

A Practical Approach to Process-Oriented Knowledge Management

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Abstract: Due to global competition and increasingly dynamic markets, the importance of intangible resources such as knowledge has been growing dramatically, especially for small and medium-sized enterprises (SME). SMEs have to be more innovative, flexible, and efficient to successfully cope with typical challenges such as growing competition and rapidly changing demand patterns. In the past, knowledge management has been successfully implemented and developed by large enterprises in particular. In contrast, knowledge management for SME is not a matter of course yet. However, current survey results affirm that activities in the area of knowledge management depend less on the size of an enterprise or its industry, but rather on an enterprise's business strategy and core competencies. In the light of these results, SMEs seem not to have disadvantages regarding the implementation of knowledge management because of their size or industry, but rather because they need to take strategic decisions to implement such solutions and have difficulties in doing so. Against this background, the German Federal Ministry of Economics and Technology started the initiative "Fit für den Wissenswettbewerb" to support especially SMEs on the way to the knowledge society. In the course of the initiative, the research institutes Fraunhofer IPK and Fraunhofer IFF initiated the project "ProWis – Prozessorientiertes und integriertes Wissensmanagement in KMU". Within this project, researchers designed methods meeting the specific needs of SMEs allowing the implementation of process-oriented knowledge management at reasonable efforts. Building up on the developed methods, both institutes accompanied 15 SMEs during the implementation of knowledge management and used the findings from these implementations to refine the methods. The results of the project are summarised in the guideline "Praxisleitfaden Wissensmanagement", which is freely accessible to interested parties and enables SMEs to systematically and autonomously implement knowledge management. Based on the aforementioned results, this article illustrates the process-oriented implementation of knowledge management according to the ProWis approach and, by means of a case study, leads the reader through the single steps of the implementation process towards a business process-oriented knowledge management.

Keywords: Knowledge Management, Intellectual Capital, Process-orientation, Knowledge management activities, knowledge management methods

1. Introduction

In the past, knowledge management has been successfully implemented and developed by large enterprises in particular. In contrast, knowledge management for SME is not yet a relevant matter of fact although knowledge management can increase value creation in business processes and thus support competitiveness (Gronau, 2009). However, current surveys results affirm that activities in the area of knowledge management depend less on the size of an enterprise or its industry, but more on an enterprise's business strategy and core competencies (Pawlowsky *et al.*, 2011). In the light of these results, SMEs seem not to have disadvantages regarding the implementation of knowledge management because of their size or industry, but rather because they need to take strategic decisions to implement such solutions. (Alwert *et al.*, 2008). In this context, the German Federal Ministry of Economics and Technology started the initiative "Fit für den Wissenswettbewerb" to support especially SMEs on the way to the knowledge society. In the course of the initiative, the research institutes Fraunhofer IPK and Fraunhofer IFF initiated the project "ProWis – Prozessorientiertes und integriertes Wissensmanagement in KMU".

Within this project, researchers designed methods meeting the specific needs of SMEs allowing the implementation of process-oriented knowledge management at reasonable efforts. Building up on the developed methods, both institutes accompanied 15 SMEs during the implementation of knowledge management and used the findings from these implementations to refine the methods. The results of the project are summarized in the guideline "Praxisleitfaden Wissensmanagement", which is freely accessible to interested parties and enables SMEs to systematically and autonomously implement knowledge management (Orth *et al.*, 2011). In this paper, the authors will illustrate the steps that a SME passes through towards the implementation of process oriented knowledge management from the initialisation, through the analysis, objectives and solutions to the assessment of the adopted measures. In the course of this description tools from the ProWis toolbox supporting the implementation of the single steps as well as the ProWis toolbox itself are outlined. In the second chapter of this contribution the importance of intellectual capital, knowledge management and their relation are addressed introductory. The fundamentals of the ProWis approach are explained in chapter 3, whereas chapter 4 focuses on the description of the single steps for

implementing KM according to ProWis approach. In chapter 5 the application of the approach is illustrated by means of the anonymised “Engineering Ltd.” in a case study. Chapter 6 closes with a brief summary and some final remarks.

2. Intellectual Capital and Knowledge Management as Drivers of Business Success

The concept of intellectual capital (IC) has received and still receives a great deal of attention in research and practice. In both areas intellectual capital is subject on the organisational, regional and national level as well as on layers in between such as for organisational networks. In science the field of intellectual capital with regard to small and medium-sized enterprises (SME) as well as in larger companies and organisational networks has been adequately researched (Wuscher *et al.*, 2015).

The subject of research on this topic has evolved significantly over the past two decades according to Guthrie *et al.* (2012) whereas they differentiate three distinct stages. In a first stage of research on IC the focus was on raising awareness of why intellectual capital is important for competitive advantage. This stage has its origins in the 1980s and into the 1990s and helped to develop a framework of intellectual capital firmly grounded in the work of practitioners such as Edvinsson’s work at Skandia or Sveiby’s work at Swedish publisher Affärsvärlden Group (Edvinsson, 1997).

