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# Holistic Development of Knowledge Management with KMMM®

Siemens AG / Corporate Technology  
Knowledge Management & Business Transformation

If knowledge management is to become a professional management discipline within the company rather than a short-lived "fad", it is essential to have a reliable instrument for defining ones current position and driving long-term corporate development. With its Knowledge Management Maturity Model the Competence Center for Knowledge Management at Siemens AG has developed such a methodology and already applied it successfully. This methodology comprises three components: A development model, an analysis model and an auditing process. Applying this instrument generally leads to understanding and appreciation of a gradual and integral development of knowledge management. It delivers the important qualitative and quantitative information to navigate this journey.

## Background

Over the last two years the importance of knowledge management (KM) has been brought home to managers through numerous conferences and publications. Effective handling of knowledge is increasingly being recognized as a significant factor of competition - which is why most companies have already begun (more or less coordinated) KM activities. Often these initial steps in KM have arisen from the desire "not to be left out" of the much-discussed subject. This has been helpful in terms of sensitization and motivation.

If knowledge is to be managed permanently and successfully in future, it would seem sensible today to review the suitability of the activities under way and, if necessary, make reasonable adjustments. For KM to be developed further effectively and efficiently, it must mature from mere "hype" into a cross-sectional function firmly anchored in the company.

The first step in developing *professional* knowledge management is to determine the current position of KM systematically or, more accurately, determine the currently practiced KM activities and organizational conditions. Many organizations or organizational units find this positioning difficult. In our experience, there are two main reasons for this.

On the one hand, there is a lack of coherent and comprehensible concepts and procedures providing concise results and pointers to suitable interventions. In a field as complex and many-layered as knowledge management, it is easy to miss the mark with regard to what and where the problem is, so often the expected project results only appear very late – if at all. Only the broadest of perspectives can guarantee that nothing is overlooked or underestimated.

On the other hand, the discussion on "knowledge metrics" has prematurely awakened expectations of quantification procedures which could not and cannot be met quite that easily. This call for metrics often springs from the desire to reduce a complex situation which is not yet fully understood to easily manageable figures. This shows that it is not possible to take the second step before the first, i.e. the situation must be understood qualitatively *before* quantitative investigations can be made. Metrics which are based exclusively on indicators measured via scorecards usually record only certain aspects of KM and can therefore be easily manipulated by anyone with a mind to do so. The controlling effect of these indicators on a company is therefore often counterproductive.

These facts have occasionally discouraged "practitioners" or business managers from in-

vesting time and money in diagnostic steps, and constitute a barrier to the introduction of suitable interventions for the systematic improvement of knowledge management.

### *The need for an analysis instrument*

It is against this background that we see the need for an instrument which

- allows an holistic assessment of the KM activities of a given organization which covers all relevant key areas of knowledge management
- derives suitable steps for development which are based on the current status of knowledge management, and thus shows the most appropriate starting point *before* a KM project actually kicks off
- supports ongoing development of the company through KM projects.

Further requirements include the following:

- The model should provide qualitative *and* quantitative results, taking into account the different views of the participants on the KM tasks of an organization.
- It should be possible to apply the model to an organization as a whole, to classical and virtual organizational *units* or to KM systems.
- There should be a systematic and structured approach which ensures transparency and reliable handling of the procedure.
- The underlying structure or the "model" should be comprehensible and – if possible – allow cross-references to proven management concepts or models.

## **Methodology**

To meet the requirements listed above, we have developed a methodology that we call Knowledge Management Maturity Model (KMMM®). This deliberately designed model allows both, qualitative and quantitative outputs on the current status of knowledge management in an organization.

KMMM® consists of an analysis model, a development model and a defined assessment

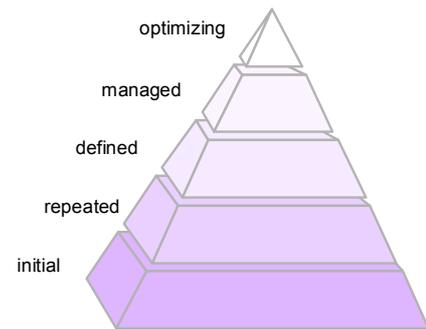


Figure 1: The Five Maturity Levels of Knowledge Management

process. The analysis model helps the KMMM® consultant to take account of all important aspects of knowledge management and reveals *which* key areas and topics should be developed in future. The development model provides information as to *how* the respective key areas and topics can be best developed to reach the next maturity level. The assessment process structures all relevant steps from assessment definition to result interpretation.

### *Maturity Levels in the Development Model*

The development model defines five maturity levels of knowledge management (see Fig. 1). This idea is based on the levels of the *CMM* (Capability Maturity Model) of the *Software Engineering Institute* at Carnegie Mellon University. The names of the levels were adopted from this concept. However, the transfer to the domain of knowledge management represents a completely new development. The maturity levels should be seen as relatively robust states of an organization which are based on in-place activities and processes practiced over time.

