

3 THEORY

The theory section is based on authors' and researchers' viewpoints found in literature. The first part clarifies what constitutes a knowledge management project in order to present what kind of project is the basis for the thesis. The second part deals with measuring performance of activities in such projects and describes the concept of performance indicators. The chapter ends with a brief summary.

3.1 CONSTITUTION OF KNOWLEDGE MANAGEMENT PROJECT



This section clarifies what kind of project is the basis of the thesis. In order to understand what is going to be measured, one needs to understand what constitutes a knowledge management project. Therefore, this section briefly explains the concept of knowledge management itself and presents a definition of knowledge management projects.

3.1.1 Knowledge Management in Short

There is no universal definition of knowledge management, just as there is no agreement as to what comprise knowledge. Knowledge management is in essence an organizing principle, which lays foundation for capturing the potentials of the possessed knowledge within an organization.

Knowledge management aims to leverage and utilize the uniqueness of the organization - to capitalize on the mix of people, processes, services and products that define the organizations identity and position in its competitive market.¹⁴ The knowledge content of products and services is increasing and there is a need to add competence and the knowledge surrounding the product in order to become more competitive.¹⁵ At the margin, when a business faces competition, the difference between success and failure may well turn on how effectively it manages its knowledge.¹⁶

¹⁴ Abell, A. & Oxbrow, N. (1999), p. 4-1

¹⁵ Hlupic, V., Pouloudi, A. & Rzevski, G. (2002), p. 96.

¹⁶ Davenport, T.H., de Long, D.W. & Beers, M.C. (1998), p. 56.

The very essence of knowledge management is a mix of skills and experience, a new approach to organization development, and a new focus on the management of people.¹⁷ A knowledge management initiative will help the organization to better manage, share, create and distribute their knowledge-based assets.¹⁸

Therefore, knowledge management is the process of creating value from an organization's intangible assets. Knowledge management deals with finding the best way to control knowledge and increase knowledge sharing.¹⁹

3.1.2 Knowledge Sharing

A very important area of knowledge management is how to encourage people to share what they know.²⁰ This can be done for instance by creating an encouraging environment or by using incentives.

Usually knowledge is considered to be a source of power, and by not sharing, a person is increasing his or her personal value to the organization thus making him/herself less likely to be replaced. For this reason, it is important to encourage people to share instead of hoarding knowledge. Another aspect is that expertise in general is often considered a threat to the ones who need it but does not possess it.²¹ To solve this, it is vital to make sure that knowledge sharing is encouraged and that the people in possession of the knowledge understand the benefits of sharing it. Coleman suggests that a clearer linkage between knowledge sharing and business benefits may motivate workers to take the time to share what they know.²²

Hence, the quest for each organization is to value contributions from its individuals. By doing so, more contributions will be encouraged since it will become clear that sharing knowledge does not imply losing it.²³ Sharing knowledge will only generate new knowledge and increase the value of the organization as well as its individuals. On this matter, Ågren, Olofsson and Persson point out that real competitiveness stems from being willing to share, and not the other way around, and that it is crucial to get this point across to the people who are supposed to do the sharing.²⁴

Ågren, Olofsson and Persson also identify the prerequisites for knowledge sharing. These prerequisites are an encouraging environment, motivation, forums in which to share, providing relevant information and making it accessible and giving the employees sufficient time to share their knowledge.²⁵

¹⁷ Abell, A. & Oxbrow, N. (1999), p. 4-3

¹⁸ Liebowitz, J., & Wright, K. (1999), 5-1

¹⁹ Abell, A. & Oxbrow, N. (1999), p. 4-1

²⁰ Beckman, T.J. (1999), p. 1-16

²¹ *ibid.*, p. 1-16

²² Coleman, D. (1999), p. 12-9

²³ *ibid.*, p. 12-10

²⁴ Ågren, A, Olofsson, C. & Persson, M. (1999), p. 3.

²⁵ *ibid.*, p. 4.

As a means to motivate people to share their knowledge, many organizations use incentives. However, as another side of the coin, Fitzek referring to Kleiner and Roth, brings forward another important aspect in relation to the incentive system. They state, that people becoming aware of being judged and measured seek to satisfy the evaluation criteria instead of improving their capabilities. The intrinsic motivation, which drives learning and knowledge transfer, is then supplanted by the desire to look successful. Yet evaluation is vital to learning as a feedback process that provides guidance and support.²⁶

3.1.3 Hard and Soft Aspects of Knowledge Management

To make the most of the organization's resources and enhance knowledge sharing it is important to acknowledge that it is about managing both technology and people in order to provide a beneficial knowledge-sharing environment.

Hlupic et al. among others state that both the hard aspects, that is technology, and the soft aspects, that is human and culture, are of vital importance for effective knowledge management. Technology develops rapidly with increasing functionality and at the same time the workers become increasingly competent in its use. One important reason why knowledge management has become increasingly popular is that the capabilities of contemporary information systems enhance and enable knowledge storage and transfer. It is important to realize that effective management of knowledge involves more than simply implementing supporting technology. Similar to all information systems, knowledge management systems can only be of great benefit to an organization if used in the right environment. The introduction and implementation of systems supporting knowledge management does not result in a knowledge environment. Therefore the soft parts, including human and cultural aspects are equally important to manage knowledge effectively.²⁷

It is the integration of the hard and the soft parts of the knowledge base that are critical to be able to optimise the effects of knowledge management. These two parts are inseparable as they form and influence each other.²⁸ They are also present in all projects aiming to manage knowledge. Such projects will be defined in more detail below.

3.1.4 Definition of Knowledge Management Projects

Knowledge management projects aims to do something useful with knowledge and enhance knowledge sharing by structuring people, technology and knowledge content. To get a better understanding of knowledge management projects, different studies have been looked into in order to find out if there is a general agreement as to what constitutes such projects.

3.1.4.1 Categories of Knowledge Management Projects

The study found to be most useful was conducted by Davenport, de Long & Beers.²⁹ They have identified four broad types of knowledge management projects depending on what the

²⁶ Fitzek, D. (1999). p. 81.

²⁷ Hlupic, V., Pouloudi, A. & Rzevski, G. (2002), p. 96.

²⁸ *ibid.*, p. 97.

²⁹ Davenport, T.H., de Long, D.W. & Beers, M.C. (1998), p. 44.

project emphasises: creating knowledge repositories, improving knowledge access and transfer, enhancing knowledge environment and managing knowledge as an asset.³⁰

The categorization by Davenport et al. has been selected to make the structure of this section, even though other viewpoints are brought up as well. This choice was made since the categorization is the compiled result of a comprehensive study and also since the study is made by researchers, who, based on literature studies, are found to be reliable.

Creating Knowledge Repositories

In this kind of projects, major emphasis is put into trying to capture knowledge and to treat knowledge as an "it", that is, an entity separate from the people who create and use the knowledge. One way of doing this is taking documents with knowledge embedded and storing these in a repository where it can easily be accessed. According to Davenport et al., there are three types of knowledge repositories: external knowledge, structured internal knowledge and informal internal knowledge. For capturing external knowledge, competitive intelligence systems are used. These systems can filter, synthesize and add context to information from the external environment in order to make it more valuable. Repositories for structured internal knowledge store both knowledge and document based information, such as research reports, product-oriented marketing materials, techniques and methods. Informal internal knowledge is less a structured form of knowledge, that is, the one that resides in peoples mind. This kind of knowledge, referred to as tacit, is not structured as a document and is therefore not easily converted.³¹

Projects in this category are usually the type of projects that initiate knowledge management within an organization. As a first step towards fulfilling a business need, which varies according to type of organization, a compilation of the organization's knowledge is made. The repositories are supposed to fill the knowledge need of many people and often its contents may be of diverse types.³²

Improving Knowledge Access and Transfer

Projects of this kind put emphasis on activities providing access to knowledge or facilitating its transfer between people. One aspect of this is the difficulty in finding the person with the desired knowledge and then effectively transferring it from that person to another.³³

When it comes to the access and transfer of knowledge, Foy argues that part of the focus on knowledge management today stems from increased technological capabilities. However, one does not only want to take full advantage of technological improvements, but also to do useful things with the retrieved knowledge in order to spread it further.³⁴

One activity of this kind is a community of practice, which can be either online-communities or face-to-face communities. A community of practice is a group of people sharing

³⁰ *ibid.*, p. 45.

³¹ *ibid.*, p. 45.

³² Foy, P.S. (1999), p. 15-3.

³³ Davenport, T.H., de Long, D.W. & Beers, M.C. (1998), p. 46.

³⁴ Foy, P.S. (1999), p. 15-4.

knowledge, learning together and creating common practices. Communities of practice share information, insights and experiences about an area of common interest. Community members frequently help each other to solve problems and develop new approaches for their field. Other examples of activities to improve knowledge access and transfer are workshops, seminars and different kinds of networks. Desktop videoconferencing system, document scanning and other sharing tools are examples, which supports the communication of knowledge between people who would not otherwise work together, and hence, improve knowledge transfer.

The above-mentioned projects indicate a need for, and put emphasis on, connectivity, access and transfer.³⁵

Enhancing Knowledge Environment

Unlike data and information, knowledge is created invisibly in the human brain and only the accurate organizational climate can influence people to create, reveal, share and use this knowledge. This kind of projects involves activities to establish an environment contributing to a more effective knowledge creation, sharing and use. Activities involved are trying to build awareness and cultural attention to knowledge sharing.³⁶ A culture supporting knowledge environment eliminates or decreases people's possible reluctance for sharing knowledge.³⁷

These projects are trying to change behaviour and attitude within the organization. People need to feel part of the knowledge network and in some cases this may imply having to learn to trust colleagues in a new way. Knowledge, which previously has been kept individually, is to be shared.³⁸ Therefore, part of enhancing the knowledge environment is making clear that a win-win situation will be the result, both for the organization and for the individual.

Other activities make efforts to change the organizational norms and values related to knowledge and to support and promote the re-use of different kinds of knowledge. Example of such an activity is support and encouragement from management. The new culture needs to be developed to become a natural way of working.

Many of the features in enhancing the knowledge environment of an organization, such as behavioural changes, are not developed rapidly. People may need to learn how to work a bit differently than what they are used to, since sharing not always comes naturally. Incentives are generally recognized as a means to speed up the process even though it may take a few years before the enhancement is fully achieved. This also accounts for a longer period before the knowledge management project may show the desired results.³⁹

³⁵ Davenport, T.H., de Long, D.W. & Beers, M.C. (1998), p. 46.

³⁶ *ibid*, p. 47.

³⁷ Liebowitz, J. (1999), p. 39.

³⁸ Foy, P.S. (1999), p. 15-5.

³⁹ Foy, P.S. (1999), p. 15-5.