According to Guthrie *et al.* (2012) the second stage is characterised by the focus on approaches for measuring, managing and reporting IC as well as the investigation of the impact of IC on financial performance and value creation (Dumay and Garanina, 2013). Against this background, “by the mid-2000s more than 50 methods were created which either helped to define IC as a whole or define different elements of IC” (Dumay and Garanina, 2013: 11). As a result of these two stages it is nowadays widely acknowledged that IC plays a fundamental role in value creation and a common terminology of IC has been developed. However, with regard to the second stage Dumay and Garanina (2013) criticise that it is predominantly focused on measuring the impact of IC on financial performance and value creation rather than on methods for the development of IC in practice. On the basis of these observations, the third stage of research as outlined by Guthrie *et al.* (2012) is characterised by research that critically examines IC in practice and is dedicated to the managerial implications of how to use IC in managing a company.

Two methods that have been developed in the context of the latter stage are the management methods “Wissensbilanz – Made in Germany” and “Intellectual Capital Statement – Made In Europe” whereas the latter represents an extension of the method from Germany. The former method was especially developed for the implementation of IC management in German SME and has already been applied in more than 1000 organisations in Germany and beyond since its development (Mertins *et al.*, 2012).

A “Wissensbilanz” (intellectual capital statement or report) “[...] is an instrument to precisely assess and to develop the intellectual capital of an organisation. It shows how organisational goals are linked to the business processes, the intellectual capital and the business success of an organisation using indicators to visualise these elements” (Alwert *et al.*, 2004: 11). It is a tool for the systematic development of strategy and of the organisation that makes it possible to targetedly manage projects and initiatives internally so as to improve intellectual capital management. In addition, it can be used for external communication such as the acquisition of funding (Alwert *et al.*, 2013).

The method builds on the well-established categorisation of IC into human, structural and relational capital (Dumay and Garanina, 2013). The human capital comprises all characteristics and capabilities which employees contribute to an enterprise. The structural capital comprises all structures which are applied by the employees to conduct business and the relational capital consists of all relations to external groups and persons used for conducting business. To capture the IC of an organisation these three types of capital each comprise a set of single factors which are defined and assessed in a participatory, bottom-up approach within workshops (Alwert *et al.*, 2013)

The transferability of the single factors was analysed on the basis of the empirical data collected in more than 50 pilot implementations of the method. The analysis showed, that approx. 80-90% of individual IC elements could be harmonised on an aggregated level, while remaining 10-20% are individual respectively organisational (Mertins and Will, 2008). The result is a set of 15 factors which capture 80% of the enterprise-specific IC (European Commission, 2008).

On the basis of this standard set of factors added by some factors for material resources, the empirical survey “Wissensstandort Deutschland – Deutsche Unternehmen auf dem Weg in die wissensbasierte Gesellschaft” firstly underpinned the importance of IC for German enterprises in 2010 with 947 participants (Mertins *et al.*, 2010) and

again in 2014 with 139 participants (Orth *et al.*, 2014). In both surveys the participating enterprises were asked how important certain factors are with regard to their business success and how well these factors are developed in their enterprise at present on a scale from 0-10. Thus, it was possible to derive the importance of the specific factors for the surveyed enterprises.

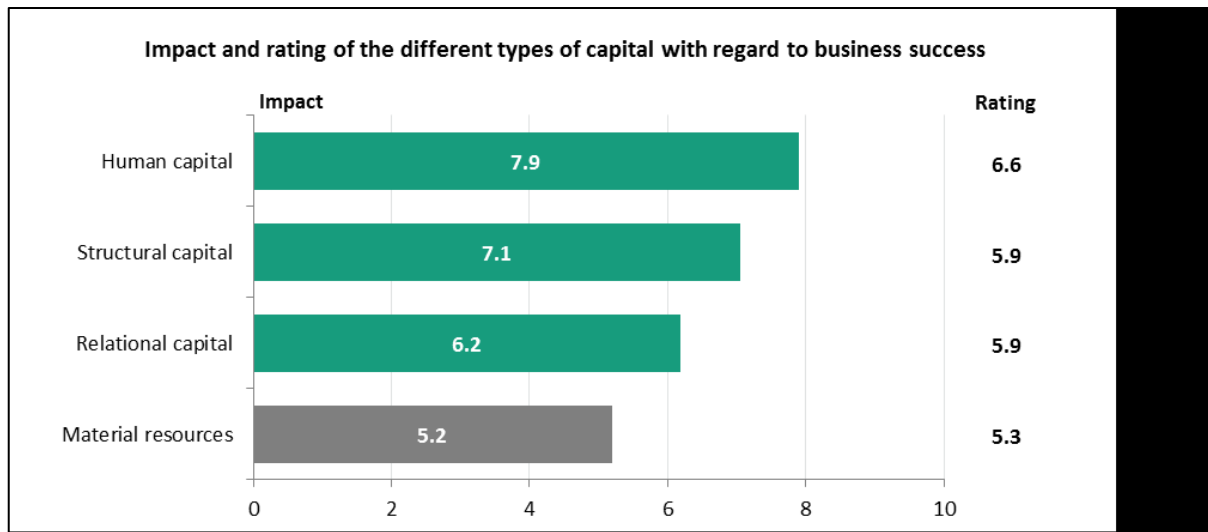


Figure 1: Impact and rating of the different types of capital with regard to business success

As illustrated in the figure above from the study in 2014 the aggregation of the single factors for each type of capital show that the different types of IC are of higher importance for business success than the material resources. In addition the IC is also rated better by the surveyed enterprises. The impact of the human capital on business success is by far the greatest (7.9) and has the best rating (6.6) as well. The factors of the structural capital (7.1) are seen as the second most important type of capital by the surveyed participants and were rated with 5.9 in the mean.

