KMap: Providing Orientation for Practitioners when Introducing Knowledge Management

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Abstract. One of the first question each knowledge management project faces is: Which concrete activities are referred to under the name of knowledge management and how do they relate to each other? To help answer this question and to provide guidance when introducing knowledge management we have developed KMap. KMap is an environment which supports a practitioner in the interactive exploration of a map of knowledge management activities. The interaction helps trigger interesting questions crucial to the exploration of the solution space and makes hidden argumentation lines visible. KMap is not a new theory of knowledge management but a pragmatic "object to think with" and is currently in use in two case studies.

1 Introduction

In recent years knowledge management has gained importance in the business world. For more and more managers it is now a priority to introduce knowledge management into their organizations. They have heard a lot about knowledge management, its benefits, and especially the technology and believe that this knowledge-oriented perspective will help solve many of the reoccurring communication and information problems they face. More than that, they often enough expect something magical to occur to their organization at the moment they introduce knowledge management. Maybe hidden treasures will be found which will raise the profits or at least the organization will become highly efficient over night? These expectations are not surprising since the field is highly interdisciplinary, drawing from very different

disciplines such as organizational development, business sciences, psychology, all the way to computer science – and the solutions offered are typically rather fragmented.

People in general feel overwhelmed by the broadness of the topic, do not know how to communicate the value of knowledge management to their superiors, and do not know where to start. In our experience this confusion expresses itself through the following three questions which typically arise at the beginning of any knowledge management project:

1. Which concrete activities are referred to under the name of knowledge management and how do they relate to each other?
2. How can top management be convinced that knowledge management activities are instrumental to reach business goals?
3. How can knowledge management be introduced effectively into an organization?
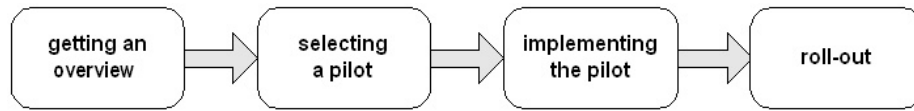
While a lot of research has been conducted to design new knowledge management theories [1,2,3], methods [4,5], systems [6,7], etc. little has been published on how to address a broad range of pragmatic, down to earth problems and questions involved in introducing knowledge management into an organization. This paper aims at helping to close this gap and provide answers to the three questions above by giving pragmatic guidance to practitioners.

The work reported in this paper rests on our long-year experience as knowledge management researchers and consultants. We have introduced knowledge management into a number of very different organizations ranging from large automobile companies, over medium sized governmental institutions, to small consulting companies – even into our own firm. We have captured and documented the experiences we have gained throughout the different projects and have condensed them into KMap (Knowledge Management Map) – a tool which helps to interactively explore the possibilities of knowledge management and "serves as an object to think with" [8] during the early phase of introduction.

In the following we first illustrate a typical knowledge management introduction process and explain which role KMap can play within this process. Section 3 explains why we chose concrete knowledge management activities as the focus of our work. The KMap structure is then introduced in Section 4 and in Section 5 we explain the features of KMap on usage scenarios illustrating corresponding to the introduction process of Section 2. Finally, in Section 6 you find the conclusion and outlook of future work.

2 Introduction Process of Knowledge Management

Typically a project for the introduction of knowledge management follows four phases:

KMap is intended to be used within the first two phases of the introduction process in order to provide an overview, to clarify the relationships between possible knowledge management activities, to improve the communication to the practitioners, and most importantly to help select concrete knowledge management activities to be introduced. In the later phases of implementation and roll-out, KMap serves as a crystallization point for documenting experiences, success stories, and return on investment (ROI) measures. Feeding the obtained experiences back into the tool ensures a living artefact whose value to the user will grow over time.

3 Focus on Knowledge Management Activities

In our work we have found that by arranging our thinking around concrete knowledge management activities – the ones which are applicable within a given situation – we are able to communicate effectively and efficiently with our customers. A business goal or problem typically can be addressed by introducing one or a number of interconnected knowledge management activities, a success story can illustrate the effectiveness of a knowledge management activity, and ROI measures only make sense in the context of a concrete activity and the corresponding business goal which it is supposed to achieve.

So what is a knowledge management activity? We consider activities which range from human-oriented approaches such as skills management, to organization-oriented activities such as establishing knowledge management roles and process-oriented such as business process modelling, to technology support such as groupware systems. Applying these activities to an organization they all support knowledge management in some way or another. However, many of them could also be used to achieve very different goals and might already be used within the organization – but in a different context. Knowledge management activities are concrete enough to provide a basis for an interesting discussion and to ask intelligent questions but they are also general enough to leave sufficient room for interpretation and adaptation to a specific situation.

