

Knowledge Management in Cross-Organizational Networks as Illustrated by One of the Largest European ICT Associations A Case Study of the “METORA” Project of the Federal Ministry of Economics and Technology (BMW*i*)

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Abstract—In networks, mainly small and medium-sized businesses benefit from the knowledge, experiences and solutions offered by experts from industry and science or from the exchange with practitioners. Associations which focus, among other things, on networking, information and knowledge transfer and which are interested in supporting such cooperations are especially well suited to provide such networks and the appropriate web platforms. Using METORA as an example – a project developed and run by the Federal Association for Information Economy, Telecommunications and New Media e.V. (BITKOM) for the Federal Ministry of Economics and Technology (BMW*i*) – This paper will discuss how associations and other network organizations can achieve this task and what conditions they have to consider.

Keywords—Associations, collaboration, communities, cross-departmental organizations, semantic web, web 2.0.

I. BACKGROUND

A. Knowledge Management in Networks

In an extremely specialized and globalized economy with increasingly shorter innovation cycles and a demand for more and more complex solutions small and medium-sized businesses are increasingly forced to network with business and cooperation partners to compete successfully. Large businesses depend on cooperations with small, flexible companies to be able to adapt faster to changing trends of the market. The businesses' tendency to focus on their core competencies and an increasingly high turnover of employees as know-how experts accelerates the need to cooperate with external key personnel in general [1,12].

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In this context, a number of new inter-organizational forms of cooperation have evolved. One example are cross-organizational networks which organize an efficient transfer of resources and knowledge to assimilate new developments more rapidly and effectively [4]. The businesses involved benefit from the knowledge, experiences and solutions offered by experts and practitioners in the network. Hence, cooperations in networks help promptly develop, introduce and market innovative products and services or assist in establishing value creation processes across businesses [3].

Networks have flat, flexible, open and cooperative structures which fundamentally differ from the conventional supply chain structures seen in vertical or hierarchical business relationships [5].

The increasingly high standards of complex, time-and-place flexible coordination tasks, in particular between geographically distant partners, cannot be efficiently managed without web-based platforms. In addition to the organizational measures based on the particular socio-economic and cultural conditions the ICT therefore plays an important, even constituent role in the establishment of these networks and the knowledge intensive processes involved.

B. Association Networks

Associations are genuine forms of inter-organizational networks, which focus, among other things, on networking as well as on information and knowledge transfer. Furthermore, they are interested in promoting co-operations between members and their exchange with experts from science and practice.

Taking a closer look at the key tasks of associations, you will find that the fields of information and consulting are gradually gaining in importance: according to a study by the Forum Marktforschung (Forum for Market Research) from 2006 [see <http://forum-mainz.de> (German only)] 36% of all respondents consider “Information” (23%) and “Consulting” (13%) important association services.

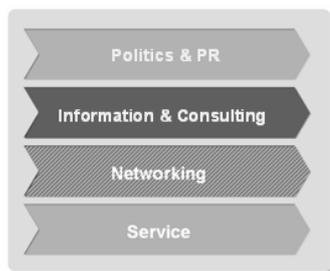


Fig. 1 Key tasks and processes of associations

The association's network is primarily composed of topic-based and, to some extent, decentralized bodies/working groups, in which representatives of different businesses cooperate.

Even today, associations almost exclusively use face-to-face communication, i.e. events for networking. In recent years, two trends in particular have been responsible for a need to adapt: decision makers are faced with an overabundance of events which they cannot attend due to scheduling difficulties and lack of time. Furthermore, association networks compete with web 2.0 or community platforms such as Xing, Linked-In, The Greater IBM, etc. where business representatives and independent experts can meet and organize – often for free.

Members of associations continue to expect cash value services for their member fees and an effectively operating office, as membership must be considered profitable by controlling. Document-based business processes used in public relations, for the creation of info material or simply for member information play a major part in this.

Also, associations compete with one another for members [7].

In its 2010 strategic policy paper BITKOM states: 'Promoting the ability of small and medium-sized enterprises to cooperate with research centers and larger companies is essential for ensuring the competitiveness of the ICT SMBs' [8].

According to this paper connecting members with external experts from science and user groups as well as association bodies with each other (multidisciplinarity) is considered one of the most important services provided by the association.

Using one of the largest German ICT associations as an example, this case study shows how network associations can present, use and develop their huge knowledge potential as represented by members, cooperation partners and their own staff as well as by the assets and production of information material and data.

II. DEMAND ANALYSIS & APPLICATION SCENARIO FOR A KNOWLEDGE MANAGEMENT PLATFORM USED BY THE BITKOM ASSOCIATION NETWORK

A. Demand Analysis

BITKOM represents more than 1,100 companies, with 850 direct members, including practically all German global players as well as 600 key medium-sized companies, thus representing 90 percent of the German ICT market.

