

Siemens: Knowledge Networking with TechnoWeb 2.0

Susan Mörl, Michael Heiss and Alexander Richter

For over ten years, Siemens AG has accumulated experience in the field of knowledge networking through different solutions. The so-called TechnoWeb was introduced in a software development division with 6,000 employees at Siemens AG Austria in 1998. In June 2009, the Executive Board of Siemens AG decided that this platform will be based on a new technology, Liferay, and rolled out company-wide, because of the intention to examine the potential of the service for the entire company. The new platform should support a heterogeneous group of more than 40,000 potential users to connect to each other and share information. The case study describes the accumulated experience in the implementation of the platform.

The following persons were involved in elaborating this case study:

Table 1: Personnel of the Case Study

Contact person	Function	Company	Role
Susanne Mörl	External PhD student	Munich University of the Federal Armed Forces, Siemens IT Solutions and Services GmbH	Author, Implementation team
Alexander Richter	Research associate	Munich University of the Federal Armed Forces,	Author
Michael Heiss	Project manager	Siemens	Initiator of the solution, Author
Gerhard Käfer	Product owner of the solution	Siemens IT Solutions and Services GmbH	Implementation team

1 Company profile

1.1 Background, Branch, Product and Target Group

Siemens AG was founded in 1847 and is a global powerhouse in the industry, energy and healthcare sectors. Around 405,000 employees work at 1640 locations in 190 regions, including 176 research and development facilities. The company achieved turnover of EUR 76.651 billion and earnings from continuing operations of EUR 2.457 billion in the commercial year 2009. Siemens is defined as an integrated technology company, the strategic goal of which is to focus on innovation-driven growth markets. The company's program for achieving its goals is called "One Siemens" - clear integration and cooperation.

1.2 Significance of Information Technology in the Company

On one hand, IT plays a crucial role in the products, as interoperability and flexibility, low-cost adaptation to customer needs, as well as increasing intelligence is expected. In addition, innovation is increasingly expected beyond technology in IT-supported new business models. On the other hand, in-house IT plays a crucial role in cooperation between the divisions in order to become an "integrated technology company". The responsibility for developing in-house IT further lies on the central IT department, the Corporate IT (CIT), which is managed by the Chief Information Officer (CIO) and reports directly to the managing board. In addition is the Chief Technology Officer (CTO), who is a member of the Siemens Managing Board and is responsible for innovation and technology strategy, the open innovation program, for university cooperation, and the entire Corporate Technology.

2 The Starting Point for the Project (Ex-ante Point of View)

2.1 Starting Position

As a group of companies with 405,000 employees in 1640 locations worldwide, its sectors and cross-sectoral business units are set up in a very autonomous manner. This is also reflected in the IT environment for knowledge networking. The contact details of each employee can be found in a Siemens-wide corporate directory, but there is no connection to the field of activity and thus the knowledge of the employee. Such dynamic Yellow Pages were only in some divisions before the introduction of TechnoWeb 2.0, among others at Siemens IT Solutions and Services. The first version of TechnoWeb was widely introduced here in 1998, in which employees could create networks with specialized topics. This is how communities

have emerged. The interested parties could exchange information, and at the same time they could be found by other employees. With the aim of becoming an "integrated technology company" the responsible persons for open innovation have drawn different projects. Besides external projects, such as the competition of ideas and an e-broker, a project was initiated to introduce TechnoWeb 2.0 as an internal platform for knowledge networking. TechnoWeb 2.0 should take over the concept of the first version of TechnoWeb from Siemens IT Solutions and Services, and apply it across Siemens. But it should be brought to a new platform that supports the exchange between employees even more, and is capable of handling the large number of users.

2.2 Motives and Goals

The following objectives should be addressed with TechnoWeb 2.0:

- *"If Siemens knew what Siemens knows"*: The tacit knowledge that exists in the minds of employees should be more discoverable. The aim of the TechnoWeb is to find Siemens colleagues that can give advice on current problems: The motto of TechnoWeb 2.0 is: "Find people to get answers."
- *Country and cross-unit networking*: The knowledge should not only be available within one area, but across all sectors by means of the greater networking of all Siemens units.
- *Protected area*: At the same time employees should be given a protected area within which they can exchange information concerning business affairs, which is why a platform has been chosen that will be closed from the outside.
- The implicit objective was also to first generate professional respect and professional recognition among employees across borders, which is the basis of a culture of trust across national and departmental boundaries. This culture should also have productivity-enhancing effects. Experience has shown how large productivity levers are for cooperation on global projects, if such are based on a culture of trust.