By talking about concrete knowledge management activities we are able to communicate better with our customers and to give them a "hands on" feeling on what can be done to solve their problems. But most importantly, by making knowledge management concrete and viable we are able to control expectations. The side effect is that people also become disenchanted with knowledge management and realize how much work they themselves have to contribute in order to make it a success. Suddenly knowledge management is not perceived anymore as something which is introduced by consultants and consumed by employees, but something which

is owned by the organization and which can only be of benefit if it is of benefit to every single person working there.

> Concrete knowledge management activities are essential for the communication with the customer: They are easily understood, solve problems, control expectations, encourage the customer to contribute and help to own the solution.

4 KMap

Building KMap we started out by collecting about 130 typical knowledge management activities ranging from human- and organization-oriented approaches to technology support. Over time this collection developed into a systematic graph and later was implemented in an interactive environment. The name KMap refers to the union of the graph and its environment, together providing a map of knowledge management.

Obviously any collection of knowledge management activities can never be complete. A user will always be able to come up with new activities which are not included or she will find relationships between activities which are not represented. However, this is not a bug but a feature. By providing a reasonable large number of activities and bringing them in relationship to each other we are able to provide an overview to the user, enable her to explore the possible solution space, and help her to come up with new ideas which can be easily added to the collection.
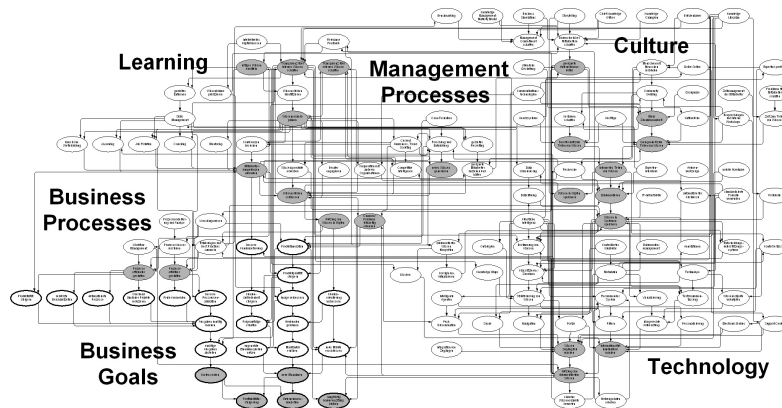

Fig. 1. KMap

KMap consists of six large areas (business goals, process-, learning-, culture- and technology-oriented knowledge management activities) in order to group the provided

KMap elements into coarse clusters. The geometric position of knowledge management activities is determined by means of their relationship to one of the five knowledge management activity areas and their relationships among each other. The sixth area contains business goals.

The interactive environment of KMap allows for effective filtering, visualization, extension, modification, customisation, and personalization of information. In addition to knowledge management activities, KMap contains a number of success stories and ROI considerations. Currently we are using KMap within two case studies. As indicated in Section 2 the experiences gained will in turn flow back into KMap and enrich it even further.

KMap Structure

KMap consists of the following main elements:
- business goals
- knowledge management activities
- success stories
- ROI approaches

Elements in KMap are interconnected via directed lines that express "X supports Y" relationships between two elements and are called a*rgumentation lines* since they can be used to support argumentation of knowledge management activities.
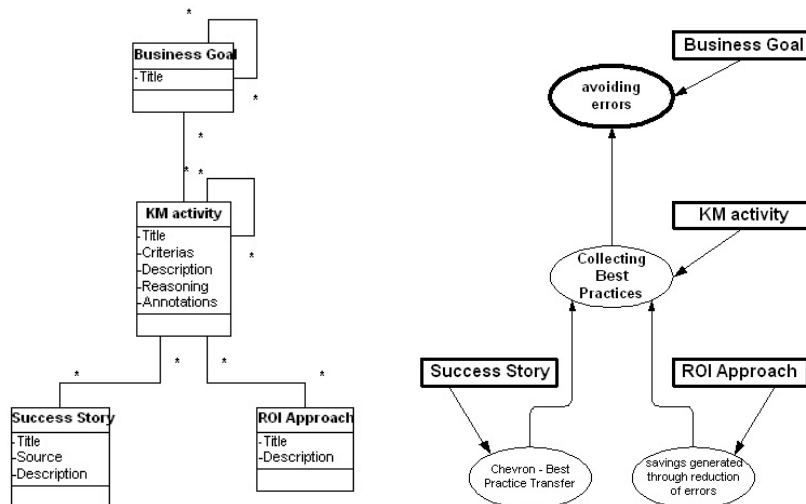

Fig. 2. UML diagram and corresponding KMap structure

The UML diagram on the left of Figure 2 describes the structure of and relationships between these main elements. The graph on the right shows the concrete representation used in KMap. In the interactive version of KMap, thick lines indicate business goals while ROI approaches and success stories are color coded.

