Practical Aspects
of Knowledge Management
in Industry

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Abstract. After a short introduction into the problem area of knowledge management and some basic definitions of key terms a holistic process model – the K2BE® Roadmap – is introduced as a practical guideline for the implementation of knowledge management. The four sections and phases of the K2BE® Roadmap are described shortly. Its actual application in an industrial environment is discussed in more detail. Starting with a general view of the ongoing project two action domains – the launch of communities of practice, the application of Story Telling in a major project - are depicted. At last the core lessons learned are outlined.

1 Motivation

Tons of papers and books were written on the subject knowledge management – the buzzword of the 21st century – during the last ten years. Meanwhile the theoretical concepts were given way to practical realization.

Nevertheless the question is still unanswered if some of these concepts can keep their promises helping companies to accomplish and extend their business excellence by managing the knowledge of their personnel in a professional manner in order to achieve product leadership, customer orientation, and operational excellence as well.

Knowledge management (KM) installed in a holistic manner targets the methodical management of all intangible resources of an organization. The challenge concerning knowledge management is that the actual situation is unique in every organization.

The specific situation we are facing at **voest**alpine Stahl GmbH is that the average age of our personnel is up to fourty. Therefore we have to find means keeping persons fit and productive for a longer time as well as improving the teamwork between generations. Further our essential knowledge is spread upon thousands of brains. This leads to expensive provision of information, difficulties in locating knowledge carriers, danger of wasted effort because of parallel work, and risk through drop out of knowledge carriers.

Last but not least we must fortify our innovative ability by developing new knowledge which becomes increasingly a competitive advantage.

2 Definition of Key Terms

First of all the key term *knowledge* has to be defined first. Hearing the word "knowledge" many people first think of expertise which is an important but not the only puzzle stone of what knowledge is all about. Knowledge forms a framework out of experiences, expertise (based on skills and abilities), values, rules and context information for judging and integrating new experiences and information (see Figure 1: Puzzle Stones of Knowledge). Formation and usage of knowledge takes place in the brain and is therefore bound to individuals. Knowledge is both a process and a stock. Knowledge is drawn one third out of documents and two-thirds get across by personal contacts like formal training or informal talks [4].
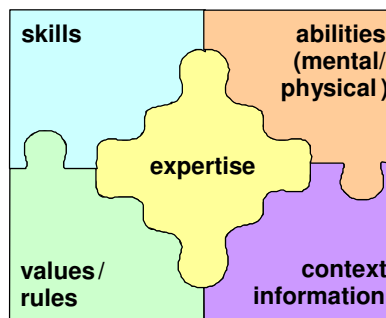

Figure 1: Puzzle Stones of Knowledge

Knowledge is based on data which is the raw material for the creation of information. Using the knowledge which was generated out of the information in an appropriate way leads to organizational competence. Competence in all essential knowledge domains sustains the competitiveness of the firm in question in the long run.

Knowledge may be available in *individual* mode bound basically to a person. Knowledge in *collective* mode may be found in processes, routines, practices and rules of an organizational unit or working group. Another knowledge mode essential for knowledge management is *implicit* and *explicit* knowledge. Implicit knowledge is the individual knowledge base of a person which cannot be easily communicated. Whereas explicit knowledge is methodical, systematical, and is available in articulated mode. It may be disseminated with aid of information and communication technology. The root problem of knowledge management is the transition of implicit knowledge to explicit ones. Only explicit knowledge is at call for the organization

usable for all its members. Knowledge may exist *internally* or *externally* at consultants or co-operation partners of the firm [5], [6].

The next key term to be defined is *knowledge management* itself. For **voest**alpine knowledge management is the systematized and institutionalized use of methods and tools for knowledge transfer and for the creation and application of new knowledge for achieving added value.