2.3 Expected Benefits

Within Siemens, a large and heterogeneous group, business units operate largely autonomously in their business responsibility. This means that synergy potentials

are often insufficiently exploited at the technical level. The expectation of TechnoWeb 2.0 was to take a step closer to the goal of becoming an "integrated technology company". Synergy potentials between divisions should be identified and contacts established. By bringing together employees who deal with similar issues, a continuous exchange of specialized topics should be sought, and fast and uncomplicated assistance with urgent problems could be facilitated. In addition, the search for relevant information should not only be accelerated but also of higher quality, not only by finding relevant documents, but also the associated experts. Individual employees should have the opportunity to access the giant Siemens' internal knowledge pool with TechnoWeb 2.0. This pool of knowledge should be primarily used for fast and targeted responses to customer queries and also for the development of innovations. Innovative ideas should emerge through the cross-sector exchange of employees who use their specialized knowledge in various contexts. For example how an existing material can be used in a totally new area and therefore lead to an improvement.

Expected benefits were therefore a combination of *organizational* benefits (where the interaction of divisions should be improved) and *individual* benefits for employees. Employees should be empowered to do their work faster and more efficiently, and this effect should encourage as many employees to use TechnoWeb 2.0 as possible. As the name suggests, the intention was to implement synergies and innovation potential especially in the technology sector. However, the tool should also be accessible to all other areas and therefore used for commercial as well as sales topics.

2.4 Decision-making Process and Investment Decision

In December 2008, a concept for the introduction of social networking for Siemens AG was commissioned by the Chief Technology Office. The concept was created by a unit of Siemens IT Solutions and Services, which has already gathered experience with internal knowledge networking since 1998. The concept serves the CTO as a basis for decision whether such solution will be implemented Siemens-wide. In March 2009, the concept was presented to the Siemens CTO and a month later to the Innovation Working Group (a monthly working group of the respective CTOs of the divisions), each time with a positive evaluation. A division of the energy sector ("Energy Fossils") was selected to participate in the pilot and the CEO was involved in the Project Steering Committee. It should be noted that during the decision making process, the actual investment costs were not the main concern, but more the credibility of what was promised in the concept, because it was clear to the affected managers that the low costs pay off themselves if the concept is successful.

2.5 Presentation of the Partners

The solution was implemented by a project team from Siemens IT Solutions and Services division. The software solution, Liferay Portal, is Java-developed open source software that was designed as an enterprise portal.

3 TechnoWeb 2.0 - Find People to Get Answers

3.1 The Basic Idea

The lower the half-life of knowledge and the higher the rate of innovation in one's own domain, the more often you have an employee in a situation that you do not have the knowledge available that is required for one's activities.

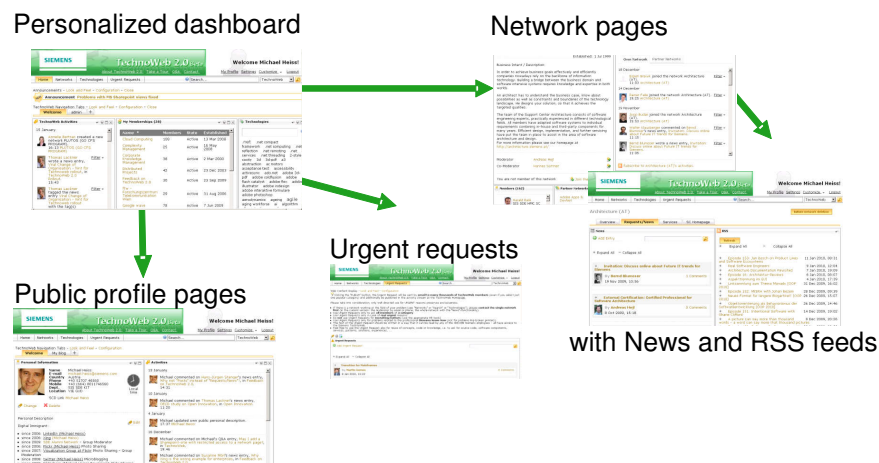


Figure 1: Basic Concept of TechnoWeb 2.0

A typical example is a salesperson who is asked by a customer about a new technology within or outside his specialized field. Solution experts can only give the customer the best solution (cost-efficient) if they are acquainted with the suitable Siemens solution approaches. It happens more often, however, that such solutions are not found in their own division; for example in the case of a mechanical de-