To distinguish between different abstraction levels in KMap, two types of elements exist: Abstract elements provide a conceptual summarization of contributing elements (along argumentation lines to reduce complexity and to enable easy navigation) while regular elements describe concrete knowledge management activities or business goals.

Knowledge Management Activities
Knowledge management activities are activities that contribute to the overall goal of introducing knowledge management into an organization (for instance "Communities of Practice", "Portals", and "Knowledge Maps"). For each activity a generalized description and pointers to further reading are provided, and a classification along organization- and activity-specific criteria is suggested.

The following set of criteria is available for each of the provided knowledge management activities:

- *Number of employees*
  to classify knowledge management activities which are most useful in e.g. larger organizations
- *Attitude of the employees concerning knowledge management*
  to classify knowledge management activities which are not appropriate e.g. for employees with a negative attitude concerning knowledge management
- *Initial time of implementing the knowledge management activity*
  to classify knowledge management activities which e.g. can be implemented very quickly in an organization
- *Potential decision level for the knowledge management activity*
  to classify knowledge management activities which e.g. need the top-management's commitment
- *Costs of implementing the knowledge management activity*
  to classify e.g. very costly knowledge management activities
- *Focus of the knowledge management activities*
  to classify knowledge management activities which e.g. primarily have effects on an organization's culture

These criteria enable the classification and structuring of activities and allow for effective filtering in the interactive environment. To provide a clear description of the reasons that led to a certain classification of a knowledge management activity, a text field for rationale is provided. Additionally, each of the knowledge management activities can be annotated.

Through information hiding, all of this additional information described above is only available "on demand"; that is the user has to click on an element in KMap and after that, a separate browser window appears containing the requested information. (see Figure 3)

Business Goals
Business goals (like "Company Growth", "Reduction of Expenses" or "Improvement of Customer satisfaction") are described via descriptive names. Because the value of potential knowledge management projects strongly depends on how much they contribute to organizational business goals, knowledge management activities are related to business goals via argumentation lines.

Success Stories
Success stories (from companies like Chevron, McKinsey, and Sun) consist of textual descriptions and references to the sources of the success stories. Because success stories document successful knowledge management implementations, they contain experiences and best practices and thus are important to be included in KMap.

ROI Approaches
ROI approaches (like "Reduction of travel expenses", "Reduction of education costs" or "Reduction of maintenance costs") provide a textual description of measures that allow for effective calculation of ROIs for certain activities. ROI approaches take the financial aspects of knowledge management projects in account and thus are important in planning stages of knowledge management projects.

By default both success stories and ROI approaches are not visible in KMap, their visibility is controlled separately. Also, success stories and ROI approaches are related to knowledge management activities (via a n:n relationship) *and* vice versa, thus enabling navigational aid (through Hypertext links) from knowledge management activity descriptions (displayed in the browser window) to related success stories and back to other related knowledge management activity descriptions.

5 KMap Implementation

KMap itself is an example of how complexity in a broad problem domain can effectively be reduced with the support of technology. KMap builds on an authoring and representation tool for complex graphics (Microsoft Visio ®) and uses its development environment to fulfil the KMap system requirements. KMap is visualized through graphical elements and connections which are located on static geometric positions even when they get greyed-out by the provided filtering mechanism. This ensures that users do not get lost in the complexity of the provided information or loose orientation after filtering knowledge management activities and thus reduces the cognitive burden. Detailed element descriptions are provided via generated HTML pages that can be accessed through KMap.

Although KMap comes with a large set of already structured, classified and described elements, it also focuses on the support of easy modification. The interactive environment aids in extending and altering both the structure and the content of KMap through an intuitive graphical interface. Thus, KMap can be tailored to specific

needs of a variety of potential users and ensures personalization of the provided knowledge.

6 KMap Application Scenarios

In this section three scenarios are introduced that demonstrate the typical usage and potential benefits of KMap.