The last one is the *knowledge management process* which should be integrated into all business processes of a firm. The knowledge management process parallels on two levels, the individual and the organizational ones (see Figure 2: Knowledge Management Process). On the *individual level* it deals with identifying all missing knowledge items (sub-process *identification*) for any reason, saving your own knowledge by means of documenting or reactivating of (nearly) forgotten (sub-process *saving*), and developing new knowledge e.g. by learning out of documentations or experiences of others (sub-process *development*). These three sub-processes are linked together by the sub-process *evaluation* where the objectives are targeted and the appraisal of the identified, saved or developed knowledge items takes place.
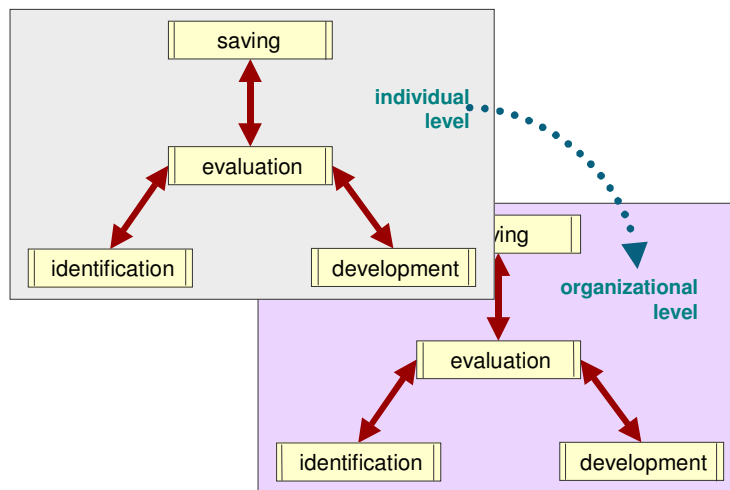

Figure 2: Knowledge Management Process

On the organizational level the individual sub-processes are performed by the co-operation of groups, (project-) teams, staff of a whole department or business areas. Therefore *identification* does not only mean searching for knowledge items but also for knowledge carriers, *saving* includes making available the experiences and lessons learned of groups or teams, *development* takes place by collaboration within knowledge networks. Evaluation comprises all relevant fields.

3 K2BE® – Holistic Process Model for Introducing Knowledge Management

The K2BE® roadmap (see [1], [2], [3]) is a rough process model for installing professional knowledge management. K2BE® stands for *Knowledge Management to Business Excellence* and is a roadmap for introducing knowledge management in an organization. K2BE® is a brand held by the five main contributors of the roadmap. It is based on the process model VEM (German acronym for "A process model for strategy-oriented implementation of executive management information systems") developed by Erhart [7] and Häntschel [1], the essentials of organizational learning and knowledge management contributed by Mittelmann and Wienerroither (see [5], [8]) and last but not least the basics of the roadmap itself worked out by Hahn [9]. The theoretical concept of the K2BE® roadmap has been empirically proved by replicated case studies. This research strategy enables the prototyping-oriented development of the K2BE® roadmap where in every development cycle the roadmap is empirical proved and refined according to the insights.

It consists of four fundamental sections and five phases (see Figure 3: Sections and Phases of the K2BE® Roadmap). The first section *Awareness Creation* contains the phase *Check-In* in which senior management should become aware of problems which might be better solved by using systematically knowledge management techniques and tools. The second section *Strategy Development* consists of the two phases *Start-Up* and *Line-Up* where the enterprise-wide and long-running planning for the professionalization of knowledge management takes place. The aggregate conception determinates the focus and timing of the implementation process. Depending on the available resources and the risk readiness of the organization the aggregate conception will be devided into steps accordingly. The forth section *Strategy Implementation* consists of the phase *Take-Off* where the stepwise implementation takes place. The forth section *Strategy Evaluation* includes the phase *Stop-Over* where all knowledge management activities so far are consolidated and evaluated.
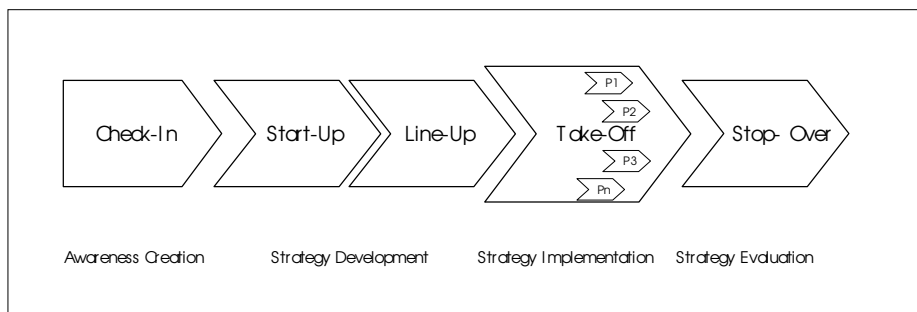