With more than 100 working groups, forums and other association bodies including several thousands of experts provides a professional fundament for the network regarding both people and content.

The introduction of a platform reforming knowledge management within the association network has already been referred to as "BITKOM direkt" (working title) in the 2010 policy paper mentioned above.

Essential requirements from the strategic point of view of the association management are:

- Allowing for a higher level of self-organization and direct involvement of members, adding virtual infrastructures to the physical networking, improving the efficiency of the association bodies and network groups (also with respect to ecological and economical aspects) and making their work less dependent on physical meetings
- Developing a web platform which provides all association bodies with an online presence and a virtual infrastructure for personalized information and the participation of network members as well as for the enhancement of topic-based work in the web
- Providing a higher level of transparency of the issues addressed as well as of the communities, working groups, experts, businesses, information assets, events and their interconnections for network members and the public
- Improving the flexibility of the association bodies' work across organizational boundaries to be able to adjust more quickly to the increasing issue convergence in the ICT sector
- Improving the communication and cooperation with external groups and experts from i.e. science and practice (opening up to external contributors) while providing new premium services for members at the same time
- Providing efficient support for key processes concerning the association bodies and the office as well as for the management of experts, documents and events

Before the project was implemented, an independent institute was asked to conduct a study [9] analyzing the requirements of association members for such a platform.

The results confirm the approach mentioned above and, apart from a preference for general communication and cooperation services, point out more precise applications, such as:

- document management,
- expert & competence management
- scheduling or event management,
- topic management,
- development of a semantic knowledge pool,
- cross-organizational cooperation including external persons and groups as well as
- enabling closed user groups.

These requirements can be synthesized into two areas of application:

- i. Supporting knowledge intensive and primarily document-based processes in **closed user groups** (association bodies such as working groups or departments) by using collaboration tools for scheduling, document and project management as well as communication (i.e. threads, blogs, web conferencing) including contact data of all group members
- ii. Supporting cross-departmental cooperation in **communities** by using a knowledge pool, in which topics, working groups and experts are managed in a structured way

B. Application Scenarios

As the network's key activities take place in association bodies such as working groups, project groups, forums, etc. the pilot application scenario for the initial development and introduction phase illustrates the main processes that support the work in these bodies.

Furthermore, this scenario can be transferred to other network organizations, as they include similar processes for working and project groups.

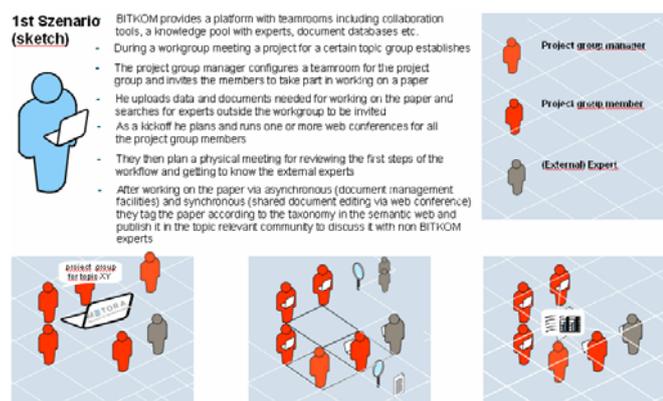


Fig. 2 Illustration of pilot application scenario

Although the scenario has remained highly significant even in later phases of development, more scenarios were added, such as "implementation of webinars and web presentations", "preparation and evaluation of online surveys for data acquisition", "topic discussions in semantic blogs" and more. At this point I would also like to mention the scenario for the **communities** previously discussed:

The open areas form the bidirectional link between the association bodies which mainly act as closed user groups and external groups, media or individuals. They expand classical networking structures by enabling existing groups to further develop by including external persons and to promote the appearance of new cooperations. It is important that the bodies, experts and topics within the network are presented in such a way that they can be easily researched.

In a next step, cooperating partnerships can turn into new closed user groups, in which, as described above, representatives of cooperating organizations who would like to work together in a productive and mostly document-based

way can organize themselves or with the help of a project team leader.

The following chart is an example of the interconnections between closed bodies such as working or project groups with topic-related, public communities.