signer who has to optimize a turbine, based on complex simulation technologies, and requires the experience of other colleagues who work with this simulation technology.

The basic idea of TechnoWeb 2.0 is to create a type of dynamic Yellow Pages, which allows all employees to find a contact person, regarding a certain specialized topic and across all sectors. Personal profile pages are used on one hand here (see Figure 1). Besides this are networks that employees can join, and where employees who deal with the same subject can exchange information. When an employee becomes a member of a network, he also shows his interest in the specialized topic and can easily be found and contacted. Additional urgent requests are used for fast, cross-network responses to questions.

3.2 Functions in TechnoWeb 2.0

Networks

The start page of each network comprises a short description that shows the aim of the network, the name of the moderator and the co-moderator, the list of network members, the assigned tags by which a network can be found, and the display of network activities. RSS feeds, events (calendar functionality), and other content from the intranet or internet can also be integrated on the network page. Networks with similar topics can be linked as partner networks, so that the activities of one network are also displayed on another. The network page allows you to post news and to discuss network topics. The network as a central element connects the contents of a topic with the appropriate contact persons.

Every employee has the possibility, after logging into TechnoWeb 2.0, to create networks or join existing networks without an approval process.

User groups are repeatedly asking for closed networks, but these are contrary to the idea of cross-unit networking and have therefore not been implemented.

News

News can be written within a network and comments can be added. It is also possible to upload attachments in the news section. There is also a micro blogging function for short messages within a network. The messages can also be subscribed via RSS.

Profile pages

Every registered user in TechnoWeb 2.0, automatically receives a profile page, which is maintained with data from the corporate directory. The user adds personal data regarding his current position and his specific knowledge in a free text field. Tags, which the user assigns for networks, news or urgent requests, are automatically allocated to his profile. All networks, which the user is a member of, are also automatically displayed on the profile page of the user. Displaying the activity stream of a person to all users needs permission of the respective user - due to data protection reasons. Similarly to other networks, additional content such as a personal profile in Xing or a personal blog can be added to the profile page.

Urgent Requests

Users who are looking for urgent assistance in a specialized topic, for which no corresponding network exists, can send an urgent requests within a specific thematic group. Users who became members of this topic group through their personal preferences, receive a notification by e-mail of such urgent request.

Dashboard

Every user can adjust his most important functions and arrange an overview in TechnoWeb 2.0 in his personal dashboard. The user finds the latest activities from all networks in which he is a member, the list of networks, the tag cloud, and the five most recently established networks are by default shown.

Support Functions

Besides the above mentioned features, TechnoWeb 2.0 also offers support functions typical for such platforms, including the comprehensive option to search for networks or individual persons, permission management, and the option to rate contents and networks.