When analysing the difference between impact and rating it becomes obvious that the rating of the factors is in most cases lower than their impact on business success. The biggest difference is to be found in the human capital (-1.3) followed by the structural capital (-1.2) and the Relational Capital (-0.3). The factors of the material resources only show slight differences. In conclusion the highest demand for action of knowledge-based corporate management constitutes itself in the human capital. Material resources on the other hand already seem to be well managed today and might even consume more effort than they require.

These results are in line with the insights gained in the frame of the previous study and thus indicate the prevailing importance of IC for corporate success from an entrepreneurs' perspective (Mertins *et al.*, 2010; Orth *et al.*, 2014). In addition, both studies show that there is still potential for improvement with regard to IC in German organisations.

The positive direct and indirect relationship between IC and business goals or performance have also been investigated within further studies across Europe and beyond (e.g. Bramhandkar *et al.*, 2007; Chu *et al.*, 2010; Kianto *et al.*, 2013; Hormiga *et al.*, 2013; Jardon, 2014; Costa *et al.*, 2014). Bramhandkar *et al.* (2007) follow an industry-specific approach and use data of companies from the pharmaceutical industry in North America to analyse the relation between IC development and returns. The gained result suggests that a strong relationship may exist between successful development of IC and organisational performance. Chu *et al.* (2010) conducted a survey among companies located in Hong Kong and found that the structural capital had a positive impact on profitability. Hormiga *et al.* (2013) analysed the relation of IC in new ventures and their sustainability and found that having IC measurement in place supports business development. Kianto *et al.* (2013) were for example able to prove that the management of IC has a significant impact on company performance in terms of competitiveness, as well as financial revenues in a survey among companies from Finland, Russia and China. In contrast to the studies mentioned before, Jardon (2014) analysed the processes companies use to turn IC into competitive advantage and found that IC has a direct effect on innovativeness which finally leads to improved business performance. Costa *et al.* (2014) focused on the relation between IC and product innovation in Portuguese SMEs and gain the insight that IC actually influences innovation performance, whereas only three elements from the different types of capital show a relevant effect.

Taking the research results above it can be concluded that IC plays a fundamental role as it has direct and indirect effects on organisations' performance. Thus IC should be understood as a fundamental source or asset of an organisation's success.

This implies that IC is rather static and requires certain processes and management activities to make it useable for value creation. Kianto *et al.* (2014) understand these knowledge-related processes and management activities as KM practices and conclude "while the intangible resources controlled by an organisation are a key factor determining its value creation potential, the other necessary factor in the equation is the means by which these are controlled and managed" (Kianto *et al.*, 2014: 365). Thus, only the combination of the rather static IC and the dynamic KM enables value creation in organisations.

The general importance of KM is also reflected in the great revision the new ISO standard 9001:2015 which will for the first time contain the clear requirement of comprehending knowledge as a central resource which must be managed systematically. KM has always belonged to quality management and plays a prominent role in this context. This approach is taken up by the new standard which introduces a process to capture an organisation's knowledge according to the PDCA-cycle:

- Plan: The organisation has to capture the knowledge that is required for carrying out processes and to achieve conformity of products and services
- Do: This knowledge has to be maintained and imparted to a sufficient scale
- Check: In order to take into account changing requirements and trends the organisation has to analyse its present knowledge and
- Act: must determine how the required additional knowledge is obtained or how it is accessed.

According to the ISO/DIS 9001:2014 the acquired knowledge of an organisation and the collected experience must be secured (security function of the management system). KM related aspects are particularly made a subject of discussion in the seventh section of the new ISO 9001 under the headlines resources, competencies, communication and documented information. Specifically the sub-section knowledge of the organisation takes into account that relevant knowledge must be maintained and be made available to the employees sufficiently. In addition, organisations should have specific provisions on how the required knowledge can be obtained. For obtaining knowledge internal as well as external sources shall be used.

Another objective of the updated standard is a more stringent orientation towards an effective process management. Thus, processes related to product realisation and customer satisfaction will be more strongly emphasised and therefore the process-oriented approach will be accentuated more clearly. The process-orientation provides a solid foundation for interlinking quality and KM. On the one hand knowledge about the own processes need to be captured and secured. Dealing with business processes increases the transparency and comprehension of general inter-connections and relationships within an organisation. On the other hand knowledge is used within business processes and is thus fundamental for the production of products and services as well as the creation of value added.

After the publication of the revised standard in September 2015 all certified organisations will be required to adapt to the changes within a three year transition period, which will inevitably lead to companies tackling KM to a greater extent again (Orth and Karcher, 2015).