Scenario 1: "Providing orientation in the broad field of knowledge management"

The Case: Bill is a manager who wants to implement knowledge management activities in his division. Because he is new to the field of knowledge management he needs to get a quick overview of potential knowledge management activities and how they can be implemented effectively. Also, he needs to get a deeper understanding of how certain activities depend on each other and where to find further information.
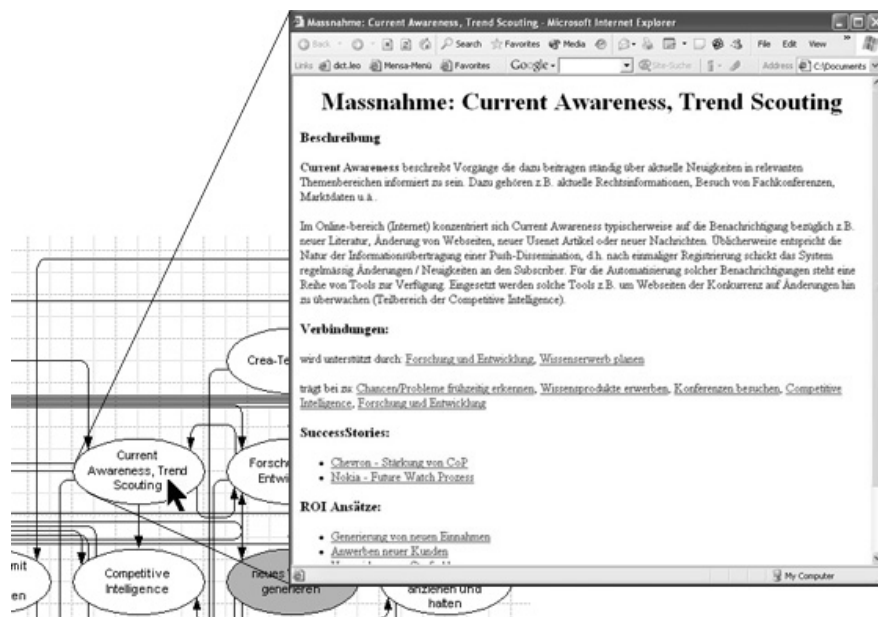

Fig. 3. Details of a knowledge management activity description. After clicking on elements in KMap, a browser window appears containing: the knowledge management activity's textual description, assigned criteria, links to other KMap elements (such as business goals, knowledge management activities, success stories, ROI approaches), reasoning concerning the assigned criteria and annotations.

Application of KMap: Because of the coarse positioning of the KMap elements in six large areas, Bill is able to quickly get an overview over the main domains

involved in knowledge management. By focussing on the provided abstract elements of KMap, Bill recognizes basic concepts of knowledge management. One concept that grasps Bill's attention is "Early recognition of opportunities and threats". To learn more about this concept, Bill follows the provided argumentation lines to more concrete knowledge management activities (e.g. "Current Awareness and Trend Scouting") and thus he understands various relationships between concepts and activities involved. Now Bill wants to read more details about certain activities. By clicking on "Current Awareness and Trend Scouting", he gets more background information on this specific knowledge management activity as well as links to related success stories that contain experiences and best practices (see Figure 3).

Benefits of using KMap: In this scenario, KMap supports knowledge management practitioners in getting an overview of a large set of knowledge management activities and thus aids practitioners in building mental models of involved relationships and dependencies.

Scenario 2: "Supporting the planning stage of knowledge management projects"

The Case: Arthur is a knowledge management consultant and is responsible for developing knowledge management concepts and project plans for his customers. In order to optimize the knowledge management concepts, he tailors his proposed solutions to specific needs of his customers. To accomplish that, he has to take customer-specific parameters (for example the size of the company, preferred knowledge management activity domain, …) in account. His customer in this case is "THIS-SME Inc.", a medium enterprise with about 100 employees which demands technology-oriented knowledge management activities that can be implemented in less than 6 months.

Application of KMap: Arthur uses KMap filtering mechanism to filter out activities that are not relevant for THIS-SME Inc. He does that by choosing the following set of criteria in the KMap filtering form down below.

Fig. 4. The filtering form that enables filtering of knowledge management activities based on organization- and activity-centric criteria.