Figure 3: Sections and Phases of the K2BE® Roadmap

The names of the five phases are aeronautical terms which describe the job steps preparation of the flight, the motoring of the aircraft engines, the rolling of the air-

craft on the runway, the lift-off of the plane, the alighting (before motoring the air-craft engines again, a.s.o.). Analogously these activities reflect the ones executed during the implementation of knowledge management. Each phase is separated from the next by a "Point of Clearance" (PoC, see Figure 4: The Five Phases of the K2BE[®] Roadmap). The term "clearance" has a special meaning for the air traffic controllers and the pilots. The air traffic control center as the central controlling station issues the clearance of specific flight phases. The most familiar clearance "Cleared for Take off" signalizes the pilot that the runway is released and that the plane is allowed to take off.
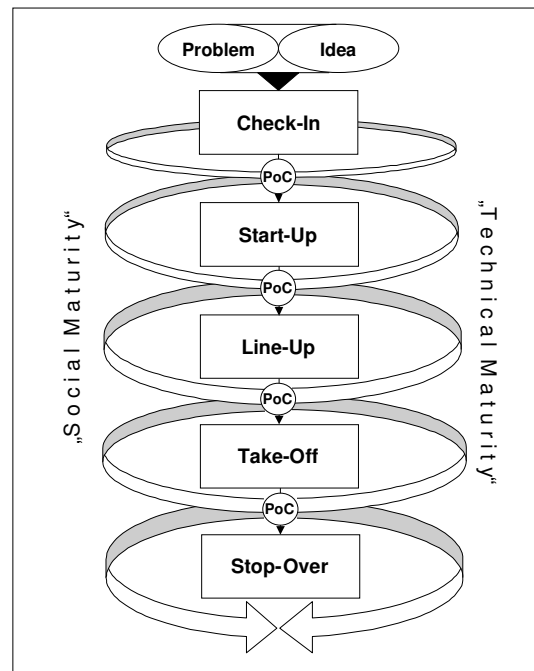

Figure 4: The Five Phases of the K2BE[®] Roadmap

Roughly the phases include the following activities:
- *Check-In*
  Initialization; sensitization of the managers; campaigning for a holistic system approach and a participative top-down-strategy; establishing a lobby
- *Start-Up*
  Developing and dovetailling the knowledge management goals; surveying the actual state; building the call for action
- *Line-Up*
  planning of sub-ordinate targets; planning and prioritizing the projects; generating the knowledge management project portfolio

- *Take-Off*

  putting single projects into practice based on chosen process models; ongoing adjustment of the planning to changing structural as well as cultural general conditions
- *Stop-Over*

  Merging and consolidating the results of the single projects; evaluating the previous activities; surveying the new actual state

At every "Point of Clearance" (PoC) of the K2BE ®-Roadmap an explicit reflection of the previous project progression and of the results is provided. The results are presented to senior management who decide on the ongoing knowledge management activities (continuation as planned, change or stop) based on this information.

According to the organization of the company the affirmations of the senior management for the ongoing activities are required. These affirmations can only be expected if the decision-makers trust in the success of the suggested activities. During the progression of the activity phases beside the "technical maturity" of the results (product and process quality) the maturity of the acceptance of the decision-makers is essential. Because this maturity level depends on the trust in and acceptance of the planned activities it is spoken of the "social maturity" or "social maturity level". A continuous and successful progression of the implementation process of knowledge management can only be expected, if the "technical maturity level" as well as the "social maturity level" is further developed with the same carefulness and intensity. A too low "social maturity level" may lead to substantial resistance and denial of the realization of a structural solution.

4   The Knowledge Management Project Portfolio at voestalpine

The project started in March 2000 with the following defined objectives:
- Creating a shared concept of knowledge and knowledge management within the whole organization
- Demonstration and communication of the benefits for every employee and the organization as a whole
- Development and implementation of an integrated and holistic knowledge management concept for **voest**alpine Stahl

The above described process model *K2BE® Roadmap* was put into practice as follows:
- *Check-In*

  After the placing of order by the top executive management the project team was arranged. This team worked out the project order in detail based on the K2BE®-Roadmap. At this first PoC the top executive management allowed the project application.
- *Start-Up*

  In this phase best practice examples (e.g. AVL Graz, Deutsche Bank, McKinsey) were collected and analyzed. With aid of a questionnaire and structured interviews of key personalities the actual state of knowledge management was surveyed as

well as what requests resp. expectations are put on knowledge management so far. The actual action domains (project database and standards, process description, lessons learned, knowledge nets, know-how retention, and IT architecture for KM; see: Figure 5: Knowledge Management Action Domains; [10]) were deduced out of these results.