According to current literature in the field of KM strategic KM and operative KM can be distinguished. Taking the before illustrated connection of IC and KM as given it is of particular interest how these two different types of KM affect organisations' IC and its performance. On the one hand the IC needs to be managed on a strategic level whereas long-term measures are derived to improve or optimise the IC regarding a company's objectives and on the other hand the handling of knowledge needs to be taken into account to improve the company's ability to apply knowledge within its operative business more efficiently. For the latter, business process-oriented KM constitutes an appropriate means, which might be implemented according to the ProWis approach.

3. Fundamentals

The Fraunhofer IPK reference model provides the conceptual basis for the analysis, design and implementation of knowledge management according to the ProWis approach (Mertins and Seidel, 2009). The reference model

illustrates the way how knowledge circulates within an organisation and forms the basis for optimising and systematising the handling of knowledge.

The value adding business processes (e.g. research and development or production process) and the central knowledge domains (e.g. knowledge about customers or markets) are the focus of the model. This knowledge is created, stored, distributed and applied in business processes to secure the provision of needed knowledge and thus enable the supply of the required performance (Figure 2).

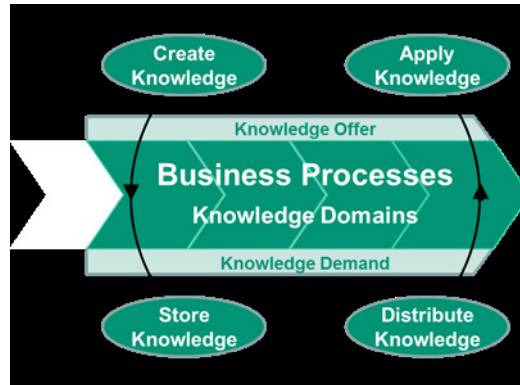


Figure 2: KM reference model of Fraunhofer IPK

The alignment of the KM activities with the business processes ensures that the internal operative procedures are considered. This guarantees the integration of KM into everyday activities.

4. Implementation of KM According to the ProWis Approach

The ProWis approach supports enterprises in creating transparency in the handling of knowledge and proposes, to that end, the most important steps towards the implementation of a process-oriented knowledge management (Figure 3).

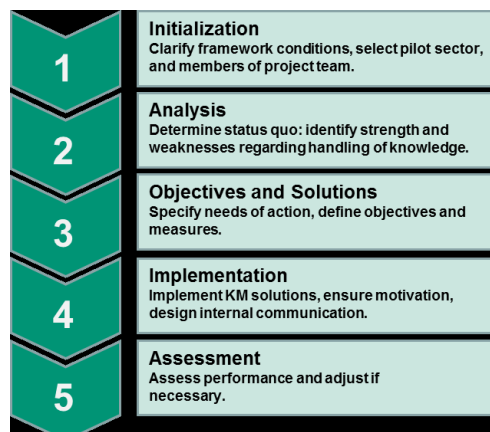


Figure 3: ProWis approach for the implementation process

For the implementation of the five steps illustrated above numerous support materials are provided in the online portal www.prowis.net. These comprise practically tested tools for self-assessment, a comprehensive collection of knowledge management solutions with case studies as well as checklists and templates. In the following sections of this article the five steps will be outlined.

The implementation of knowledge management should be planned as a project. At the beginning, of the project basic decisions regarding the objectives of the project have to be taken. These include, among other things, the selection of a suitable pilot sector within the organisation.

For the team members who are able to make basic decision regarding the application area (divisions), objectives and direction are needed. Optimally, the project team is composed of professional experts and people who have a significant influence within the organisation. In addition, it is helpful to involve a management representative in the project to keep direct contact with the management and induce change.

Experience has shown that setting a clear focus on where to introduce KM has a positive impact on its successful implementation. Therefore, it makes sense to select one or more divisions or business processes as a pilot sector for the implementation of KM within the organisation. The determination of such a pilot sector is also important for the selection and composition of the project team during the analysis phase.

During the initialisation phase it is of particular importance to introduce and communicate the KM implementation project to the employees. Therefore, in a third step the communication of the project and its benefits for the employees should be planned and carried out systematically. This ensures the sensitisation of the employees for the topic and increases the probability of the project's success.

The process-orientation already delivers value at this stage, as the reflection of business processes promotes the creation of transparency and a deeper understanding of connections and relations in an enterprise in a wider context. The alignment of the knowledge management activities with the business processes ensures that the internal operative procedures are considered. This guarantees the integration of knowledge management into everyday activities.

In the course of the project, different approaches for the description of knowledge in business processes were tested. As a result, a simplified procedure using knowledge-oriented process descriptions has proven to be particularly efficient and constructive. In a "knowledge-oriented process description" the most important steps, involved persons as well as inputs and results of a process are described. Furthermore, it is also documented which specific knowledge is relevant for the related process and which instruments and tools are currently used to carry out the process. This simplified process description supports the following steps of the analysis.