3.3 Application Layer

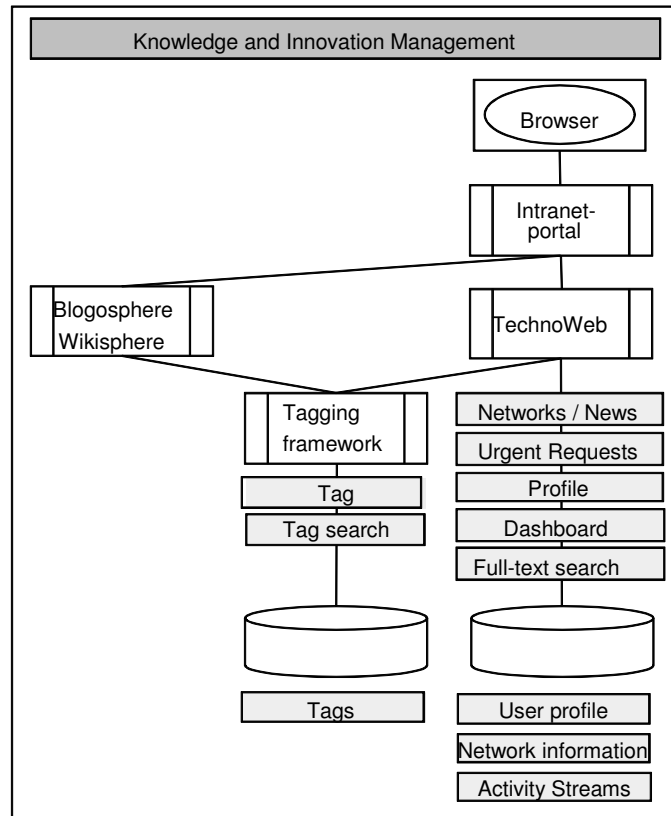


Figure 2: Application Layer in TechnoWeb 2.0

Figure 2 shows the application layer of solutions at Siemens. The open source software Liferay presents the basis for TechnoWeb 2.0. Some major adjustments were made however for use in the Siemens-specific environment, such as automatic synchronization with the corporate directory, and the integration of entitlement services for the registration. The option to simply integrate existing platforms

and internet or intranet pages was an important aspect in the implementation. Two components were developed in addition:

- External web content in the main pages (network, dashboard and profile page) can be integrated with the *content aggregator*. Various intranet as well as internet sources can be connected directly without having to leave the navigation environment.
- RSS feeds from the selected pages are integrated as activities in the respective activity stream through *activity adapters*. It is therefore possible for example both to aggregate internal activities (Network news, Blogosphere, Wikisphere and messages) as well as external activities (RSS feeds) on the dashboard in a common activity stream.
- A tagging framework allows a tag-based search of various Enterprise 2.0 platforms at Siemens, which also include, in addition to TechnoWeb 2.0, a wiki and a multi-blogging platform (the Blogosphere and the Wikisphere).

4 Implementation Project and Operation

4.1 Conception, Development and Roll-out of the Solution

The development of TechnoWeb 2.0 was based on agile software development, because this enabled the option to go with a beta version into the pilot phase, and subsequently to flexibly integrate additional features on the basis of use cases. The development of the beta version took three months, so that TechnoWeb 2.0 could enter a six-month pilot phase in October 2009.

4.2 Project Management and Change Management

The sponsor for the project was the Chief Technology Office, in particular the person responsible for open innovation. It was important to have very tight project organization from the beginning. This comprised a project manager, who had about 30 percent of his work time available for this project, as well as a "product owner" who defined the requirements for the technical development, and coordinated the development. In addition, one person was involved full-time in the development phase and took over quality management and project support. Several software developers at Siemens IT Solutions and Services were variably involved in the development. The project team was then in the pilot and roll-out phase supplemented by another person who worked 50 percent of his time on TechnoWeb 2.0. The tasks of this person were communication and marketing.

Pilot Phase

The aim of the pilot phase was to ascertain what potential TechnoWeb 2.0 could have for individual Siemens areas and for the group as a whole. Furthermore, a critical mass of users and topics had to be reached in order to support the company-wide roll-out. In order not to start with a completely empty system, the content and the users of the original TechnoWeb (1.0) migrated prior to the start of the pilot phase of TechnoWeb 2.0. Approximately 3,000 users were active in 400 networks. A division was officially selected as the pilot unit by the Steering Committee on Innovation. Other units could volunteer as a pilot unit if they were willing to give detailed feedback on the use of the system and its further development. Four additional units from cross-sector business and corporate functions joined, so that the number of pilots rose to five. The project team, together with a contact person from each division, was responsible for actively improving the usage of TechnoWeb 2.0 during the pilot phase. TechnoWeb 2.0 was and actively supported to pilot units in the first six months. The system itself however was freely accessible to all Siemens employees, so that employees from all sectors were present at the end of this phase. Representatives from the management of the pilot areas with the sponsor and the project management of TechnoWeb 2.0 attended regular steering committee meetings, in which the status of the implementation was presented and pilot areas reported their experiences. Improvement potentials of technical manner and the implementation process were also discussed.