#### *Maturity Level "initial"*

In every existing organization knowledge processes take place in some form or other (generation, exchange, usage, loss). Typical for organizations at level 1 ("initial") is that these processes are not consciously controlled; "successful" knowledge related activities are seen as a stroke of luck and not as the result of goal-setting and planning. Tasks and phenomena which are knowledge intensive are *not* seen in con-

nection with survival and success of an organization. There is no language in place to describe phenomena or problems from a knowledge perspective.

**Maturity Level “repeatable”**

At level-2 (“repeatable”) organizations have recognized the importance of knowledge management activities for their business. Organizational processes are partly described as knowledge management tasks and, by virtue of ideas from individual “KM pioneers”, pilot projects on KM typically exist. The success or failure of these projects is a topic of discussion within the organization. If conditions are favorable, these individual activities can serve as the seeds of further, integrated knowledge management activities.

**Maturity Level “defined”**

At level 3 (“defined”) there are stable and “practiced” activities which effectively support the KM of individual parts of the organization. These activities are integrated in the day-to-day work processes and the corresponding technical systems are maintained. Individual KM roles have been defined and filled.

**Maturity Level “managed”**

A common strategy and standardized approaches to the subject of knowledge management are a feature of level-4 (“managed”) organizations. The solutions found at level 3 have flowed into organization-wide standards or adjustments. Indicators relating to the efficiency of these robust KM activities are regularly meas-

ured. The activities are secured in the long term by organization-wide roles and compatible socio-technical KM systems.

**Maturity Level “optimizing”**

A level-5 (“optimizing”) organization has developed the ability to adapt flexibly in order to meet new requirements in knowledge management without dropping a maturity level. These challenges are mastered even in the case of larger external or internal changes. The measuring instruments already introduced at level 4 are used in combination with other instruments for strategic control. There are no challenges left which cannot be solved with the established knowledge management tools. The motto is: “Hold onto your maturity level (hands off the KM budget!) and enjoy the profits!”

With regard to the interventions for developing knowledge management, KMMM® suggests concentrating on reaching the *next* higher maturity level. The model does not allow for “skipping” a level, as it is highly improbable that the level will be retained for long. Rather, a *synchronous* development of the individual key areas seems far more sensible. This means focussing on weaker key areas first with suitable actions before starting a further, integral development to the next level up.

**Key Areas in the Analysis Model**

The maturity levels have been defined independently of specific knowledge management activities and conditions. To specify what, for example, maturity level 2 means, we must now take a different perspective.

Perspective	Key distinction			→	Key area pair		
Time horizon	strategic	vs.	operative	→	Strategy, Knowledge Goals	vs.	Leadership, Support
Knowledge	external	vs.	internal	→	Environment, Partnerships	vs.	Knowledge Structures, Knowledge Forms
Actor	people	vs.	technology	→	Staff, Competencies	vs.	Technology, Infrastructure
Rules	informal	vs.	formal	→	Cooperation, Culture	vs.	Processes, Organization Roles,

Table I: Key Distinctions and Key Areas of Knowledge Management

Four "key distinctions" (see table I) help defining an initial assignment of organizational phenomena and activities which leads to a rough classification of our eight key areas of knowledge management.

These eight key areas are based on the enablers of the EFQM (European Foundation for Quality Management) model and have been extended or differentiated to represent KM-specific aspects. On the next level of the analysis model, 64 knowledge management topics are described, which drill deeper into organizational practices supporting knowledge management. The representation of the key areas in an octagon (see Fig. 2) is designed to express conceptual relationships between the key areas through the "spatial" arrangement. Adjacent sectors are "close" to each other in terms of content, while opposite sectors represent antitheses of a key distinction.

**Strategy, Knowledge goals**

The topics of this structural field describe aspects of the corporate vision and goal-setting with regard to knowledge management. The behavior of the top management and the budget policy are analyzed.

Relation to the next key area: Changes in the corporate environment and information from partnerships are often the catalyst for changes to the strategy and the knowledge goals.

**Environment, partnerships**

The topics of this structural field relate to important participants from *outside* the "system boundary" of the organization. Aspects covered are customers and other stakeholders, the comparison with other enterprises, and the problems of using external knowledge.

**People, competencies**

This key area deals with the topics of knowledge management which concern *individual* "soft factors". These include classical personnel topics such as personnel selection, development and support as well as topics relating to responsibility management and self-management.

Relation to the next key area: With the distinction *individual vs. collective* the two adjacent key areas can be relatively clearly delimited.

**Collaboration, culture**

This key area addresses the *collective* "soft factors" which have a significant influence on the knowledge management of an organization. These include topics such as corporate culture, communication and team structures or network and relationship structures.