4.1 Analysis

During the analysis, strengths and weaknesses regarding the handling of knowledge are identified and some first ideas for improvement are collected. In order to support the analysis, ProWis provides two complementary procedures: a multi-functional questionnaire and an interview guideline that allows assessing the knowledge management core activities in a workshop.

KM-Fitness-Check and KM-Audit (Questionnaire)

The KM-Fitness-Check is used to identify strength and weaknesses regarding the handling of knowledge and is carried out through a self-assessment questionnaire. The result of the KM-Fitness-Check is an overview about the status quo of the handling of knowledge with regard to the specific knowledge management core activities (create, store, distribute, and apply) as well as the enterprise's internal framework conditions. Important knowledge domains are identified and assessed according to their availability. The KM-Fitness-Check questionnaire allows a quick evaluation and gives an overview on the handling of knowledge in an enterprise. The questionnaire may be used by a single individual for assessment as well as for a basis for an employee survey.

The KM-Audit is a more comprehensive questionnaire which was the basis for the development of the KM-Fitness-Check. It has been continuously developed and can be adapted to the specific needs of an enterprise (Finke, 2009). The KM-Audit is usually carried out as an online survey and therefore enables the involvement of a higher number of employees and the analysis as well as comparison of different divisions. Furthermore, it can be used to capture potential solutions and transferable best practices directly.

BPO-KM-Analysis

In the frame of the ProWis project the established procedure by Heisig (2005) was used and further developed as well as simplified in some places. Primarily carried out in workshops the method of business process-oriented knowledge management (BPO-KM) is a method to analyse and design knowledge management practice (Heisig, 2005). The aim of the method is to assess the handling of knowledge in the context of a specific business process, to identify strengths and weaknesses as well as potential for improvement, and to develop solutions together with the participating employees. The knowledge domains (e.g. knowledge about customers, products or markets) build the basis for the assessment. Supported by simple electronic templates and in a standardised procedure it is possible to assess selected knowledge domains with respect to the four knowledge management core activities (Mertins and Orth, 2009).

The implementation of the BPO-KM-Analysis includes three main steps. On the basis of the business processes selected within the initialisation phase the knowledge domains which should be analysed must be determined and the most important factors for these should be documented in a first step. For this purpose ProWis provides a simplified

process description template that includes a section for knowledge-related aspects such as the most important knowledge domains of the process and knowledge carriers. In the following the workshop participants should be invited to the workshop and a moderator should be appointed.

In the second step, the KM core activities (create, store, distribute and apply) are assessed for each of the previously selected knowledge domains by the workshop participants. For this purpose, the team at first supplements the description of processes and knowledge domains for the respective process and thus captures the status quo of the respective business process from their perspective. Furthermore, the personnel and material knowledge carriers that hold the respective knowledge are recorded. Subsequently, the selected knowledge domains are analysed with regard to the KM core activities. To this end, supporting instruments that are used for each KM core activity are documented and core activities are assessed with regard to the need for action by the team using the logic of a traffic light. Each team member receives one moderation card in green, yellow and red whereas they represent no need for action, medium need for action and high need for action, respectively. For the assessment all team members hold up the card that is most appropriate from their point of view and discuss the assessment whereas strengths and weaknesses as well as ideas for improvement are documented by the moderator. The documentation is of particular importance for the understanding of the assessment in the following steps. According to this scheme all selected knowledge domains and KM core activities are assessed.

The last step of the procedure is focused on the preparation of the workshop results for the following steps of the implementation of KM according to the ProWis approach and is carried out by the moderator. The results give an overview on the fields of action with regard to the KM core activities and knowledge domains of the respective business process.

4.2 Objectives and Solutions

During this phase, the objectives for the enterprise-specific knowledge management program are elaborated in detail: "Which solutions should be used to achieve which objectives until when?" For this purpose, measures are defined and solutions are elaborated and assessed with regard to their feasibility. It is also of importance to provide the project team with the needed resources and competences. For this phase, ProWis offers different tools as well:

ProWis Toolbox

The identified potentials of improvement can be developed through suitable design components of knowledge management. As a portal-based internet platform, the ProWis Toolbox includes about 50 selected methods for implementing knowledge management. This creates the possibility of getting information about benefits, opportunities, risks and procedures regarding the implementation of each single solution. All of this is available to the end-user (Voigt, 2009).

In order to derive solutions from the results of the KM-Audit or the BPO-KM-Analysis, the central components of both instruments were picked up within the ProWis toolbox. The methods provided within the ProWis toolbox are structured according to different and combinable criteria. The navigation, for example, can be done on the basis of the core activities or the design areas of knowledge management (Figure 3). In addition, further access routes have been developed and include, for example, specific questions regarding the corporate practice: "Which methods can be used to retain the knowledge of leaving employees? How can knowledge be transferred between projects and departments? How can we optimise our data storage?" Furthermore, solutions can be selected with regard to the three dimensions of intellectual capital (human capital, structural capital and relational capital) (Alwert *et al.*, 2008). Through this feature, enterprises which prepared an intellectual capital statement may use the ProWis portal in an objective-oriented manner in order to plan adjustment measures.