Managing Knowledge as an Asset

Projects of this kind focus on treating knowledge like any other asset on the balance sheet.⁴⁰ The intangible type of information that stems from knowledge projects makes it very difficult to transform and estimate in financial terms.⁴¹ Organizations carry out financial reporting, but few do the same for their intellectual and knowledge assets. This puts pressure on finding a way to be able to measure these intangible assets.⁴² As of today, there are a few methods for such measurements; Balanced Business Scorecard, EFQM (European Foundation for Quality Management) and The Skandia Navigator. These methods give some attention to knowledge related items such as innovation, patents and intellectual capital.⁴³ In a report written 2001, researchers at the Gartner Group predict that intellectual capital in the coming years will be the primary way in which businesses measure their value.⁴⁴

However, in the context of this thesis, the area “Manage Knowledge as an Asset” will not be expanded further. This is due to the fact that the thesis focuses on measuring the performance of activities in knowledge management projects, rather than quantifying the organizations intangible assets in financial terms.

As can be seen above, the knowledge management projects, and included activities, may take different forms. However, a majority of them emphasize sharing knowledge within an organization. Therefore, *our definition of knowledge management projects is a collection of ongoing activities performed to increase knowledge sharing*. Based on previous sections, the project does not have a well-defined end. It usually starts with implementation of the needed technology, but continues even after its implementation. The aim is to integrate and increase knowledge sharing in the organization and those activities are constantly ongoing. There is no point in time when those activities can be said to be completed.

As a means to handle these activities, as well as to ensure desired results and to meet expectations, performance is measured. Performance measurement facilitates interventions at the right time and with the right action to enable controlling the outcomes of a project. In the next section, this will be discussed further.

⁴⁰ Davenport, T.H., de Long, D.W. & Beers, M.C. (1998), p. 47.

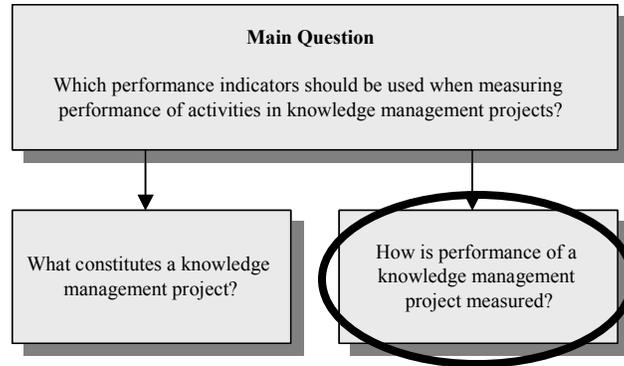
⁴¹ Skyrme, D.J. (2000), p. 197.

⁴² *ibid.*, p. 198.

⁴³ Perkman, M. (2002), p. 1.

⁴⁴ Suebert, E., Balaji, Y. & Makhija, M. (2001), p. 1.

3.2 MEASURING PERFORMANCE OF KNOWLEDGE MANAGEMENT PROJECTS



This section discusses how performance of activities in knowledge management projects is measured and describes the concept of performance indicators.

3.2.1 Performance Measurement

One of the main reasons for measuring performance is a wish to find out the current performance and be able to control it.⁴⁵ Also, in the context of knowledge management, visible progress may be what is needed to justify knowledge management projects to top management.

Roy, among other researchers, states that little research has been done on measuring the impact of knowledge management and that there is a strong need for developing methods for such.⁴⁶ To ensure an overall organizational performance, the organization needs to manage and measure their technological, human and financial resources.⁴⁷ As a part of ensuring the desired effects and to be able to manage and impact the progression of a knowledge management project, there is a need to measure it.⁴⁸

Measuring performance also deals with creating a better understanding of whether the desired outcome is generated. It is also a matter of being able to validate that efforts have been worth their while.⁴⁹

Traditional measures do not adequately fit the knowledge management projects, which in the long run may lead to valuable assets being unnoticed. The reason for this is that knowledge management projects often have intangible outcomes. What is measured is, most often what

⁴⁵ Armstrong, M. & Baron, A. (1998), p. 269.

⁴⁶ Roy, R. (2000), p.11.

⁴⁷ Berrah, L., Mauris, G., Haurat, A. & Foulloy, L. (2000), p. 212.

⁴⁸ Yakhlef, A. & Salzer-Mörling, M. (2000), p. 32.

⁴⁹ Armstrong, M. & Baron, A. (1998), p. 270.

can be measured, which leads to the difficulty of indicating results stemming from these projects.⁵⁰

Kald & Nilsson point out that generally when measuring performance, it is mainly focused on the past and on a shorter period of time. This is most likely the case since the traditional measures are of the financial kind. Measurement regarding competence, employee satisfaction and technological development, to mention a few, do not seem to be used as frequently as measurement regarding financial areas such as cost effectiveness, product efficiency and distribution of sales. This result, they argue, does not stem from the organization's lack of interest, but rather the fact that the organizations have not yet been able to develop metrics that adequately fit qualitative areas.⁵¹ The fragmented and often intangible type of information that stems from performance measures makes it difficult to establish diverse and universal metrics.

On this matter, Boston considers performance measurement in qualitative areas to be very difficult. Often measurement in such areas involves limited information and impaired judgement.⁵² It is probable that the organizations attempt to measure these areas but because of insufficient measurement systems it appears as if they are focused on the financial areas. Eventually, however, organizations will need performance measurement for areas that are difficult to define because competition intensifies. Performance measurement, therefore, needs more attention in order to support decisions and provide feedback on those.⁵³

By measuring performance of activities in a knowledge management project it is possible to intervene at the right time with the right action.⁵⁴ The results provide feedback on the project and enlighten problematic areas, which helps in determining the areas of improvement. This gives valuable insights into what may need to be acted on in the future.⁵⁵ The results may be collected differently depending on the type of measure; examples are for instance database logs or by asking employees in a survey.

As a part of ensuring the desired effects of a knowledge management project, performance measurement is needed during its course. This can be done by using different performance indicators and interpreting the results. Performance indicators may not necessarily show an improving overall organizational performance, but they do show whether the knowledge activity is increasing or not.

3.2.2 Performance Indicators

As mentioned before, the purpose of measuring performance is to determine the status of the project and to establish a level of satisfaction or need for improvement. When doing this, performance indicators are used.

⁵⁰ Bontis, N., Dragonetti, N.C., Jacobsen, K., & Roos, G. (1999), p. 392.

⁵¹ Kald, M. & Nilsson, F. (2000), p. 117.

⁵² Boston, J. (2000), p. 26.

⁵³ Kald, M. & Nilsson, F. (2000), p. 117.

⁵⁴ *ibid.*, p. 122.

⁵⁵ Armstrong, M. & Baron, A. (1998), p. 330.

The definition of indicators varies in the literature. To bring forward an example of the plethora of definitions, Veleva and Ellenbecker, define an indicator as a variable, parameter, measure, statistical measure, a proxy for a measure, and a sub index among others.⁵⁶

In the context of this thesis, the performance indicators are measures to observe to find out if the knowledge sharing within an organization is increasing or decreasing. They are also relative and prospective. The indicators are relative in the matter that they need to be repeated in order to show a changing performance and they are prospective since they point out areas in which actions will need to be taken in order for performance to improve.⁵⁷ Thus, the performance indicators do not necessarily show value by themselves.⁵⁸

3.2.2.1 Expressing the Performance Indicators

Before one can actually begin the performance measurement, there is a need to decide how to express the results of the indicators. Generally when expressing measures there are four ways to go about it. The indicator may be an indicator of how many times an event takes place, or a ratio, i.e. how many times an event takes place compared to how many times it could have taken place in the given time period. The indicator may also be expressed as a percentage or as a boolean variable, i.e. did the indicator generate what it was supposed to generate or not.⁵⁹ Quantitative indicators are easier to express in this way, whereas qualitative indicators are a bit difficult to put into quantitative terms, since they do not always generate a specific value.

3.2.2.2 Characteristics of Performance Indicators

When using performance indicators as a means to determine project performance, there are some characteristics to take into account. These characteristics are applicable independent of which area the indicator is supposed to concern. Fitz-Gibbon has distinguished a number of representative features for performance indicators. Among these representative features are for instance relevance, for project goals, and provisional, since there may appear a need to eventually change the performance indicator. The indicator also needs to be understandable, valid and sufficiently flexible. Since the effect of a knowledge management project may be wide ranging, these are important for the indicator being used correctly and measuring what it is supposed to measure.⁶⁰ Moreover, it is also beneficial if the indicators are possible to influence by the involved people. For instance by being more active in knowledge sharing activities, employees may see that the performance is increasing which may be perceived as a motivating aspect.

In addition to this, the indicators may also be qualitative or quantitative. Qualitative indicators indicate improvements by measuring for instance attitudes, beliefs and culture. Quantitative indicators, on the other hand, indicate participation, for instance number of communities or the number of people using a database.⁶¹

⁵⁶ Veleva, V. & Ellenbecker, M. (2001), p. 521.

⁵⁷ Armstrong, M. & Baron, A. (1998), p. 285.

⁵⁸ Yakhlef, A. & Salzer-Mörling, M. (2000), p 26.

⁵⁹ Armstrong, M. & Baron, A. (1998), p. 274.

⁶⁰ Markless, S. & Streatfield, D. (2001), p. 173.

⁶¹ Schlumberger (2002)

Furthermore, the performance indicators need to be in line with the organization and its business goals, as well as the project in question. As has been mentioned previously, all indicators may not be suitable for every project. A feature that may be relevant in most cases however, is the focus on behaviour that can be clearly defined. Armstrong & Baron argue that when being able to define a type of behaviour, it is also possible to verify and control the result of the measure.⁶²

Generally, determining which indicators are the most useful when measuring performance of project is mostly about judgment.⁶³ In light of what has been discussed and bearing in mind our earlier stated definition of knowledge management projects, *our view is that an organization measure performance of activities in knowledge management projects as a part of controlling and ensuring the desired outcomes. This is done by using relevant and understandable performance indicators and comparing the result of such in order to see a changing performance.*

3.3 SUMMARY

Knowledge management is in essence an organizing principle, which lays foundation for capturing the potentials of the possessed knowledge within an organization. The knowledge content of products and services is increasing and there is a need to add competence and the knowledge surrounding the product in order to become more competitive. At the margin, when a business faces competition, the difference between success and failure may well turn on how effectively it manages its knowledge.

To make the most of the organization's resources and enhance knowledge sharing it is important to acknowledge that it is about managing both technology and people in order to provide a beneficial knowledge-sharing environment. In order to get a well functioning knowledge management initiative there is a need to be aware of both aspects.