After filtering, KMap now only visualizes knowledge management activities (and relations between them and business goals) that are potentially suitable for THIS-SME Inc.; knowledge management activities that do not fit these criteria are greyed out.
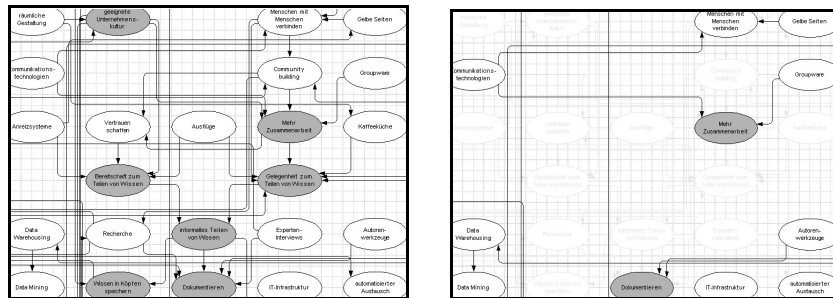

Fig. 5. An example of filtering KMap: On the left, KMap is in an unfiltered condition while on the right side, non-appropriate knowledge management activities are greyed out by the filtering mechanism and thus, the set of potential knowledge management activities is reduced.

Subsequently, Arthur matches the business goals of THIS-SME Inc. to the provided KMap business goals. By following the argumentation lines that link to the remaining knowledge management activities, he can effectively work out a customer-centric knowledge management project plan that includes a set of appropriate knowledge management activities which contribute to THIS-SME Inc.'s business goals. Related success stories support Arthur with successful examples which can act as templates for his concepts.

Benefits of using KMap: This scenario demonstrates how KMap can effectively be utilized to provide guidance in the introduction stage of a knowledge management project by supporting the development of concepts which are tailored to specific needs of an organization.

Scenario 3: "Supporting knowledge management practitioners in convincing (top) management of the necessity of knowledge management projects"

The Case: Kris is a sales representative of a company which sells groupware systems. In order to sell his products, he has to convince the customer's top management, division managers and technical staff. Also, he has to find and introduce knowledge management activities that complement his products.

Application of KMap: Kris browses KMap for groupware-related knowledge management activities. In order to convince top management, he follows the provided links from the "Groupware" knowledge management activity to related ROI approaches (e.g. "reduction of communication costs"). Based on that, Kris can work out a set of arguments that focus on financial aspects of introducing groupware, which is appropriate for convincing top management. When talking to division managers,

Kris uses KMap to find success stories which aid in demonstrating potential benefits. Thus, Kris can draw up a picture of the future that describes how groupware can increase effectiveness of work in a division. Also, through argumentation lines, Kris finds related knowledge management activities like "community building" that are necessary in order to successfully implement the new groupware system. These arguments are suitable to use when talking to division managers. When talking to technicians, KMap aids Kris in keeping an overview over various technical concepts of knowledge management. This enables him to be well prepared for a broad range of discussions with customers that cover aspects of knowledge management that are not addressed by his product.

Benefits of using KMap: In this scenario, KMap supports sales representatives via a large set of arguments that aid in convincing top management of the necessity of knowledge management projects.

7 Conclusion and Outlook

We have introduced KMap – a tool which can be used within the early stages of knowledge management introduction (as described in Section 2) to answer the three questions typically asked in each knowledge management project (as described in Section 1):

1. KMap offers a collection of over 130 concrete knowledge management activities to the user and allows an interactive exploration of the field. The rich content and context of KMap enables a practitioner to gain an overview of the complex, interdisciplinary field in a short time.
2. KMap visualizes argumentation lines which start from concrete business goals and lead to knowledge management activities which could be applied to reach this goal. These argumentation lines serve to trigger important questions, open the mind to different solutions and thus help a practitioner to design his/her thread of argumentation in support of knowledge management.
3. KMap provides success stories and ROI approaches for the knowledge management activities. This information enables a practitioner to judge the introduction context of the activity and helps her to set up efficient evaluation processes to measure the benefits.

This paper also provides additional guidance to the practitioner by illustrating a typical knowledge management introduction process and by explaining which role KMap can play within this process.

Future Functionality
During the use of KMap in different projects, two additional technical features emerged and will be implemented soon:

- *Spotlight-filtering* allows to visualize the n-neighbourhood (based on the connections between elements) of a certain knowledge management activity or business goal. This can further reduce complexity in cases where users of KMap are only interested in a single knowledge management activity and its related KMap elements (neighbours).
- V*isualising changes* made to a KMap is necessary to compare multiple instances (created through extension or customization) of KMaps.

In addition, we consider customizing or personalizing the names of the knowledge management activities to the vocabulary of the organization in which it is in use. In the application projects it has become obvious that the adjustment of the vocabulary can significantly increase the acceptance of the tool.

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