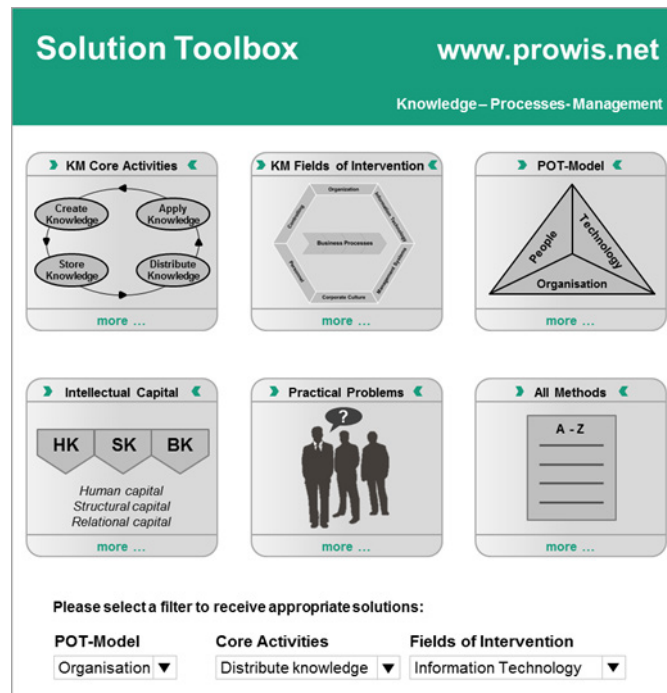


Figure 4: Filter options within the ProWis toolbox

Prioritisation-Matrix and Roadmap

The number of possible solutions is often large. To make best use of the scarce resources of an enterprise, ProWis provides two further methods.

Among the pilot users, it has been proven effective to use a two-dimensional matrix. The matrix differentiates between the dimensions “need for action (urgency)” and “feasibility” – each of them assuming the characteristic values low, medium and high. The matrix can help identifying which measures are urgent and how easy or difficult they are to implement (Figure 5).

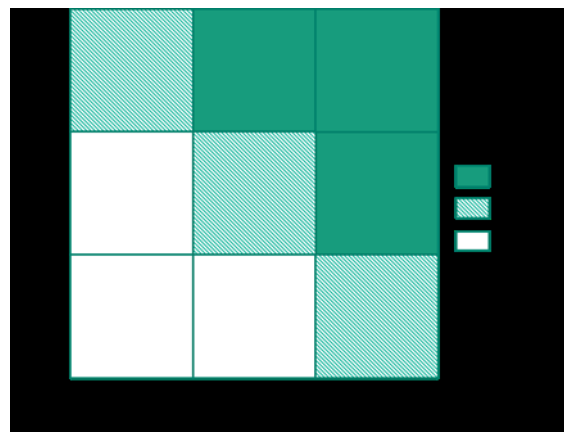


Figure 5: Prioritisation-Matrix

Within the next step, the implementation plans have to be specified for the identified fields of action and related solutions. For this task, the “solution roadmap” can be used. It makes clear the schedule for changes and illustrates which stages have to be achieved until when on a timeline.

4.3 Implementation

During this phase, the enterprise implements the selected solutions. This step is usually the longest and is crucial to the success of the whole project. However, its duration as well as the amounts of goals achieved should be kept under

control as low project progress can lead to the loss of interest which can only hardly be reversed. Implementing some “initial actions” which lead to quick wins is therefore recommendable.

From another perspective, the implementation of knowledge management is also to be seen as a change of processes within the enterprise: habitual/ordinary work and related routines might have to be changed as well as new methods and tools might have to be tested. This also means that employees have to be involved and actively participate in a learning process as transparency about objectives and procedures for the implementation of measures is essential during this phase. However, experience shows that enterprises communicate such contents often irregularly and too rarely. Therefore, especially the managers (participating) play an important role within such a project.

Motivation Assistant

Against this background, ProWis provides another tool to handle this challenge, the “Motivation Assistant” (Kohl, 2009). This tool helps to sensitise and qualify especially managers for the communication of the necessary steps and for the motivation of the employees during the change process. The development of a communication plan, the systematic preparation of arguments concerning the project’s benefits as well as the reflection on management behaviour have proved to be effective in practice.

4.4 Assessment

In the course of the assessment, the project results are assessed with regard to overall success. Building up on the assessment results, new measures can be derived or running measures can be adapted. Several methods can be applied for the assessment:

KM Project Evaluation (Debriefing)

In a debriefing, the focus is put on the people who were directly involved in the project. With this procedure, the success of the project is assessed ex post in order to learn from the past for future tasks. Emphasis should be placed on the following questions: “What has worked well? In which areas did we have difficulties? What can we do better in future?” (Voigt *et al.*, 2009).

Repeat the Analysis

The performance of the enterprise with regard to knowledge management has already been measured through the usage of the KM Audit or the BPO-KM Analysis. Thus, an appropriate basis has been built for the development of a control instrument. It could therefore be useful to use again the instruments already applied in order to examine changes. Using such instruments continuously supports the establishment of knowledge management in an enterprise.