Knowledge management projects aims to do something useful with knowledge by structuring people, technology and knowledge content. Some of the projects are based on IT-systems, while others put emphasis on relationships and communication based on networks, workshops and seminars. However, a majority of the projects emphasize activities for managing, sharing, creating and distributing knowledge within an organization. Therefore, *our definition of knowledge management projects is a collection of activities performed to increase knowledge sharing.*

By measuring performance of activities in a knowledge management project it is possible to intervene at the right time with the right action. One of the main reasons for measuring performance is a wish to find out the current performance and be able to control it. The measurement may be collected differently depending on the type of measure; examples are for instance database logs and surveys.

⁶² Armstrong, M. & Baron, A. (1998), p. 272.

⁶³ Department of the Navy. (2003) *Metrics Guide for Knowledge Management Initiatives*. [www document]. URL <http://don-imit.navy.mil/summaryTemplate.asp?theID=09112001GKA4873046> p. 9.

For measuring performance of activities in a knowledge management project, performance indicators are used. The performance indicators are measures to observe, and are relative and prospective. They need to be in line with the organization and its business goals, as well as the project in question.

Determining which indicators are the most useful when measuring performance of project, is mostly about judgment. *Our view is that an organization measure performance of activities in knowledge management projects as a part of controlling and ensuring the desired outcomes. This is done by using relevant and understandable performance indicators and comparing the result of such in order to see a changing performance.*

4 EMPIRICAL SECTION

This chapter presents the results from the conducted interviews and collected information from case studies. The section is structured by each organization and the topics in the questionnaire. The chapter ends with a summary and a matrix showing a compilation of the identified performance indicators.

4.1 ERICSSON⁶⁴

Ericsson is large supplier of mobile systems and provides solutions concerning systems and applications as well as services and core technology for mobile handsets. After merging with Sony Ericsson, they also supply complete mobile multi-media products. Ericsson is a global company and has around 64,600 employees in more than 140 countries.⁶⁵ The business unit studied for this section is Ericsson Global Services in Gothenburg.

Purpose of Implementing Knowledge Management

Knowledge management is somewhat new to the business unit within Ericsson that we studied, and was implemented as an attempt to take advantage of knowledge acquired in one market in other markets. The idea is to find supporting structures and be able to repeat successful solutions in more than one market. Since this part of Ericsson is in quite a complex service business, there is a need to be able to re-use knowledge and connect experts within the organization with each other. As a result the organization hopes to become more efficient and be able to put the right person in the right place in order to deliver more quality to the customer.

As of right now, there is a central knowledge management team in charge of implementations. The aim is to eventually have a knowledge manager in each market unit, who, based upon the knowledge management frame of reference, will be in charge of the implementation locally.

Knowledge Management Projects

There have been knowledge management initiatives before the recent ones, but they have had rather limited impact on the business unit studied. However, the tool developed in an earlier project is the basis of inspiration for the current initiative. That tool was developed to connect people in knowledge-sharing communities and also to store documentation. The current knowledge management projects have tacit and formal components.

The tacit parts are made up of network communities, exclusive committees, a who-is-who directory and personal meetings/seminars.

⁶⁴ The information was received via the Knowledge Manager at Ericsson Global Services.

⁶⁵ <http://www.ericsson.com/about/compfacts/>

The network communities were developed in the earlier knowledge management project and are supported by a database sorted by area of interest. The exclusive committees are made up of key people who are important for the business, mainly from within the organization. They are local directors who are part of an informal network. The committees are based on physical meetings, but do also use phone conferences as a means of staying in touch. Since these network are made up of people from Mexico, Australia, USA, etc this is the only feasible way to keep these networks together.

The who-is-who directory is currently expanding. The aim is to achieve global visibility, but as of right now there is only one department who has full access. The directory is basically a way to find individuals within the organization based on their unique competences and experiences, involvement in a project or a having a certain customer. The personal meetings are a way to encourage knowledge sharing. At this moment, they are somewhat informal, but in the future they will be more structured in the form of meetings where people are able to ask questions and share experiences.

The formal part of the knowledge management project is a re-use database, which is implemented with the purpose to be able to find the deliverables and view documentation, etc. from all customer projects globally within Ericsson. It is currently in the start-up phase.

Knowledge Sharing

To encourage knowledge sharing there is a template for lessons learned. However, it has traditionally not been used very much. The culture in the organization has traditionally not had a focus on sharing knowledge, which may be one of the reasons for the lack of use. There are also success stories and best practices as well as workshops in order to enlighten the benefits of knowledge management and knowledge sharing.

As of today, there are no incentives directly connected to the knowledge management project, even though there is a bonus within the organization, which is related to occupational title and personal goals.

Measurement

At Ericsson, the idea is to be able to evaluate the project related to the amount of new business generated, but this is not yet an established procedure. This far, mostly quantitative measures are used in a Balanced Scorecard. In the future the measures that are developed will be more focused on qualitative areas, but that is yet to come.

When it comes to the communities the variables are number of individuals in the community and each individual's activity. Unique log-ins are tracked, as well as number of contributions and an individual's average number of contributions, eventually more qualitative measurements will be developed. Contributions are ratable on usability and readability by other members of the community. When it comes to the re-use of documents, etc. from projects the variables used for measurement are number of contributions in the re-use database related to the total number of projects delivered in the market unit; number of contributions rated as re-usable; number of best practices identified; number of contributions proven to have led to new/repetitive business. Number of contributions leading to new

business is of course hard to measure. It is done by interviewing sales people and trying to estimate how contributions or parts of contributions have been re-used.

There are also variables for community ratings in the database, which are chosen since they are the only way to get a measure unless using spot-checks. The experts are involved in the networks and should get to decide what is good and usable and what is not. When it comes to the variables used in the Balanced Scorecard, those are chosen since the aim solely is to measure whether things are getting started or not. Other organizations may choose to use others depending on what they aim to measure.

Measurements are being conducted every month, and then there is a final measurement by the end of the year. The knowledge manager and the local manager is being informed of the results. The community leader and a team around him or her do the measurement. They see who makes contributions and who does not. In the who-is-who directory there are people who have full access to all of its parts who are able to see if somebody is being more sought-after than others.

The measurement lays foundation for showing how well the knowledge management projects are going, and it is important to be able to show business results. Right now knowledge management is a priority, since this is seen as one of the success factors for succeeding with the business that this particular unit is in. Results in terms of business value are the way to keep management focused on this activity.

Performance Indicators

- number of best practices identified
- number of contributions
- number of contributions in the re-use database related to the total number of projects delivered in the market unit
- number of contributions proven to have led to new/repetitive business
- number of contributions rated as re-usable
- number of individuals in the community and each individual's activity
- unique log-ins

4.2 HEWLETT PACKARD⁶⁶

HP provides of products, technologies, solutions and services to consumers and business. The offerings cover IT infrastructure, personal computing and access devices, global services, and imaging and printing. A large R&D investment budget lays foundation for the invention of products, solutions and new technologies. The organizational goal is to provide better service to customers and explore new business areas. The merger of HP and Compaq Computer Corporation consists of 140,000 employees, located in 160 countries.⁶⁷

Purpose of Implementing Knowledge Management

HP has a decentralized organization with little sharing of information across units. The business culture supports sharing but few units have been willing to invest in efforts that do not have fast payback for the involved. There has previously been some informal knowledge transfer when employees have changed business units. In order to solve this problem knowledge management was implemented.

Initially, the initiatives for knowledge management were taken locally. Later on, there was a workshop with the purpose of finding out what was going on in the organization to coordinate the efforts. To avoid re-inventing the wheel in various locations, the different knowledge management initiatives were coordinated.

Since knowledge management started locally and was then coordinated in workshops in order to find out the different initiatives within the organization, there is as of the time of the case study, nobody who has knowledge management as his/her only job component. At HP there is an awareness that other companies are appointing CKOs, but considering the decentralized organization, people doubt that a centralised knowledge management function would make much sense.

Knowledge Management Projects

Knowledge management projects at HP have been implemented in different departments, for instance among the HP educators, the HP laboratories and the HP computer dealer channel.

The educators around the organization find it difficult to share knowledge and as an attempt to make the group more of a community was carried out. The hope was to be able to share history, tools and processes. To go about this, three knowledge bases were established. These were called Trainer's Trading Post, Training Library and Training Review respectively. The first one was a discussion database where training topics were discussed. The second was a collection of documents and the third a collection of evaluations. However, the third one did not quite take off, since there was no reward structure. Eventually the discussion database became the dominant one. As of the time of the case study, the general thought was that the discussion database probably would be the only offering in the future.

⁶⁶ The information was received from a case study.

⁶⁷ <http://www.hp.com/hpinfo/abouthp/>

The project involving the HP Laboratories aimed to create a guide to human knowledge resources called Connex. As a first step the guide would only be within the unit, but eventually expand and be working throughout HP. This directory of "experts" was an attempt to find out more accurately what the organization knows. It would use a web browser as an interface to a database. After finding the right person there would be a possibility to connect to that individual's homepage. One concern with Connex was how to categorize the knowledge each individual has, in order to be widely understood and accurate.

The knowledge management project at the HP computer dealer channel consists of a dialup database. As business increased the calls with frequently asked questions also increased very rapidly. As a means to relieve the employees from answering support calls the dialup database was introduced with the purpose to decrease number of support calls.

Knowledge Sharing

Knowledge sharing through participation in the systems is encouraged by incentives. To get employees to take part of the knowledge databases and share their knowledge, the organization initially gave free Notus licenses to prospective users. Later this was changed into airline mileage given to active users to get more people to participate in the knowledge bases. In the library function the incentive was a Dove bar for each submitted profile.

Measurement

The performance of the knowledge management project is measured in active involvement. The number of participating employees determines the performance itself, the number of postings/contributions to the knowledge bases as well as number of downloads. The number of calls to support function and support ratings are also considered.

Performance Indicators

- active involvement
- number of participating employees
- number of postings/contributions
- number of downloads
- number of calls to support function
- support ratings

4.3 KPMG⁶⁸

KPMG is one of the leading knowledge organizations in the country, with 1800 employees at 80 different offices. Services offered are for instance to provide business and financial advice, help organizations with risk management, accounting and auditing. As part of KPMG International, KPMG is part of network of consultants with locations in 150 countries.⁶⁹

Purpose of Implementing Knowledge Management

The purpose of implementing knowledge management is to in the best way possible take care of and take advantage of the experience within the organization, both in Sweden and globally. KPMG's overriding vision is that knowledge connects people, clients and communities through an inherent process practiced across boundaries. The overriding objectives are to maximize value creation and realization for the organization and for their clients, by making universally and instantly available best practices, experiences, insights and connections to the right people.