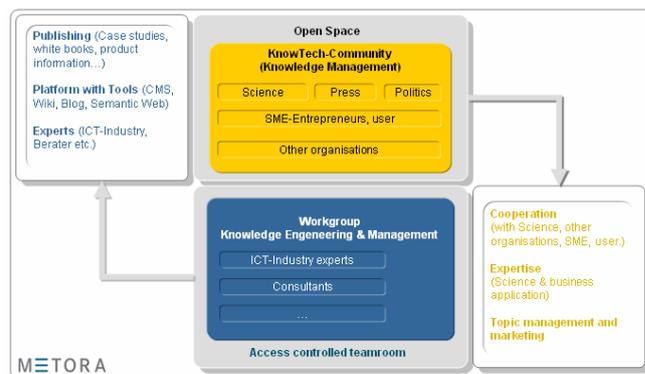


Fig. 3 Exchange between a closed working group and a connected open community

III. IMPLEMENTATION OF THE METORA PLATFORM FOR THE KNOWLEDGE MANAGEMENT AT BITKOM

A. Process of Project Development and Implementation

The development of the platform is an integral part of METORA (derived from the Latin "meta orare": "talking or speaking on a meta level"), a project funded by the Federal Ministry of Economics and Technology (Bundesministerium für Wirtschaft und Industrie – BMWi) from May 2005 through May 2008.

Based on the requirements analysis and subsequent conception phase a pilot for the platform was developed. The pilot's key requirements were then made available to a representative group of 150 pilot users and tested by them. After the evaluation of the pilot phase was finished by the end of 2006, the first production system was developed and has been continuously rolled out since the beginning of 2007.

At the same time as part of an evolutionary project development process including continuous evaluation based on online user surveys and service requests analysis the test environment is being further developed and rotationally switched to production system mode.

The approx. 60 employees of the association office are introduced to the project by group training and subsequent supervision. The network's members are either trained face-to-face or via webinars which are conducted on the platform. Training materials for follow-up support and non-members are provided as webinars, demos and manuals on the platform. Furthermore, a contact person is available for specific professional and technical questions.

Except for the inclusion of a responsible project manager the organizational structure of both the association network and the association office was maintained: primarily, initially existing structures and processes were to be supported. Technical developmental tasks as well as hosting have been outsourced to service providers.

The platform's contents mainly emerge from the daily work of the association body and complimented by the contributions of network partners or external sources via the communities.

B. Technology

The basic technological concept provides for a service-oriented web portal including *topic-oriented communities* with semantic web technologies such as semantic wikis, blogs [see 2] attached to a topic map, *open and closed workspaces* with collaboration, content and document management services made available by high-quality, online usable software tools and *a semantically structured and graphically navigable knowledge and expert pool* with specially prepared case studies and reports.

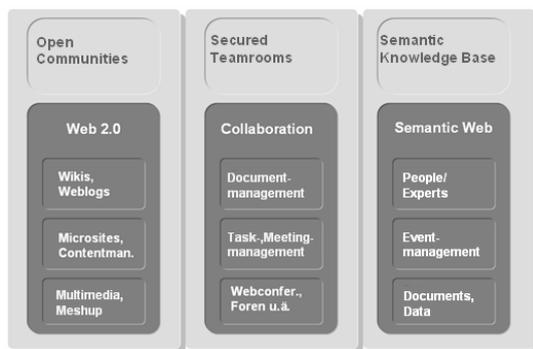


Fig. 4 Modules of the web platform

Web 2.0 modules which are expanded by collaboration tools for managing documents, appointments, tasks and experts as well as forums and synchronous communication media such as web conferencing support the working groups and communities.

In addition, semantic web technologies e.g. model based topic maps [see 6] which graphically present relations between persons, documents, appointments and topics as well as postings in forums, weblogs and wikis, etc., and a semantically extended statistical search are implemented. The graphical display allows a clear and hands-on navigation within the interconnected information space of the platform. If required, users can switch from a graphical to a text-based interface, navigate by index or conduct a string search.

The topic maps are developed in tandem with topic management. In each community the users can blog and comment about specific topics and related knowledge items. Next to the topic map navigation users can access the entire knowledge pool by using a semantically extended search function. The community runs on a portal while topic map and search function are integrated as portlets. The knowledge pool is linked via web services to the collaboration software which also handles the user and rights management.

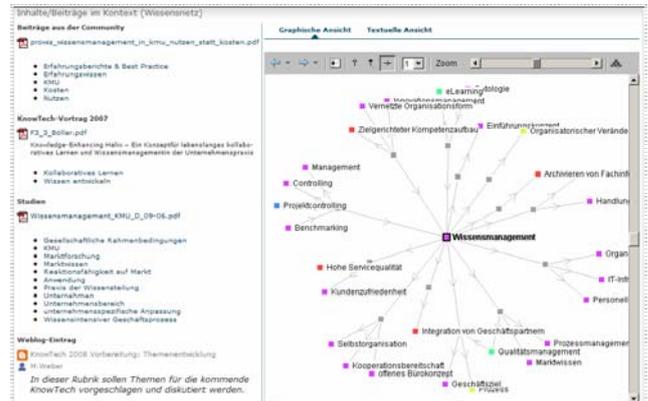


Fig. 5 Detail of knowledge network including documents and postings taken from shown context