5. Case Study – Application of the ProWis Approach

The case used in this paper follows the implementation of KM according to the ProWis approach described in the previous chapter. It is illustrated by means of the anonymised “Engineering Ltd.” case study, which is based on the practical experience gained through the accompaniment of 15 pilot companies.

5.1 Initialisation

The management of the Engineering Ltd. is convinced of the importance of KM for their approximately 200 employees and starts a relevant project accordingly. From the point of view of the managing director the knowledge transfer between the divisions R&D and Services shows the greatest need for action. The management’s assistant is appointed as the project manager. As a neutral person, she is most likely able to mediate between both departments and can additionally give direct and unbiased feedback to the management on the project’s progress. The directors of both departments, each of them comprising around 20 employees, also belong to the project team. The processes to be analysed are on the one hand the R&D process for individual customer orders, and on the other hand the commissioning process at the customer’s site.

In a first step, the management informs all employees about the planned initiative and points out the central objective increased productivity through an optimised knowledge transfer between both departments”. The managing director encourages the employees to participate in the project and limits the scope of the measures to be implemented to an acceptable number of one to three. The directors of both departments inform their employees during meetings in

which the appointed project manager presents the concrete procedure of the project and distributes related information material.

5.2 Analysis

KM-Fitness-Check and KM-Audit

Due to the fact that within the pilot sector only 20 employees shall be questioned, the project manager of the Engineering Ltd. decides to use the KM-Fitness-Check for a survey. The printed Excel-questionnaires are handed out to the employees and collected anonymously in the mailbox of the project manager. Their evaluation is made using excel. As a result of the survey, the knowledge about products and customers is identified as being the most critical for success. Both knowledge domains are not sufficiently available to the employees. As part of their workflows, every employee has individually optimised the needed content and knowledge, but the view beyond the horizon is missing. Hence, the main challenge is the interdepartmental distribution of knowledge.

BPO-KM-Analysis

Within a training, the project manager was trained to apply the BPO-KM methodology. Using the ProWis guideline and the online available templates, she conducts and moderates four workshop-sessions. For each process, one workshop is conducted regarding the knowledge about products and customers, where the following challenges are identified:

- Gained knowledge about products and customers in the service department does not flow back into the R&D department. Necessary methods and tools are missing and, additionally, knowledge transfer only occurs randomly and delayed.
- Within the R&D department there is no procedure for the documentation of experience from already concluded projects available.
- The service employees only meet infrequently, as their presence is requested mostly at the customers' sites. Each employee records and reports customer visits differently, resulting in individualised styles and different templates. Hence, different information is documented in different depth and in addition, it is not sufficiently distributed.
- Both departments' employees use different terms to describe identical objects, often causing misunderstandings.

5.3 Objectives and Solutions

In the ProWis Toolbox, the project manager of Engineering Ltd. looks up suitable methods to better distribute knowledge, since the main problems have been identified in this area. The findings of her research which she will present to the employees are the following:

- Debriefing to capture and secure projects experiences after project conclusion.
- Wikis to support the documentation and distribution of information.
- Checklists – e.g. for the preparation and follow up of customer visits.
- Micro Articles – e.g. for the documentation of customer visits
- Knowledge Dictionary for the unification of special terms

The management of Engineering Ltd. limited the implementation to one to three measures in advance. The project manager now has the task to assess possible solutions jointly with the involved employees. The illustration below shows the result of this process. The debriefing in the R&D department as well as the implementation of a wiki to support the communication of both departments (internal and inter-departmental) are the priorities. Since the debriefing shows the highest need for action and feasibility it is decided to implement the debriefing before initiating further measures. The selection of the measures is coordinated with the management and then presented to the employees in dedicated department meetings.

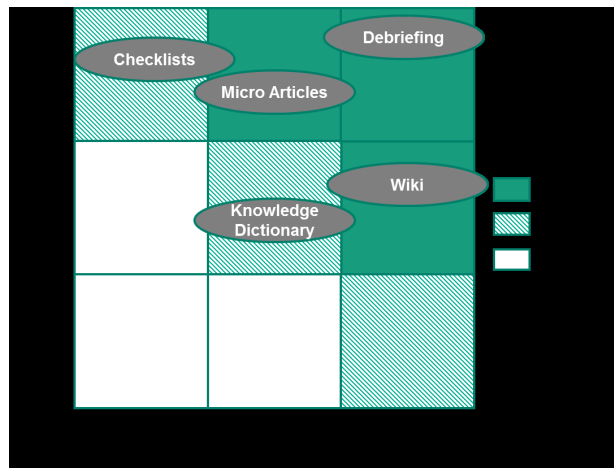


Figure 6: Prioritisation-Matrix of Engineering Ltd.

5.4 Implementation

Before the implementation of the debriefing method the project manager develops an enterprise-specific concept for the execution of workshops on the basis of the content from the ProWis Toolbox. The toolbox provides information for conducting a standardised workshop for retaining experience which was developed by Fraunhofer IFF in another research project funded by the German Federal Ministry of Education and Research on the basis of the well-established methods “lessons learned” and “debriefing” (Schnauffer *et al.*, 2004).