There is a central organization internationally, which is responsible for the overall development of knowledge management. A global CKO is responsible for carrying through the work. Every country has a CKO responsible for knowledge management in their country. The local unit drives knowledge management in line with the common initiatives, carries out education and supports the functional organization. The functional knowledge organization is constituted by a group, which drives issues in line with the business plan and supports employees within their business unit.

Knowledge Management Projects

KMPG continuously work with larger and smaller knowledge management projects. One example is the introduction of database containing the employees' CVs and information to simplify the process of finding the right person in each country. As of today, KMPG are locally working on updating the database with competence information in line with the organization's supply of services and organizational focus.

Databases, workshops and seminars are examples of knowledge management projects. Workshops and seminars are conducted to educate and to incorporate the new routines and processes in the everyday work. For instance the handling of the CVs will be a natural part of the offer to the customer.

Knowledge Sharing

As of today, there are no incentives for knowledge sharing, but knowledge sharing is encouraged and is one of the issues that are evaluated on the personnel development meetings. These evaluations are individual, but are conducted with methods developed within KPMG that are partly focused on individual accomplishments and partly on how the individual contributes to the evolvement of others.

⁶⁸ The information was received from the Chief Knowledge Officer at KPMG Sweden.

⁶⁹ <http://www.kpmg.se>

Measurement

The general measurement of knowledge sharing is based on how much the individual contributes to the further development of the organization and its employees. This is not measured in absolute values but in estimates from other employees.

The knowledge management projects are measured differently depending on the type of project. Surveys are conducted at different time-intervals and the adoption curve is regularly checked to see if the knowledge culture is progressing. The effect might also be measured in statistics of awareness of products and level of use.

The goal is to be able to measure business value, but the goal has not yet been accomplished. On the other hand, it is measured whether or not a project has generated business, i.e. if new services have been developed from a knowledge management project. All projects need to be in line with the business objectives and clear goals must be specified. The measurement of how a knowledge management project has generated more contacts has this far only been measured indirectly via surveys. This is mainly due to the fact that such knowledge sharing often is very informal, for instance when bumping into each other in the corridor.

Generally there is no difference when evaluating a knowledge management project and other projects, both are evaluated via surveys. However, when it comes to knowledge projects the measurement is conducted more thoroughly since this type of projects are viewed more critically. In charge of the measurement is the central knowledge management organization, locally or globally. Attitude surveys are conducted by independent organizations. The participants differ depending on the target groups of the project. Afterwards the results are made available to involved business units and the functional knowledge organization. These results are then used to justify future knowledge management initiatives, however, they are not used for future funding. Each project has to be in line with the overall business objectives and have its own financing.

When deciding what variables to use KPMG cooperates with other countries and the international organization. Variable that are important are customer value, increased efficiency and increased visibility on the market. Others influencing factors are whether or not the project has led to a possibility to re-use information and/or experiences for new services, and if the employees feel that their needs are met.

The purpose of measuring the effects of knowledge management projects is partly to justify future projects, that is, to show that positive outcomes of the project, and partly to be able to do things better in the future. As of today there is a feeling that the latter has not been completely fulfilled, but there is an on-going learning process. When possible, success stories are published and every country contributes with their own stories of their successes.

Performance Indicators

- adoption curve to see knowledge culture progression
- generated business
- individual contributions to the further development of the organization and its employees

- statistics of awareness
- number of contacts gained
- attitude of knowledge sharing
- efficiency & visibility on the market
- employee satisfaction
- re-use of information and/or experience

4.4 SCHLUMBERGER⁷⁰

Schlumberger is a global technology services company with corporate offices in New York and Paris. Schlumberger employees represent more than 140 nationalities working in 100 countries. The company consists of two business segments: Schlumberger Oil Field Services and SchlumbergerSema. Schlumberger Oil Field Services supplies products, services and technical solutions to the oil and gas exploration and production industry. SchlumbergerSema provides IT consulting, systems integration and managed services to the oil and gas, telecommunication, energy and utilities, finance, transport and public sector markets. The two business segments work closely together to take full advantage of each other's expertise and global contacts in order to provide the best products and services to their customers.⁷¹

Purpose of Implementing Knowledge Management

The purposes of implementing knowledge management at Schlumberger are to capture, manage and share knowledge within the large and geographically spread organization. The aim with doing so is to become more productive and efficient.

Knowledge Management Projects

Schlumberger uses three knowledge portals: InTouchSupport.com, Eureka Communities of Practice and The Hub. In addition, Schlumberger also uses Decision Support and an expertise locator system.

InTouchSupport is a global initiative for capturing, managing and sharing knowledge. The InTouchSupport system allows Schlumberger to apply everywhere, what is learned anywhere. This has resulted in faster and more reliable services for customers, increased product development and significant financial benefits. By using the InTouchSupport, one can access validated data, information and knowledge 24 hours a day, 7 days a week. More than 17.000 users benefit from real-time knowledge interchange with technical experts at 15 technology centers worldwide. The InTouchSupport supports rapid problem solving, a better understanding of customer needs and thereby leading to a more rapid development of Schlumberger products and services.

Eureka Community of Practice have 25 communities organized in specific areas. There are several communities, which are both disciplinary focused and problem focused. The disciplinary communities focus on well engineering, geophysics, chemistry and chemical engineering. One example of the problem community aims to solve is engineers working on similar well-stimulation problems.

The Hub is a wide web system to secure access to all employees, information and systems within Schlumberger. The Hub store specific information concerning Schlumbergers products and services, clients, competitors, training, special links etc. Several pages have an external view for public and client access, thus, showing more restricted information.

⁷⁰ The information was received from a case study provided by the Director of Business Development.

⁷¹ <http://www.slb.com>

Knowledge Sharing

There are several knowledge management activities supporting knowledge sharing and transfer. Schlumberger has identified nine activities to measure extent of use and the level of effectiveness of these activities. Schlumberger also calculate percent of KM-program effort dedicated to each activity. (see figure below)

Activities Used	Extent of Use (rate 1 to 7)	Effectiveness of Activity (rate 1 to 7)	Percent of KM-program effort dedicated to this activity
Community of Practice			
Best Practice Transfer Process			
After Action Review			
Lessons Learned Process			
Expertise Locator Systems			
Content Management			
Decision-Support Systems			
Technical HelpDesk for Oilfield Operations			
Expert Teams			
			100 percent

Measurement

Examples of indicators used at Schlumberger are: number of tickets submitted, number of views of knowledge, participation of experts in the validation of newly shared content and support incidents saved. Other measures include revenue gained/saved, end-user satisfaction with the knowledge support desk and end-user satisfaction with the systems. When concerning measures of sharing, Schlumberger also measures a number of indexes related to knowledge activity. The Sharing Index is based on percentage of users sharing validated content for any defined user group. A Knowledge Activity Report is provided for each user, indicating the total acknowledgements for shared content, also included is an acknowledgement if other employees use their content. This report is used as a part of the quarterly and yearly appraisal process for each user. The *incentive* and recognition program is based on these acknowledgements.

Performance Indicators

- end-user satisfaction
- Knowledge Activity Report
- number of indexes related to knowledge activity
- number of tickets submitted
- number of views of knowledge
- participation of experts in
- revenue gained/saved
- Sharing Index
- support incidents saved
- validation of newly shared content

4.5 SIEMENS⁷²

Siemens is one of the leading organizations within IT, electronics and electric technology. It has about 400 000 employees in 190 countries. The organizational goal is to provide solutions that integrate complementary systems and services from throughout the Siemens organization. The products and solutions focus on generating value for customers and shareholders.⁷³

Purpose of Implementing Knowledge Management

The purpose of Siemens knowledge management implementation was that the organization wanted to steer the organization to focus on its most valuable assets: its knowledge base. The organization needed something to help overcome geography. As the company is truly global, the employees must share their knowledge by other than (or in addition to) informal face-to-face communication. In order to avoid that today's core competences become tomorrow's core rigidities it is important to reconsider the value of established processes and ways of doing business.

Instead of simply offering highly capable manufactured goods, Siemens has realized that most of their products are knowledge-based and therefore demand systematic ways of caring for this knowledge. In the end, the customer is the primary beneficiary of the process of value-added services. The products themselves become part of a total solution, which includes services meeting the customer's needs. These services are knowledge-based and benefit from activities that capture, distribute and apply knowledge.

Knowledge management at Siemens is driven by a Corporate Knowledge Management function, which coordinates the approach to knowledge management. However, most of the knowledge management efforts take place in the business units, but the corporate function plays a valuable coordinating role. There are also knowledge initiatives cutting across countries as well as other programs that only work within a particular country. It is a challenge to connect the initiatives globally and locally.

Knowledge Management Projects

To exemplify the knowledge management projects at Siemens, one is a Know-how Exchange database. This database is a knowledge-sharing network tool connecting the employees of Siemens Industrial Services. Know-how Exchange allows invaluable knowledge to be shared and experiences to be re-used. It may be compared to a kind of expert knowledge, available for everybody.

Another example is ShareNet, which links salespeople of Siemens Information & Communication Networks (ICN) worldwide, making each salesperson's accumulated learning experiences available to the whole sales force. This facilitates sales, helps to save valuable time and money and leads to increased revenue with higher profit margins.

⁷² The information was received from a case study.

⁷³ <http://www2.siemens.se>

ShareNet include a structured questionnaire, chat rooms, community news, discussion groups on special issues as well as urgent requests. ShareNet is more than a "document repository" since it provides a network-designed ad, an interactive medium, describing employees' ways of solving customer problems. This includes both the explicit and tacit knowledge of the sales value-creation process, including project know-how, technical- and functional-solution components and knowledge about the business environment.

The components in the projects are for instance best practices, customer knowledge, competitive intelligence, product as well as financial knowledge, workshops, communities of practice, networks, collaboration with universities and success stories.

Knowledge Sharing

At Siemens, there are several ways of motivating people to exchange their knowledge. Top management involvement and commitment are of huge importance and a prerequisite for a successful knowledge management project. Management can promote knowledge sharing by repeatedly emphasize its importance for the whole company.

There are also workshops and training to introduce users to the advantages of knowledge sharing. It is of vital importance for the workers to understand that knowledge sharing is important. One needs to understand this, not only for efficiency's sake, but also to increase the essential humanization of the business and social environments. Also, this will better prepare the worker for the task confronting them. One way of encourage knowledge sharing is, when working in different systems, letting a user accumulate points, which can be exchanged for a variety of knowledge-related events.

When it comes to ShareNet, contributing and re-using knowledge is rewarded, and this turned out to increase the motivation. The ShareNet Quality Assurance and Reward System are designed similar to frequent flyer mile systems found in the airline industry.