- *Line-Up*

  For every action domain project applications were worked out in detail including appropriate pilot groups. The top executive management allowed this complete project portfolio at the third PoC.
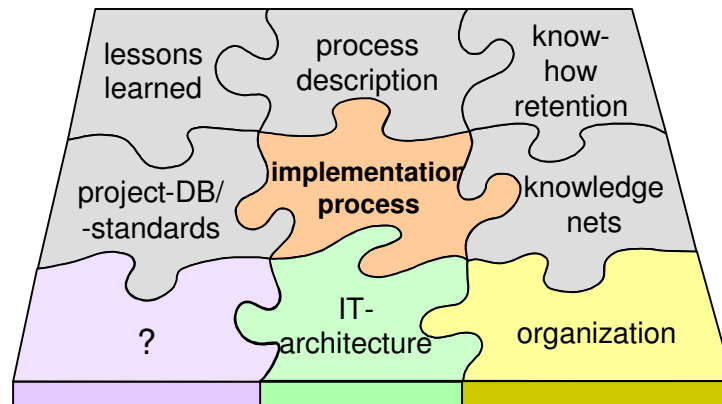

Figure 5: Knowledge Management Action Domains

- *Take-Off*

  At present some of the defined projects are finished, some of them are in the next phase of implementation. Summing up the following results are achieved till now:

  - The method Story Telling was proved for saving experiences out of a major project. The experiences were summarized and transferred to a similar major project.
  - One knowledge net is launched within the R&D departments, one for newly joined employees is in planning status. Two additional nets (personnel, controlling) are under discussion.
  - A tool for process description was evaluated and chosen by means of prototypes. Meanwhile about 30 process modelers are trained realizing the description of all relevant processes during the following three years.
  - The guideline for know-how retention is worked out including appropriate checklists and other needed material. Qualitative personnel planning is under way according to this guideline.
  - The project database created as intranet-based project management supporting tool is ready for use. Presently all project leaders are asked to fill in their relevant project data.

- The target IT-architecture for supporting the knowledge management action domains is made up. Its stepwise realization corresponding to the defined priorities is in the works.
- *Stop-Over*
The second evaluation phase is scheduled for February 2003. Since June 2002 the project organization has been adapted to a process organization in order to push the institutionalization of knowledge management.

5   Launch of "Research Community"

Concerning knowledge nets the results of the questionnaire and the structured interviews showed a request for a community of practice in the departments of the R&D.

In order to clarify the expectations the project team organized a workshop first inviting all interested R&D persons. The goal was selecting R&D spanning topics and forming the first interest groups. At the end of this event five groups were established including a selected moderator. At the next few meetings the voluntary members came together, clarified and set their targets, and defined their requirements for organization and infrastructure.

At this point the groups started to work separately on their topics but chose one delegate to the editorial team. This team defined the requirements for the needed community software and helped the IT personnel to customize it according to the needs of all groups. Meanwhile the R&D manager is the principal supporter of the "Research Community" with about 90 members at the moment.

6   Story Telling

Another request found in the questionnaire results was supporting the transfer of experiences not found in any documentation from one project to the next one. After investigating some methods useful for this task we decided to try Story Telling (ST). Luckily we also found the Story Telling GBR ready to help us using this method for our purpose.

At the beginning the assigned project team defined the objectives, selected the events (in our case the modification of one of our production plants undertaken about five years ago), assigned the commentators and interviewees. Subsequently ten former project team members were interviewed. Afterwards the project team collected their personal views and searched for "puzzle stones" found in the transcribed and anonymized interviews. The challenge was to select all momentous statements belonging to the hidden threads. After this complex and time consuming task the experience document was prepared containing six threads structured according to the project phases. The selected citations were fed back to the interviewees asking for their permission for publication. At the end the experience document was given to the members of a new project team constructing a similar production plant. During a

workshop the interviewees, the new project team and the ST project team came together in order to reflect and discuss the content of the experience document. The new project team found many improvements and decided to concentrate on three most important ones. At the moment the organization development department is working on an improved team development concept for major projects.

7 Summary

The practical application of the K2BE® roadmap proved that it leads to clearly defined terms and definitions of knowledge and knowledge management throughout the organization, cares for a balanced development of the social and technical maturity of the knowledge management process, and enables a resource saving implementation of professional knowledge management. All in all the K2BE® roadmap promotes goal and solution orientation, utilization of synergy potentials, safe investments, and the deliberate, continuous ("sane") constitution of professional knowledge management.

Holistic knowledge management seems to be a promising management concept helping companies to accomplish and extend their business excellence by managing the knowledge of their personal in a professional manner. It seems to keep its promise to support our continuous improvement process in order to be enduring *one step ahead* of our competitors.

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Appreviations

IT	information technology
K2BE®	knowledge management to business excellence
KM	knowledge management
PoC	point of clearance
R&D	research & development
ST	story telling