Afterwards, the project manager conducts two pilot workshops with selected employees from the R&D department to test the applicability of the method. To this end the project manager selects one relatively new employee with limited project experience and another one with many years’ experience. According to the enterprise-specific concept the implementation of the method is realised in six steps, namely workshop entry, project review, collection and assessment of project experience, elaboration of recommendations for action, derivation of measures and workshop conclusion.

For the entry into the workshop the project manager planned appropriate time for the establishment of a pleasant atmosphere and to communicate the objectives of the workshop. In this context, she presented the items of the agenda and illustrated important rules for carrying out the workshop.

During the project review the most important events as well as external and internal disruptive factors in the projects are reviewed *ex post* to bring back the memories of the employees and prepare them for the collection of experiences. In this context, a project timeline in combination with a so called mood curve proved to be effective as it supported the employees in reflecting their projects in detail.

The collection and assessment of the project experience starts with the collection of positive and negative experiences made within projects. For this purpose, guiding questions such as “What went well and what went wrong?”, “What experience could be useful for other projects”, “What would I do differently next time?” or “What could have been done to improve the project?” are used. As a result of this phase it appeared that the relatively new employee especially had negative experience during the starting-phase of projects which continuously improved over time. The other employee with many years of experience mainly made good experience throughout the entire project in contrast.

Therefore, the negative experiences of the relatively new employee were analysed in detail and measures to encounter these were elaborated. The analysis showed that the employee had only carried out projects with long-term customers, who already conducted projects with the enterprise before and were thus used to certain communication and project procedures the new employee was not familiar with. For this reason, the unification of account management, the introduction of a standardised project management and knowledge transfer between experienced employees were elaborated as potential recommendations for action.

In the course of the derivation of actions the potential recommendations for action were assessed and selected with regard to feasibility. The result was the introduction of a process for account management and the establishment of a personnel knowledge transfer between long-term employees who already carried out projects with certain customers and new employees who will carry out projects with these customers for the first time.

During the conclusion of the workshop the results achieved throughout the workshop were discussed to gain detailed insights for the successful implementation of the two derived measures and receive feedback on the applicability of the developed method for further development. Both employees clearly communicated that they deem the method as appropriate and favour its continuation. The results were documented and prepared for internal marketing for the project manager in order to be able to show to the employees the value of the additional effort.

5.5 Assessment

Roughly one year after the initiation of the project, the regular employee survey is measuring, among other things, the success of the KM project. To this end, the questions of the KM Fitness Check were integrated into the employee survey in order to be able to identify changes. Amongst a higher availability of needed knowledge about customers and projects, a higher satisfaction regarding the intra-departmental distribution of knowledge within the R&D department can be detected.

6. Conclusion and Outlook

In particular, SMEs are facing the challenge of implementing KM with scarce resources parallel to working on their daily business. In order to overcome this challenge, ProWis provides them with a practically tested and dedicated contribution. By means of the guideline and the online available tools, SMEs can implement step by step a company-specific KM. The recommendation from the pilot applications is the following: focus on simple and manageable measures to ensure success and prevent frustration over unattainable objectives. It is just as important to appoint a person responsible as well as a budget for the KM project and for the actual support by the management. The communication of the change processes in the enterprise, in real practice often neglected, is highlighted in the ProWis guideline. This paper briefly summarises and explains how SMEs can successfully have access and implement a process oriented KM. In fact, through the ProWis approach and its standardised guidelines, it is possible to quickly analyse and discover a firm's business process' strengths and weaknesses and to find potential for improvement with regard to its KM. Moreover, the ProWis toolbox offers a list of possible solutions and measures, aiming at helping a manager's decision making process. Hence, thanks to the ProWis approach and its guideline, it is made possible for SMEs to gain the right skills to manage the creation, storage, distribution and application of knowledge in an enterprise effectively. Up to now, only big corporations seemed to have enough resources and capacity in order to be successful in this field. With this article the authors would like to encourage further firms to make use of the ProWis approach to improve their efficiency and competitiveness through the systematic implementation of KM. Finally, a standardised method as the one illustrated in this paper is particularly interesting for SMEs, as it only involves limited personnel and further capacity constraints and hence lowers the barriers for the implementation of KM in SMEs

As mentioned before within the ProWis project 15 SME applied the developed methods and were scientifically supported. In the course of the project the following general problem areas could be identified within the 15 pilot companies:

- Inconsistent file repository – absence of generally valid directory structure as well as rules for file and directory names
- Insufficient knowledge and information transfer between departments
- Lack of transparency regarding competencies and responsibilities
- Absence of systematic capturing and documentation of project experience
- Unstructured formal communication (e.g. meetings, e-mail exchange etc.)
- Insufficient central storage of codified knowledge and information
- Expendable usage of available information systems
- Potential for improvement regarding process descriptions

Along with the identification of general problems within the pilot companies the following success factors for the implementation of knowledge management could be identified:

- Small steps and quick wins

- Accompanying communication towards the employees
- Participation of employees
- Project managers with defined responsibilities and budget
- Support by the management
- Clear, simple and systematic procedures
- External assistance – help for self-help

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