Employees are awarded with incentives, such as conference participation or telecommunication equipment, depending on the number of shares accumulated during a year. The number of shares given to the contributor depends on the re-use feedback of the taker of knowledge, thus rewarding the usefulness of the transferred knowledge. The higher the usefulness of the knowledge, the higher the reward and the quality of available knowledge can be quantified through re-use feedback from several knowledge re-users.

Based on this feedback, knowledge of lesser quality can be removed from ShareNet, whereas high-quality knowledge can be highlighted and further developed. This process leads to a constantly improving quality of the available knowledge. However, in the long run, the benefits of sharing knowledge should become apparent and thereby self-perpetuating.

Measurement

To be able to measure the performance of the knowledge management projects, the Balanced Scorecard and EFQM-model is used with different variables. Examples of indicators used are customer success, employee satisfaction and innovation index. Also number of entries in a database, quality of the information, number of orders, number of

knowledge-shares a year, usefulness of the knowledge, re-use of knowledge. Apart from using indicators for performance of projects, there are also indicators for incentives.

Performance Indicators

- customer success
- employee satisfaction
- indicators for incentives
- innovation index
- number of entries in a database
- number of knowledge-shares a year
- number of orders
- quality of the information
- re-use of knowledge
- usefulness of the knowledge

4.6 XEROX⁷⁴

Xerox is a global leader in the document management business. The organization offers a wide range of document products, services and solutions in the industry, as well as products and services to help organizations create effective knowledge-sharing environments. These products and services are also applied to Xerox's own business at both the strategic level and in a number of community-level projects.

Xerox has been recognized for its knowledge-related initiatives among its employees. As of year-end 2002 the organization employs 67,800 people worldwide. The organization's strategic intent is to help people find better ways to do great work. This is achieved by being at the leading edge in document technologies, products and services that improve the work processes as well as the business results of the organization's customers.⁷⁵

Purpose of Implementing Knowledge Management

Knowledge management at Xerox was started as a cultural dimension inside the organization. The official main purpose is maintaining a competitive advantage by using the collected knowledge of all employees, archives of patents and processes as well as all documents stored in various formats in all locations. The focus of the knowledge management strategy lies on creating a knowledge-sharing culture, which will lead to accelerated learning and innovation. The manager of the organization's technical information centre points out that it is important to recognize that the knowledge management projects have to adjust to people and not to technology. Since some of the technical solutions in the organization exist only in the expert's heads, the knowledge management project aims to solve complex problems a bit faster when the expertise is made somewhat more available to everybody.

Knowledge Management Projects

One knowledge management project consists of a communication system on the organization's intranet, which is linked to a database. In this database employees may share for instance repair tips, which they all may access from their laptops. When many employees are travelling on the job, this means they will not have to miss out on any information that normally may have been shared over a cup of coffee.

Another project consists of a virtual office space, in which employees may share electronic documents. This is made possible by creating virtual filing cabinets on the intranet, and letting contributors set codes for who will be able to access the information. All members of the specific work group may access all information related to that group, whereas other employees must be given an access code. By enabling limited user access for sensitive information as well as letting the contributor of information decide upon this, the organization hopes to encourage sharing of such information as well.

There is also a Yellow Pages system, in which the employees can find who has a certain degree of expertise within a certain area. The users must register to get access and in that way

⁷⁴ The information was received from a case study.

⁷⁵ <http://www.xerox.com>

the contents of the system expands. The system is sorted by area of expertise, and by degree of expertise within that particular area. By avoiding sorting by name and occupation, the search is facilitated.

Knowledge Sharing

Knowledge sharing is encouraged by success stories of how much more efficient the work has become, and also by, in the beginning phases of knowledge management, making sure that the ideas to be implemented supports the way the employees work, both individually and in groups.

By making knowledge management more about the people than about the technology it is hoped that it will encourage knowledge sharing. There are no financial incentives, since the general opinion is that such incentives may lead to lower quality of information. When being offered financial rewards there may be contributions based solely on receiving the reward and not as much on contributing useful information.

Measurement

The knowledge management projects at Xerox are for instance evaluated based upon number of calls to administration. When these are less frequent the implication is that the knowledge management project is working. Also by outspoken support from management and top officers, as well as the usability of the developed systems.

Apart from the above mentioned, it is also noted if the social dynamics are taken into consideration when developing the systems, and if the technology support the solutions. The evaluation is also based on usability and how easy the information is to access. The idea is to arrange knowledge according to area of expertise to facilitate finding the right person.

Performance Indicators

- access of knowledge
- arrangement of knowledge
- number of calls to administration
- support from management
- usability

4.7 SUMMARY

The purpose of implementing knowledge management among the studied organizations is to take advantage of the available knowledge and improve its transfer between individuals. There is a wish to overcome geography and repeat successes in more than one market.

The projects have different kinds of activities. The majority of the participating organizations have established some kind of technological platform to facilitate knowledge sharing. The structured document storage appears in a majority of organizations, and is usually databases with documents or virtual office spaces where documents may be shared. Another common activity among organizations is that they have implemented systems to facilitate the communication between people in various locations of the organization. Communities of Practices, or discussion databases, in which employees may contact other employees and share their experiences appear frequently. What also appears in a majority of the studied organizations is the people directory. To be able to locate the right person at the right time is a paramount issue when trying to take advantage of the knowledge embedded in the organization. There is also face-to-face communities, work shops and seminars held in order for people from various parts of the organization, as well as externally, to get together and share their experiences on various topics.

To encourage knowledge sharing the organizations observe and encourage active involvement. Some organizations use incentive systems, others post lessons learned and success stories to motivate knowledge sharing among employees.

Measurement of the activities in the projects is being done by using Balanced Scorecard or the EFQM-model, which handles quantitative measures. There are also attempts to measure qualitative areas, for instance by surveys. Some organizations mention the goal to be fulfilled is to eventually be able to measure new business generated and business value.

4.8 PERFORMANCE INDICATOR MATRIX

The following matrix consists of the performance indicators found in literature, case studies and the ones used by organizations. These are all considered to give some indication of performance in knowledge management projects.

The indicators found in literature are considered such by the authors. They are based on theoretical information about performance measurement in knowledge management projects, and are mentioned in that context. The performance indicators stemming from organizations have either been found by conducting interviews or found in case studies. The case studies have been provided by the knowledge manager at the organization or have been found elsewhere, for instance libraries or the Internet.

In the matrix, no distinction is made depending on how the performance indicator is to be applied. Instead the performance indicators are grouped alphabetically with brief descriptions.

	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
	access to knowledge availability of knowledge in information systems	X						X
	accesses number of site accesses	X	X			X	X	
	arrangement and classification of knowledge if knowledge is arranged in such a way that it facilitates finding what is sought for	X						X
	application of knowledge to what extent is the knowledge applied throughout organization	X						
	attitude of knowledge sharing				X			
	awareness of evaluation awareness of being evaluated may contribute to increased participation	X						
	baseline for maturity comparing results to a previously set baseline	X						
	calls to helpdesk number of calls to helpdesk, preferably decreasing	X		X				X
	channels enabling creative outlets to what extent the information systems enable channels for creative outlets, for instance flexible forums enabling attachments	X						
	community number of members		X					

Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
contributions:							
readability rated by other users		X					
usability rated by other users		X					
re-use rated by other users		X					
re-use number of re-used contrib. related to total number of projects delivered		X					
contributions number of contributions in systems/communities							
best practises	X	X					
documents			X				
individual experience		X					
success stories	X			X			
other contrib.		X	X	X			
co-operation with external experts the amount of co-operation after having managed knowledge in organization	X						
culture adoption curve to see the progression of the knowledge culture				X			
customer satisfaction to what extent the are customer satisfied					X		
customer success increased success with customers compared to previously						X	
customer time increase more time to spend with customers	X						
distribution of knowledge facilitated distribution of knowledge within organization	X						
downloads number of downloads	X		X				

	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
	effect of knowledge any effects of knowledge within the organization, for instance increased visibility or increased customer value				X			
	efficiency & visibility on the market increase or decrease				X			
	employee retention number of employees staying in the organization compared to previously	X						
	employee satisfaction number of employees being satisfied with their work situation compared to previously				X		X	
	expertise available the degree of expertise available in the knowledge system	X						
	expert participation number of participating experts within a field	X						
	hits number of hits when using search function	X						
	innovation index an index showing increased innovation in organization						X	
	job performance increased job performance due to managed knowledge	X						
	job satisfaction increased satisfaction with job situation due to facilitated routines	X						
	knowledge activity report stating an increased or decreased knowledge activity					X		

	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
	knowledge shares number of knowledge shares per measurement interval					X	X	
	leverage effect if the project contributes to small efforts giving large effects	X						
	motivation incentives based on							
	number of knowledge-shares a year					X		
	usefulness of the knowledge contribution					X		
	knowledge activity report						X	
	networking with external partners increased possibilities for networking with external partners	X						
	orders number of orders, preferably an increase due to managed knowledge						X	
	participation number of users participating in knowledge sharing activities			X		X		
	profitability new business gained, for instance stemming from contributions in knowledge base or contacts generated or by interviewing sales people	X	X		X			
	quality of knowledge usefulness of the knowledge found, for instance possibilities of re-use	X	X		X		X	
	query guidance sufficient instructions in systems	X						
	relationships number of relationships established due to knowledge systems & networking	X			X			

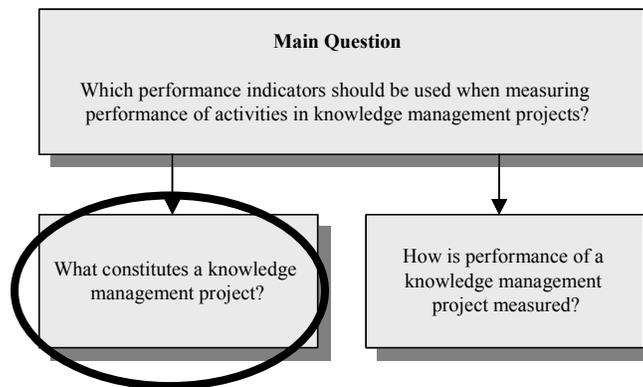
	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
	responses number of responses to a request	X						
	response time decrease of response times due to facilitation of finding information	X						
	return on investments savings from participating in communities of practice, ie estimated savings * percent attributable to the community * degree of certainty	X						
	re-use of knowledge					X	X	
	revenue gained/saved revenue gained due to managing organization's knowledge					X		
	self assessment estimate of how much the individual has gained from the managed knowledge within the organization	X						
	sharing index index showing an increased or decreased amount of knowledge sharing within the organization					X		
	support ratings number of support function ratings			X				
	support from management degree of support from management regarding managed knowledge							X
	support incidents saved decreasing need for support function					X		
	speed of knowledge transfer a more efficient knowledge transfer within the organization due to managed knowledge	X						

	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
	tickets number of tickets submitted, preferably a decrease due to knowledge systems				X			
	time, money & personnel time saved savings due to managed knowledge	X						
	time to meet customer needs increased amount of time to spend making sure customers are satisfied with solution	X						
	usability degree of user friendliness of systems and search engines	X						X
	usefulness to what extent the systems respond to user needs	X						
	usefulness of knowledge how useful a knowledge is to other individuals within organization						X	
	user acceptance amount of users accepting knowledge activities as part of their daily work	X						
	user satisfaction amount of user satisfaction with systems, routines, and knowledge available		X			X		
	value added per employee increased value due to being able to take part of collective knowledge of organization	X						
	work methods more efficient ways of working	X						

5 ANALYSIS

The following chapter analyses the results of the empirical section, in conjunction with the theory section. The first part validates the knowledge management projects found in the participating organizations. The second part analyses the performance indicator matrix, motivates the selection of performance indicators to recommend and finally presents a list of recommended performance indicators.