Relation to the next key area: The adjacent key area 'Leadership, support' represents one of the most important factors influencing the topics of



Figure 2: The Eight Key Areas of Knowledge Management

'cooperation and culture', because the ground rules of behavior are more or less explicitly defined by managers and other "protagonists".

**Leadership, support**

This key area covers leadership issues such as management models and agreement on targets. It deals with the roles played by managers, but also other participants, with regard to supporting staff in knowledge management activities.

**Knowledge structures, knowledge forms**

The topics of this key area describe aspects of the structuring of the organizational knowledge base. They cover form-based and content-based (i.e. affecting the special domains of the organization) classification criteria for knowledge and documents.

Relation to the next key area: It is important that knowledge structures are first oriented toward general, domain-specific and business-process-based criteria and are only implemented in 'Technology, infrastructure' because of this analysis.

**Technology, infrastructure**

This key area deals with the aspects of information management with the help of IT systems. It also covers the functions of spatial framework conditions in relation to knowledge management.

Relation to the next key area: The design of IT systems and processes should be derived from the design of the business processes and the structuring of the organizational knowledge and not vice versa. The key area described above is therefore embedded between the key areas "Knowledge structures, knowledge forms' and 'Processes, roles, organization'.

**Processes, roles, organization**

This key area describes matters relating to the organizational structure and the assignment of knowledge management roles. Emphasis is given to aspects of procedural organization

within the context of a process-based organization. The aim is to discover how knowledge management activities can be added to these specific business processes.

This key area is now used to illustrate in brief how the eight key areas are represented in the KMMM® by concrete topics.

The topics with examples of statements on KM in this key area are:

- "processes and their documentation", i.e. important processes are described including their knowledge aspects
- "business processes", i.e. these have been usefully extended to include KM activities
- "knowledge explication", i.e. attempting to explicate implicit knowledge to an appropriate extent
- "using knowledge in decisions", i.e. knowledge relevant to decision-making is not simply "just there", but is used systematically in decision-making processes
- "KM roles", i.e. there are new roles such as Content Steward, Knowledge Coach or CKO
- "organizational structure", i.e. the organizational structure supports comprehensive KM activities and networks
- "projects", i.e. knowledge required *for* projects and knowledge *from* projects is systematically processed and used
- "innovations", i.e. the creation of new knowledge is directly and indirectly promoted.

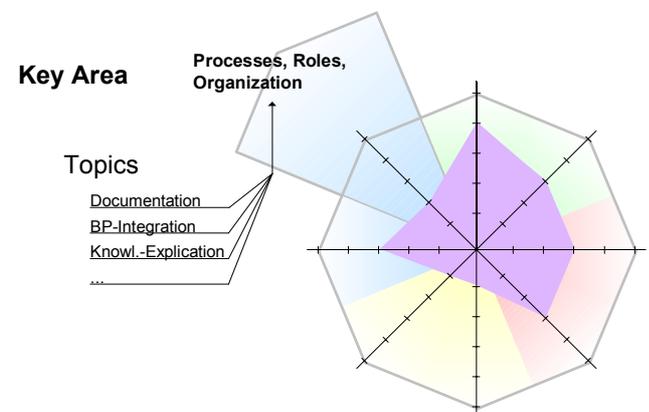


Figure 4: Condensation of quantitative Results and Resulting Maturity Profile

For each of these topics special requirements have been formulated, which the consultant then evaluates to see how far they have been met. This detailed structure should on no account lead to a "mechanical checking off" of the individual aspects, which is why the competences of the consultants are very important for the KMMM® procedure (see below). It would be naive to believe that organizational development towards KM can be successfully driven with only a "checklist" on that subject. What is crucial is linking to what has been practiced thus far and the holistic view of an overall concept.

## Procedure

The whole procedure of a KMMM® project is divided into six phases, as shown in Fig. 3.

In the 'Orientation & Planning' phase the expectations of the organization or organizational unit with regard to the KMMM® are clarified. The procedure is "defined" and planned exactly for each individual case.

Those involved and affected must be motivated to contribute actively to the KMMM® project or any subsequent interventions. To ensure this, sufficient information must be provided on the project, and its importance must be communicated by business responsables within the organization. It is worth noting that the KMMM® project will awaken or increase the expectation for change.

The information is essentially acquired through workshops and interviews based on the structure of the KMMM®. Various members of the investigated organization are selected for inter-

views, in order to provide a representative picture of the organization.