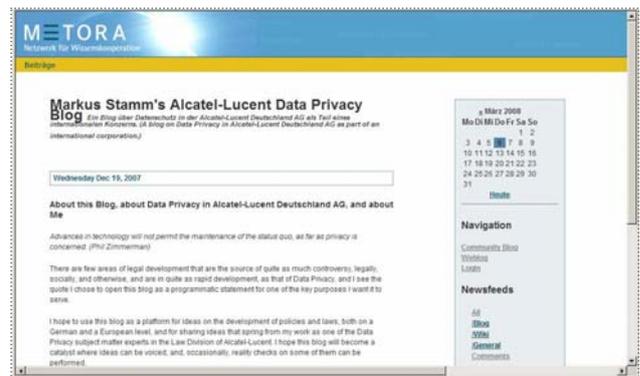


Fig. 6 Blog posting from the knowledge network

IV. RESULTS

Introducing the platform is an ongoing process that took longer than expected for a number of reasons: extensive software adjustments and release changes became necessary, the integration within the existing IT environment of the association was slowed down due to parallel ongoing projects and the training of staff took longer as well.

Currently, there are around 1000 users registered in about 75 closed user groups and one open community¹. Other associations and network organizations have voiced interest in such a platform.

Subsequently, you will find those results which can be applied to other network organizations.

A. Concept, Technology and Introduction

Based on the experiences with the development and implementation of the platform of the METORA project the following key elements and characteristics which can be applied to other knowledge cooperation networks emerge:

- A modularly upgradeable, ideally service-oriented web portal with public and closed personalized areas provides the best basis for the platform [10].

¹ By the end of 2007 the METORA portal launched the public KnowTech knowledge management community (www.knowtech-community.de), which offers a short preview of the structure and functionality of such a platform (currently in German only).

- Easy to use closed workspaces with collaboration tools that support association bodies, working groups and cooperation groups with the creation of documents, the preparing of events and the development of a shared information pool make up the central application module. The tools should best be integrated in or synchronized with the desktop working environment (word processing editors, calendar etc.).
- Public topic-oriented communities using web 2.0 tools function as communication forums between members of reserved association bodies and external groups from science, practice, media and politics (topic monitoring and placing), thereby broadening the scope of networking options significantly.
- With larger networks, a semantically structured information pool provides more transparency both internally and externally.
- Networks are based on decentralized information maintenance. This includes self-service contact or profile management and shared document and content management including the creation of other websites for specific topics and working groups. These functionalities should be easy to use so that active users can contribute contents without having to be trained first.
- Confidence-building technical measures (i.e. encrypted data transfer), organizational measures (linking closed groups to real-life events, identification of team leaders or drivers) and legal measures (conditions of use and privacy policy) are basic principles of a functioning network [10].
- Associations combine decentralized information maintenance with editorial authority: after providing initial contents they ensure a structured growth of contents. Unlike open platforms associations can use their large network of experts to tap their full editorial potentials and even act as some sort of editor. This calls for a simple management of workflow, rights and roles (including reader, author, administrator, group administration and basic approval process).
- As all participating persons including their profiles and contact data are an essential element of the network platform, user administration and related services are very important. Therefore, the integration of the user administration into the association's existing IT environment has to be taken into account from the very beginning.
- When implementing the platform a continuing participation of both decision makers and users is advisable. Also, top management support is indispensable.

B. Conclusions, Benefits

In the last user survey, which was conducted online in late 2007, the question of: "What do you think of the benefits of a platform such as METORA for association work in general?" yielded the following results:



Fig. 7 Results of user survey

The analysis of the various user assessments shows that the use of ICT platforms to support communities and working groups is considered very beneficial, especially if the following aspects have a high benchmark:

- Number and geographical distribution of network members
- Form, amount and complexity of the information material (amount of knowledge that can be formalized)
- Proportion of networking processes based on data or document processing
- Technical, organizational and cultural access to ICT platforms
- Mutual trust among network members, 'culture of exchange'

In short, the more people work from different places and at different times with digital content, the more networking can be efficiently done on a web-based platform – if the culture within the network supports this kind of work [11]. Face-to-face meetings can then focus on social exchange (to get to know each other) and coordination rather than for actual work. If a large part of the work is relocated to a platform there are many advantages such as time-and-place flexibility, better structured IT-based workflows, centralized data management and, last but not least, reduction of travel expenses and further positive influences on environmental issues.

For small, local network groups, for which regional identity, personal contact or personal trust are very important, personal workshops might be the better solution. Of course, these networks can also use web-based platforms, i.e. for centralized data storage, yet overall requirements will be lower.

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