5.1 KNOWLEDGE MANAGEMENT PROJECTS IN ORGANIZATIONS



The studied organizations have realized the importance of managing its knowledge and various projects are under way.

5.1.1 Validation of Studied Projects

When looking into the different knowledge management projects encountered when studying the organizations, we have been able to distinguish common features. The majority of the organizations states the purpose is to increase knowledge sharing and to make the most of the collective knowledge they possess in order to meet customer needs more efficiently. It has been recognized that all encountered knowledge management projects have similar activities. As of today, the projects are about connecting people in communities and networks to establish new relationships and gain experience. Databases, which store documentation to enable re-use at later points, are common, as well as people-directories to help locating the right person at the right time.

The projects studied, are in line with Davenport's categorization. Projects that fall in the first category are projects focused upon storing documents with knowledge embedded. These are stored in a repository where they can easily be accessed. This type of project stands out among the participating organizations. This involves community-based electronic discussion and "lessons learned", which also appear among the studied organizations. By posting lessons learned, the employees may see what has been generated from taking part of the

stored knowledge. Many organizations see the value in this, both as a motivational factor and as way to see concrete results.

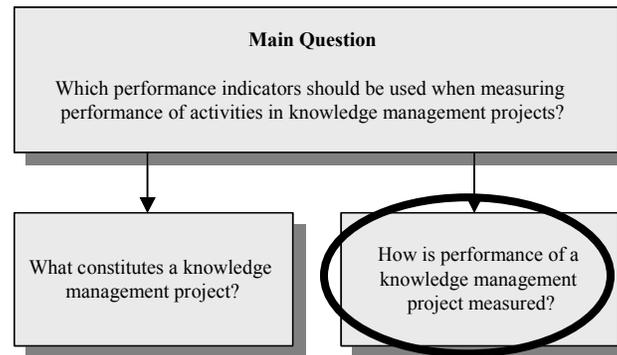
In Davenport's second category are projects, which provide access to knowledge as well as facilitate its transfer. Earlier, a problematic area has been to locate the person who has the desired knowledge and then being able to transfer this knowledge to the person in need of it. By implementing system similar to Yellow Pages this problem is solved. Even though the organizations' directories of people take slightly different forms, for instance handling complete personal profiles or just CVs, they all aim to keep track of who knows what within the organization in order to provide the competence of a specific person at the right time and place.

Projects placed in Davenport's third category are projects focusing on changing behaviour and attitudes as well as organizational norms and values. In order to fully be able to take advantage of the knowledge embedded in the organization there is the implication that individuals must feel comfortable sharing what they know. Also, apart from being willing to share what they know themselves, it is also important that they feel comfortable using somebody else's solution to a problem. When studying the participating organizations from this perspective there are a few differences that stand out. From having very similar projects that fall in the first two categories this is the one where it becomes clear that there are gaps among them. Two organizations mention a lack of focus on sharing knowledge in the organizational culture, even though it is about to change. This reluctance may stem from the idea of people feeling that they may easier be replaced if the do not have some kind of unique knowledge which makes them irreplaceable. Other organizations have somewhat more developed incentives system to encourage knowledge sharing. There is also general encouragement to knowledge sharing, as well as efforts to introduce the benefits of knowledge sharing to employees by having workshops and seminars. These activities are vital in order for people to begin, and then continue, sharing what they know.

From a general point of view, the latter category may appear to be the crucial one. It may be a slow process to change behaviour and attitudes across an organization, but it may also very well be worth the while. Considering that knowledge originates from within human beings, they are the critical part of knowledge management. The technology must not be overlooked, but without people being willing to share there is nothing to structure and put into databases and repositories. Also, one may have very sophisticated information systems mapping people in the organization, and they may very well lead to the right person being found at the right time, but if that person does not want to share his or her insights, then no good will come of it. It is therefore vital to encourage people to share in order for knowledge management projects to perform well.

Since the studied projects fall in Davenport's established categories of knowledge management projects, this validate that the studied projects fall within the theoretical framework. This is also brought forward to validate that the following section has its basis in the type of project its result is intended for.

5.2 HOW IS PERFORMANCE OF KNOWLEDGE MANAGEMENT PROJECTS MEASURED?



5.2.1 *Measuring Performance*

The measurement in the organizations is done in two main ways; by log in database or by conducting surveys. Both users, and their participation, are tracked in a database or users are asked to participate in a survey to show results from more qualitative areas. When attempting to measure more elusive aspects, the way to do this is no other than to ask people in surveys. Generally, many organizations use surveys to determine the performance in areas where quantitative measures do not apply. This is of course dependent on their willingness to participate to get credible results.

Among the organizations we have found that Balanced Scorecard is the only established method identified to handle the result stemming from the quantitative indicators, originating from logs in databases. As for the qualitative performance indicators, they do not result in a value to put in the Balanced Scorecard, since they depend on the users' subjective views. There is neither in the organizations nor in literature, an established method or tool, which handles both the quantitative and the qualitative results.

No matter type or size of organization the mentioning of how to measure performance in knowledge management projects is found to be of great interest, which confirms that this topic to a great extent is relevant and important in organizations today. However, performance measurement is apparently not being done to a great extent based upon the number of organizations, which declined participation.

5.2.2 *Analysis of the Performance Indicator Matrix*

When studying the created performance indicator matrix (see section 4.8) one can see the division between the technological and human aspects of knowledge management projects, which was introduced by Hlupic et al. (see section 3.1.3). In the matrix, it appears as if many of the indicators related to the technological aspects of knowledge management projects are more explicit and generate a specific value, which can be used in for instance Balanced Scorecard. These indicators are easy to measure by database logs, and since they generate specific values they are easy to compare in order to find out if the performance is increasing or decreasing. This confirms what Bontis et al. point out: what gets measured is what can easily be measured (see section 3.2.1).

It is easier to see an increasing or decreasing performance when it comes to absolute values stemming from technological measurement results, than when the results of the measurement stems from attitudes, values and other qualitative areas. Two indicators stand out, being used by all participating organization, as well as being acknowledged in literature. These are both information-technology indicators, measuring number of accesses and number of contributions in databases.

The performance indicators related to the human aspects are a bit more vague and often show, in our opinion, an area of interest rather than a specific measure. The human aspects are not as easy to measure since those measures depend on a person's subjective opinion. This opinion can be retrieved by using surveys, but the results are more difficult to use in Balanced Scorecards and appear to be slightly left out.

When it comes to performance indicators found in literature, we have discovered that what authors and researchers call performance indicators is not described as closely as they would have to be in order to be of any use for an organization which wishes to apply the indicators to their project. Still, the performance indicators stemming from literature contribute with areas of interest, which one can benefit from being aware of, considering that the indicators are broken down into more specific measures.

5.2.2.1 Focus Areas in Performance Indicator Matrix

Among the performance indicators there are areas in which the focus differs slightly. In addition to the hard and soft aspects of knowledge management, structures and processes, and the impact of such, are also important in order to optimise the integration between these parts. Among the performance indicators, that lay the basis for the matrix, we have distinguished three common focus areas. These are named process, human and information technology respectively. We believe that processes appear to be present in the matrix, and therefore deserve attention as well. These areas are useful to be aware of when trying to manage the project. In order to structure the performance measurement, one may choose to focus the attention towards different focus areas. When being able to put all efforts on the area that is performing less well, there is a greater chance that the project will generate the desired outcomes.

In light of this, we have categorized the performance indicator matrix according to these focus areas, (see Appendix 2). Our categorization of the matrix into focus areas is based on the following:

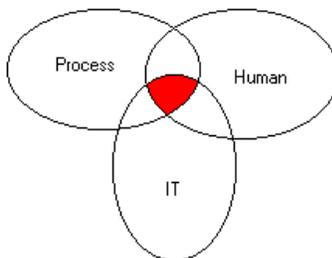


Figure 4: Focus areas.

Process

The performance indicators that have been categorized as processes have to do with the overall project, customers, and to some extent work procedures and the facilitation of such. Processes supporting a knowledge management project are policies, procedures, work instructions, workflows, routines and templates. These processes need to become part of everyday work.

To be able to add value by sharing knowledge, organizations and individuals have to make changes in the way they observe and carry out things. They need to change their working procedures and create new procedures and processes to facilitate the creation and exchange of knowledge. They have to transform information and knowledge into action. This is commonly done by using incentives to motivate people to rely on knowledge that others have gained in a previous project. Incentives motivate them to share knowledge and are important aspects, which also implies the importance of establishing routines and procedures for this activity.

Human

The performance indicators in the human category deal with employees' attitudes as well as indicators of participation in knowledge sharing activities. Participating in different knowledge activities will help employees to establish new contacts and gain new insights and experiences. Also, knowledge must be useful for employees and only when everybody gains by knowledge sharing, a culture for knowledge activities can be developed. The employee's values, norms and attitudes are important factors contributing to a knowledge sharing culture.

It is also important to make sure that the employees are aware of the benefits with knowledge sharing. This put pressure on the organization to encourage learning and knowledge sharing and to motivate the employees, and also to monitor how the sharing progresses.

Information Technology

The performance indicators found in the information technology categories deal directly with the information systems. Examples of such are number of contributions and number of site accesses. Currently, there is an array of technologies that support knowledge management activities and these systems exist to assist people in their daily work in order to increase knowledge sharing and to become more efficient.

5.2.3 Selecting Performance Indicators to Recommend

It is desirable to find performance measurements for all areas in order to see the whole picture. When measuring performance of a knowledge management project, a number of performance indicators may apply to the project in question, which gives rise to a need to choose which measures that are the most appropriate for the project. Even though there may be a wide range of measures, it may not always be cost-effective and efficient to use all identified in the performance indicator matrix.