The consultants begin evaluating the new information as soon as it arrives from the interviews, thus putting them in a better position to control subsequent information gathering. This applies particularly to the "in-depth interviews" with individuals. For the quality of the results it is very useful to work with *pairs* of consultants. Only in discussions between two *experienced* KM consultants can the observations be critically analyzed before the topics are assessed. Because of the broad and holistic understanding of KM required in this procedure, the demands made on the KMMM® consultants are high. It is important that they have:

- comprehensive knowledge-management expertise
- experience in managing projects
- consulting know-how, especially in organizational consulting
- good communication skills

These qualifications ensure that the "data collection" can take the form of competent expert discussions or workshops and does not degenerate into an unstructured barrage of questions. The consultants must often use their experience and intuition to ascertain which topics need more focus and how to do this. They have to "feel" on which topics there is little or no effort at the customer's organization, and also where "merely" different terminologies do not *yet* adequately express a KM perspective.

Once the collection phase is complete, all the information is consolidated. The maturity level is

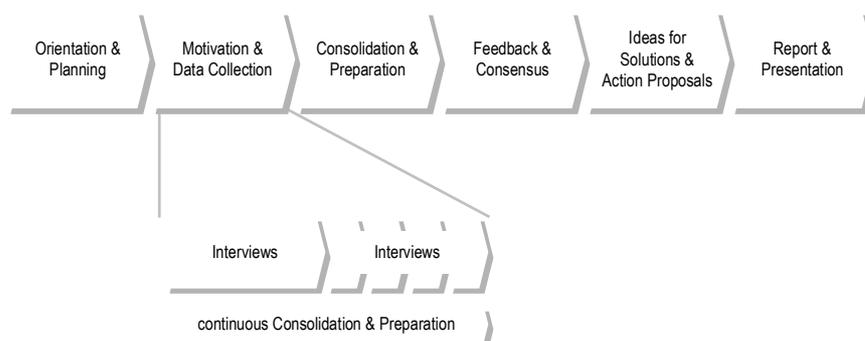


Figure 3: Process of the KMMM Assessment

assessed for the individual topics and finally for the key areas. Comments are written on the assessments, and the "results" are prepared for the feedback presentations.

In feedback sessions the provisional results are discussed and, if possible, consensus is reached between the interpretations made by the consultants and the organization members.

Detailed identification of the causes and further project planning is generally *not* part of the KMMM® project. However, since KMMM® is intervention-oriented by nature, the first ideas and suggestions emerge as starting points for maturity-level-specific KM interventions.

After the discussion of the results, the final report is drawn up. This serves as background information for the closing presentation and as important input for any subsequent knowledge management projects. Experience has shown that it is only now that it makes sense to decide on concrete measures, to appoint supervisors and to plan the implementation in detail in project form.

## Results and experience

As we know from organizational development, every analysis of the status quo has also an interventional effect. Therefore we distinguish between *implicit* and *explicit* results.

The implicit results of using the KMMM® generally include:

- fruitful communication and improved mutual understanding of different views on knowledge management problems and solutions
- understanding and appreciation of a gradual and holistic development of knowledge management
- motivation of the participants to improve knowledge management.

In the explicit results of the process we can distinguish between quantitative and qualitative results. The maturity ratings of the individual topics are condensed into one maturity level for each key area. The maturity levels of the eight key areas can be represented in a polar diagram. This

produces the organization's maturity profile, an example of which can be seen in Fig. 4. This profile already provides the first indications *which* key areas are to be developed primarily and which level is to be aimed at.

For targeted development of knowledge management the qualitative results of the KMMM® methodology are of crucial importance. Once the assessment process is completed, the general concepts of the KMMM® on knowledge management are underpinned with specific examples from real "organizational" life. These results contain the valuable information which can be used by an organization to improve its knowledge management. We believe in the simple truth, that sound analysis is a prerequisite for effective interventions.

Experience with the method were acquired in corporate departments as well as in operating groups. Both, the models and the assessment process have proved themselves to be applicable and effective in several Projects. Since finding the right track in the wide area of knowledge management without appropriate methods is an impossible mission, Siemens has integrated KMMM® in its knowledge management guidelines and recommends it to the groups

More information on further developments, experiences and background issues around KMMM® can be found at <http://www.kmmm.org>.

## About the authors

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has joined the Knowledge Management & Business Transformation competence center of the Siemens AG Corporate Technology Department in 1999 as Management Consultant. He is responsible for knowledge management methodologies, especially strategy development, information structuring and change management. Mr. Ehms has been working in the field of "learning organization" since 1995. He managed several projects on personnel development and change management with a management consultancy. He is experienced in organizational psychology and strategic management as well as usability and information architecture. Mr. Ehms strongly believes in holistic and constructivist ways of learning and knowledge management.

### *Dr.-Ing. Manfred Langen*

began work in the field of knowledge management in the Corporate Technology Department in 1996, since when he has managed numerous projects on the subject. At the beginning of 1997 he co-founded the Siemens Corporate Knowledge Management Network. Using his experience in software engineering, he transferred the Capability Maturity Model into the domain of knowledge management in 1999.