Since most of the performance indicators found in the matrix are not explicit, we believe there is a need to take the matrix a step further in order for its use to be measurable. For this reason we have chosen indicators from the matrix, some of them are broken down to more

specific indicators. To go about this we have had in mind the earlier stated characteristics of performance indicators. We have chosen to group the performance indicators into domains, for instance one domain is called Quality, and the indicators in this domain express a measure of estimated quality of the retrievable knowledge. The domains were chosen because we believe that they all can show traces of increased or decreased performance of knowledge sharing.

Below we describe the chosen domains, categorized according to the previous defined focus areas; process, human and IT. In each domain we have chosen performance indicators for measuring its performance. The choices are made by having in mind the studied projects: what they measure today and what they would benefit from measuring.

5.2.3.1 Focus Area: Process

The domain *quality of knowledge* was chosen since it implies whether or not the knowledge available due to the knowledge management project is considered to be useful to the people retrieving it. The information is of course subjective, but the opinion stems from the people who actually take part of and use the encapsulated knowledge. Performance indicators used for measuring the performance is:

- To what extent the employees consider knowledge in databases useful
- To what extent the employees re-use knowledge
- Number of returning users in databases

The domain *efficiency due to new routines* was chosen because one hopes that by managing knowledge the daily work becomes more efficient due to time previously spent on either locating a person or a piece of information now may be spent on conducting business. The value added by sharing knowledge may only come across after having made certain changes in the organization's way of carrying out things. But when being able to determine increasing or decreasing efficiency, the changes may be justified and the result may also encourage people to adopt the new way of doing their daily work. Performance indicators used for measuring the performance is:

- Number of calls to support function
- Number of hours spent with external consultants, per month
- Number of employees participating in surveys
- To what extent the employee experience saved time in finding the correct information/competence due to using the databases
- To what extent the employee consider increased number of orders connected to solutions/success stories

The domain *motivation* was chosen because of the need for incorporating a process for an incentive system in the organization and to determine the increasing or decreasing number of incentives distributed. Number of distributed incentives shows whether the performance is improving or not. Incentives are sometimes important for motivating people to continue being active in the knowledge sharing activities. When people feel that they gain something from contributing, they will continue doing so. The more incentives to active employees, the more activity in the systems and hence also an improving performance of the system itself. Performance indicators used for measuring the performance is:

- Number of distributed incentives

The final domain in the Process focus area is *knowledge contributor*, which lay foundation for the incentives. It is also useful for generally seeing statistics on each individual's contributions, which we find to be an important aspect. It may be of interest to track the users to be able to locate the most involved business unit or the most involved category of employees to be able to react with actions if necessary. Performance indicators used for measuring the performance is:

- Occupational title of the Contributor
- Business Unit, where the Contributor is working

5.2.3.2 *Focus Area: Human*

The domain *knowledge sharing attitude* is chosen because we consider it an aspect that is important to keep track of. The organizational climate influences people to share their knowledge as well as using knowledge that has originated with somebody else. The employees' values, norms and attitudes are important factors contributing to a knowledge sharing culture. The performance in this area should be increasing as the knowledge management project progresses and in line with employees seeing the benefits of sharing. It is important to measure general attitude towards sharing since if this aspect is not performing well, some counteraction may be needed. Performance indicators used for measuring the performance is:

- To what extent employees feel comfortable reusing solutions/contributions
- To what extent employees feel comfortable sharing their knowledge in order to help others
- To what extent employees feel that they save time by using knowledge databases in their daily work

The domain *knowledge sharing activities* is chosen since the participation in activities and whether or not this factor is increasing, gives an indication of whether or not employees find the knowledge activities relevant. The participation in such activities, we believe, will at best be of use both at the time of the activity but also contribute to further personal knowledge which at later points may be shared electronically as well as face-to-face in further activities. These activities aim to share information, insights and experiences about an area of common interest, and the more participation, the more knowledge sharing throughout the organization. If performance in this area is decreasing, it may be useful to either oversee what type of activities (workshops, seminars, and such) exist and perhaps also whether the target groups for the activities may need to be changed. Performance indicators used for measuring the performance is:

- Number of hours the employees participate in workshops/seminars/networks or other activities, per month

The domain *use of participation in activities* has been chosen because, as has been mentioned earlier, it is vital to make sure that employees see the benefits of taking an active part of knowledge sharing activities. We consider it valuable to see whether individuals feel that they benefit from participating, if it was useful and was worth the time. In this aspect it is

important that employees not only recognize the benefits, but also actually feel that they are taking part of them. Performance indicators used for measuring the performance is:

- To what extent employees consider that participation in activities generates new relationships/contacts
- To what extent employees consider that participation in activities generates experience and more contributions in the databases

The final domain is in the Human focus area is *awareness*. By measuring the general awareness among people it becomes clear whether or not the employees are aware of the ways to participate or of what systems exist to use. If this awareness is failing, people will not be involved due to insufficient information. This may of course be easily remedied by more information seminars, systems training or e-mail notices. Performance indicators used for measuring the performance is:

- To what extent the employees feel they have been provided with sufficient information/education for the new routines and work procedures
- To what extent the employees feel they have been provided with sufficient information/education for the new databases

5.2.3.3 Focus Area: Information Technology

The first domain is *active involvement*. We believe by being able to see for instance the number of users or the number of contributions, the performance is somewhat easily measured. This domain is chosen since it gives an indication of how well received the knowledge management project is throughout the organization. We are also of the opinion that since the systems need active involvement by employees contributing with their knowledge and insights, the amount of involvement shows the performance of the systems. Performance indicators used for measuring the performance is:

- Number of users
- Number of accesses in chosen area, per user
- Number of returning users
- Number of solutions, success stories, lessons learned, best practises or other contributions, per user
- Number of employees who have registered as a member

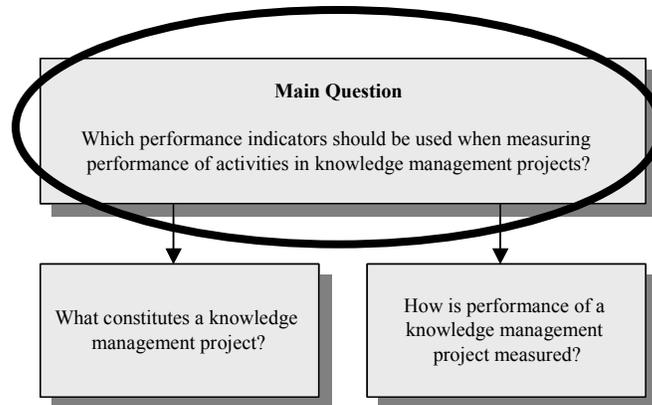
Looking at how the knowledge is structured in different communities, according to different topics and observing whether these are increasing or not, gives an indication of whether the way it was structured was of any value to the participants. The domain *knowledge structure* was hence chosen since we believe that if for instance the number of communities is increasing, this shows the communities have been considered beneficial, and that an increasing number as well as more specified communities show an evolvment, which may be equalled to an increasing performance. Performance indicators used for measuring the performance is:

- Number of communities in databases
- Number of topics in communities in databases
- Number of taxonomies in databases

The domain *usability* is chosen because the technology is supposed to support knowledge management activities and provide a tool to assist people in their daily work. Hence, usability is a critical factor. If people do not feel that the systems are user friendly, they may refrain from using them. In that case, the system does not provide the facilitation it was originally supposed to provide and there may be a need for actions to be taken. Performance indicators used for measuring the performance is:

- To what extent the employees consider the databases to be user friendly
- To what extent the employees consider help-instructions in the databases being sufficient
- To what extent the employees consider it easy finding colleagues with the correct competence

5.3 RESULT: LIST OF PERFORMANCE INDICATORS FOR RECOMMENDATION



Based on the theoretical, as well as the empirical findings and the analysis, the following performance indicators can be used to measure performance of activities in knowledge management projects. The column source shows how the measurement is being done. Thought has also been put into how the value of the performance indicator is to be retrieved, hence the Source column.

Focus Area	Domain	Performance Indicator	Source
P R O C E S S	Quality of Knowledge	To what extent the employees -consider knowledge in databases useful -re-use knowledge Number of returning users in databases	Survey Survey Log in db
	Efficiency due to new routines	Number of -calls to support function -hours spent with external experts, per month -employees participating in this survey To what extent the employee -experience saved time in finding the correct information/competence due to using the databases -consider increased number of orders connected to solutions/success stories	Supp. f. Ec. Dept. Log in db Survey Survey
	Incentives	Number of distributed incentives	Manager
	Knowledge Contributor	Occupational title of the Contributor Business Unit, where the Contributor is working	Log in db Log in db
H U M A N	Knowledge Sharing Attitude	To what extent employees feel -comfortable reusing solutions/contributions -comfortable sharing their knowledge in order to help others -that they save time by using knowledge databases in their daily work	Survey Survey Survey
	Knowledge Sharing Activities	Number of hours the employees participate in workshops/seminars/networks or other activities, per month	Survey
	Use of Participation in Activities	To what extent employees consider that participation in activities generates -new relations/contacts -experience and more contributions in databases	Survey Survey
	Awareness	To what extent the employees feel they have been provided with sufficient information/education for -the new routines and work procedures -the new databases	Survey Survey
I T	Active Involvement	Number of users Number of -accesses in chosen area, per user -returning users in databases -solutions contributed, per user -success stories contributed, per user -lessons learned contributed, per user -best practices contributed, per user -other contributions, per user Number of employees who have registered as a member	Log in db Log in db Log in db Log in db Log in db Log in db Log in db Log in db
	Knowledge Structure	Number of communities in databases Number of topics in communities in databases Number of taxonomies in databases	Log in db Log in db Log in db
	Usability	To what extent the employees consider -the databases to be user friendly -help-instructions in the databases being sufficient -it easy finding colleagues with the correct competence	Survey Survey Survey

6 CONCLUSION

This chapter presents the conclusions drawn from the analysis and gives recommendations to organizations and suggestions for further research.

6.1 CONCLUSION OF THE THESIS

According to both literature and participating organization, knowledge management projects exist to increase knowledge sharing to be able to include competence and knowledge in what is offered to the customers.

The studied projects have common features and similar activities, which all deals with increasing knowledge sharing. To follow up how these projects are progressing there is a desire among organizations to measure the performance of the activities in the projects. To do this, literature and the participating organization use performance indicators, which measure both quantitative and qualitative aspects of the projects even though these two aspects are measured separately.

In the performance indicator matrix, we have been able to identify three focus areas: process, human and information technology. To be able to measure all aspects of a knowledge management project, we have based our selection of performance indicators to recommend on the three focus areas. This selection is based on the studied projects: partly on what organizations measure today and partly on what they would benefit from measuring.

Event though performance indicators exist to measure the performance of the activities in knowledge management projects, there is a need for an established method or tool which handles both the quantitative and qualitative indicators and how these change from one measurement occasion to another. This conclusion is based partly on considering the number of organizations, which expressly do not yet measure performance of their knowledge management projects, and partly on the absence of a generally accepted method or tool for doing this among the participating organizations. In some cases, Balance Scorecard is used to show the changing performance of the quantitative indicators, but the qualitative indicators do not fit into the scorecard, since the outcome does not generate a value to compare with.

6.2 RECOMMENDATIONS

Based on our findings, we recommend organizations, which wish to measure the performance of their knowledge management projects, to use the recommended list of performance indicators and retrieve their values. In order to successfully use the performance indicator list when measuring the performance, it is necessary to have the facilities supporting the measurements. This may be done by developing a suitable tool, which compiles measurement results in order to compare different measurement occasions.

We recommend having a web-based survey, which automatically calculates the results and transfers these to the tool. Also, results gained from logs in databases need to be

automatically transferred to the tool. The results may then be calculated and after the second measurement occasion it is possible to compare the two and see how the performance is changing.

We also recommend that the results are easily read and clearly show whether the performance is increasing or decreasing, for this purpose we consider diagrams or such to be most suitable.

6.3 SUGGESTIONS FOR FURTHER RESEARCH

A suitable continuation for this thesis is to develop a tool for using the recommended performance indicators (see section 5.3) for actually measuring the performance of a knowledge management project. The authors of this thesis are currently developing a prototype tool, and any participating organizations or readers who find this interesting to take part of should not hesitate to contact us. (emma_orr@hotmail.com or mariepersson76@hotmail.com)

Also, since this thesis only deals with how to find out the current performance of activities in knowledge management projects an interesting area to explore further is what counteractions need to be taken when the measurement shows a decreasing performance. Another aspect of this is also to see which counteractions appear to be the most effective and show the greatest change from one measurement occasion to another.

Another interesting area, is studying the overall effects stemming from a number of knowledge management projects within an organization, in order to look into whether increasing organizational performance is due to knowledge management projects. This could be to see whether it is possible to connect financial measures to the evaluation of knowledge management projects.

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APPENDIX 1

QUESTIONNAIRE



Information and Questionnaire Concerning Master Thesis On "Performance Indicators for Knowledge Management Projects"

Department of Informatics
School of Economics and Commercial Law
University of Gothenburg
Emma Orr & Marie Persson

Gothenburg, 2003

Thank you for showing interest in our master thesis and considering to participate!

The enclosed information lays foundation for what we wish to retrieve. If anything about its structure or the questions is unclear, please contact us and we will explain the contents and our intent further.

We look forward to hearing from you.

Kind regards

Emma Orr & Marie Persson

Emma Orr	emma_orr@hotmail.com	+46 702 452695
Marie Persson	mariepersson76@hotmail.com	+46 702 664627

Background

The authors of the master thesis are students at the Department of Informatics at the University of Gothenburg. This master thesis is our final project and we have chosen to focus on how to measure and evaluate the effect of knowledge management projects. As a part of our thesis work we have contacted a number of organization to map how measurement and evaluation is being done in each organization.

Knowledge management exists today in various forms in many organizations. There is a need to be able to measure the effects of a knowledge management project and how this contributes to an increased amount of knowledge sharing. This measurement is needed to be able to show that goals are reached, and later be able to connect the result to the evaluation of the overall knowledge management initiative within the organization.

Purpose

The purpose of this master thesis is to identify which performance indicators/variables/tools organizations use in order to measure and evaluate their knowledge management projects/systems.

Goal and Expected Result

The expected result is to be able to compile a list of the indicators/variables that are being used in organizations today in order to enlighten current views and usages of these. The compilation will later lay foundation for finding and choosing suitable indicators/variables in organizations, depending on the focus of the project being evaluated/measured.

Chosen organizations that wish to participate in the thesis will be informed of the result and may apply this as they find suitable. Those organizations that wish to remain anonymous may of course do so.

Questionnaire

1. What was the purpose of implementing knowledge management in your organization?
2.
 - a) Who drives the knowledge management in your organization?
 - b) Do you have a centralized knowledge management function headed by a CKO (Corporate Knowledge Officer) or do you have several local knowledge management initiative driven by local divisions?
3.
 - a) Please give an example of a finished or on-going knowledge management project.
 - b) Which components did/does the project consist of? For example IT-systems, workshops, seminars, newly developed routines and processes etc.
4.
 - a) How does your organization encourage knowledge sharing?
 - b) Any incentives or ways to provide non-pecuniary compensation? If yes, how do you evaluate/measure this?
5.
 - a) How is the effect of a knowledge management project evaluated/measured in your organization?
 - b) Are there different focus areas for the evaluation/measurement? For instance IT and/or human.
 - c) Which tools or performance indicators or variables are used for the evaluation/measurement? Concerning motivation, competences, benefits of IT-system etc. (By tools we mean Balance Scorecard and such.)
 - d) Does your organization use any monetary/financial measures?
6.
 - a) Is your organization using different tools or performance indicators or variables depending on which kind of KM project is being evaluated/measured?
 - b) Are you aware of any differences when evaluating/measuring KM projects compared to other projects?
 - c) How did you decide which tools or performance indicators or variables to use? Please motivate your choice.
7.
 - a) What is the purpose of evaluating /measuring a project?
 - b) How are the results from the evaluation/measurement used? For instance, could you give examples of occasions where concrete counteractions were taken due to bad measurement results? Could you give examples of success stories being promoted after the measurement to recognize good performance?
 - c) What target groups participate in the evaluation/measurement?
 - d) What target groups are informed of the result of the evaluation/measurement?
8. Who is responsible for performing the measurements? For instance, the driver of the KM initiative or a centralized KM function or business unit level?
9. How often is the evaluation/measurement conducted?
10. Are the results of the measurements used to justify your KM initiative to top management in order to get sustained funding?

APPENDIX 2

PERFORMANCE INDICATOR MATRIX, sorted by focus areas

Focus Area	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
P R O C E S S	baseline for maturity comparing results to a previously set baseline	X						
	customer success increased success with customers compared to previously						X	
	customer time increase more time to spend with customers	X						
	customer satisfaction to what extent the are customer satisfied					X		
	distribution of knowledge facilitated distribution of knowledge within organization	X						
	effect of knowledge any effects of knowledge within the organization, for instance increased visibility or increased customer value					X		
	efficiency & visibility on the market increasing or decreasing					X		
	innovation index an index showing increased innovation in organization						X	
	knowledge activity report stating an increased or decreased knowledge activity for each user						X	

Focus Area	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
P R O C E S S	knowledge shares number of knowledge shares per measurement interval					X	X	
	leverage effect if the project contributes to small efforts giving large effects	X						
	motivation incentives based on							
	number of knowledge-shares a year					X		
	usefulness of the knowledge contribution					X		
	knowledge activity report						X	
	orders number of orders, preferably an increase due to managed knowledge						X	
	profitability new business gained, for instance stemming from contributions in knowledge base or contacts generated or by interviewing sales people	X	X			X		
	quality of knowledge usefulness of the knowledge found, for instance possibilities of re-use	X	X			X	X	
	relationships number of relationships established due to knowledge systems & networking	X				X		
	responses number of responses to a request	X						
	response time decrease of response times due to facilitation of finding information	X						
	re-use of knowledge						X	X

Focus Area	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
P R O C E S S	revenue gained/saved revenue gained due to managing organization's knowledge					X		
	return on investments savings from participating in communities of practice, ie estimated savings * percent attributable to the community * degree of certainty	X						
	support from management degree of support from management regarding managed knowledge							X
	support incidents saved decreasing need for support function					X		
	speed of knowledge transfer a more efficient knowledge transfer within the organization due to managed knowledge	X						
	tickets number of tickets submitted, preferably a decrease due to knowledge systems					X		
	time, money & personnel time saved savings due to managed knowledge	X						
	value added per employee increased value due to being able to take part of collective knowledge of organization	X						
	work methods more efficient ways of working	X						

Focus Area	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
H U M A N	attitude of knowledge sharing				X			
	application of knowledge to what extent is the knowledge applied throughout organization	X						
	awareness of evaluation awareness of being evaluated may contribute to increased participation	X						
	co-operation with external experts the amount of co-operation after having managed knowledge in organization	X						
	culture adoption curve to see the progression of the knowledge culture				X			
	employee retention number of employees staying in the organization compared to previously	X						
	employee satisfaction number of employees being satisfied with their work situation compared to previously				X		X	
	expertise available the degree of expertise available in the knowledge system	X						
	expert participation number of participating experts within a field	X						
	job performance increased job performance due to managed knowledge	X						

Focus Area	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
H U M A N	job satisfaction increased satisfaction with job situation due to facilitated routines	X						
	networking with external partners increased possibilities for networking with external partners	X						
	participation number of users participating in knowledge sharing activities			X		X		
	self assessment estimate of how much the individual has gained from the managed knowledge within the organization	X						
	sharing index index showing an increased or decreased amount of knowledge sharing within the organization					X		
	time to meet customer needs increased amount of time to spend making sure customers are satisfied with solution	X						
	user acceptance amount of users accepting knowledge activities as part of their daily work	X						
	user satisfaction amount of user satisfaction with systems, routines, and knowledge available		X				X	

Focus Area	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
I N F O R M A T I O N T E C H N O L O G Y	accesses number of site accesses	X	X			X	X	
	access to knowledge availability of knowledge in information systems	X						X
	arrangement and classification of knowledge if knowledge is arranged in such a way that it facilitates finding what is sought for	X						X
	calls to helpdesk number of calls to helpdesk, preferably decreasing	X		X				X
	channels enabling creative outlets to what extent the information systems enable channels for creative outlets, for instance flexible forums enabling attachments	X						
	community number of members		X					
	contributions number of contributions in systems/communities							
	best practises	X	X					
	documents			X				
	individual experience		X					
	success stories	X			X			
	other contrib.		X	X	X			
	contributions:							
	readability rated by other users		X					
	usability rated by other users		X					
	re-use rated by other users		X					
re-use number of re-used contrib. related to total number of projects delivered		X						

Focus Area	Performance Indicator	Literature	Ericsson	HP	KPMG	Schlumberger	Siemens	Xerox
IT	downloads number of downloads	X		X				
	hits number of hits when using search function	X						
	query guidance sufficient instructions in systems	X						
	usability degree of user friendliness of systems and search engines	X						X
	usefulness to what extent the systems respond to user needs	X						
	usefulness of knowledge how useful a knowledge is to other individuals within organization						X	