Use Case Workshops Demonstrating the Usage of TechnoWeb 2.0

The pilot unit, which was originally selected by the steering committee, developed, designed, and produced turbines for fossil power generation. The business is characterized by relatively long project life cycles, i.e. the turbines are continuously developed over a long time span. As the employees of this unit have gained many years' experience during the development, the benefits of the usage of an intensive IT-based networking was not immediately evident to them during the pilot phase. This meant that the training and change effort were particularly high and had to be designed in a very user-orientated manner. This was initially underestimated by the project team. After realizing this, the project team created *use case workshops* together with the pilot unit. Leaders of the divisions invited three particularly innovative departments to these workshops. The aim of the use case workshops was to identify usage scenarios, together with the users, in various contexts.

At these workshops the participants briefly describe their current work environment, and the challenges in internal communications they are currently facing, such as where they lack relevant information or a contact person, and where the current communication process is too slow or inflexible. This description is supported by a given questionnaire from the workshop leader. After the moderator has become familiar with the current work environment, he explains the potential of

the platform on the basis of possible usage scenarios to the participants. The participants then check which of the mentioned usage scenarios are suitable for them, or if more usage scenarios exist, and then work out concrete operational scenarios. When the analysis of the usage scenarios is completed, the participants identify concrete actions that are needed to be implemented into the operational scenarios for their work. The users realize at the end what tangible benefits the platform can have for their business, so that they ideally leave the workshop motivated and understand TechnoWeb 2.0 as a tool for their work processes. Middle management can participate at use case workshops, so that they can work out, together with their employees, the concrete benefits of TechnoWeb 2.0 for their business. The main advantages of an interactive counseling interview are the options to communicate with users, understanding usage scenarios of TechnoWeb 2.0 in concrete cases, and getting a joint feeling for its benefits. Most of these users would not respond to a conventional survey, because they have not intensely and systematically dealt with the system yet.

Roll-out

The Siemens-wide roll-out was announced on the intranet on 15th March 2010. The project team informed all managers and communicators world-wide in the run-up to the announcement. For this purpose, they provided background information and asked managers to show their support for the roll-out. Background information included questions and answers on how TechnoWeb 2.0 should be dealt with at Siemens, for example how much time could an employee spend on TechnoWeb 2.0 while on duty. An interview with the Chief Technology Officer has been published for managers, in which the officer positioned TechnoWeb 2.0 as an important component in the framework of innovation management. Various articles on TechnoWeb 2.0 were published at regular intervals on the local intranet of the divisions, and in the print media via general employee communication. The project team has created various networks in TechnoWeb 2.0, in which questions regarding TechnoWeb 2.0 are answered, and also collected further opportunities for communication channels and technical requirements. The aim was to start an exchange with users, in addition to the push media, to obtain feedback about the tool and the status of roll-outs. Reports from users, on how TechnoWeb 2.0 has precisely helped them, are collected in another network. Intranet articles are subsequently prepared from these success stories, so that employees who are still unfamiliar with TechnoWeb 2.0 can obtain a demonstrative view of its benefits.

Regular lectures in various management groups and virtual conferences regarding the implementation of TechnoWeb 2.0 also served as an instrument for answering questions. Individual trainings in combination with initiatives in sector-specific knowledge management were also held. As a regular community management, the project team observed the creation of new networks, and supported them by means

of making the networks aware of synergies with already established networks. This resulted in stronger networking between networks. Users could additionally subscribe to a weekly or monthly newsletter, in which all new networks were listed. Users should in such a way be aware of what's happening on TechnoWeb 2.0, and discover new and interesting networks which they would like to join. To reach a broad mass of people outside their workplace, road shows were carried out in various staff canteens at large Siemens sites. The project team members distributed flyers and presented TechnoWeb 2.0 on a large wall screen.

To support the bottom-up distribution of TechnoWeb 2.0, a viral spot has been filmed (YouTube, keyword "TechnoWeb") and a "Digital Native Competition" should encourage employees to talk with their children about TechnoWeb 2.0, so that the positive image of social media, which is most prevalent among young people, carries over to adults. Digital natives should at the same time also bring ideas on how TechnoWeb 2.0 can be further developed. The competition itself was again organized through TechnoWeb 2.0.

Several established key initiatives could be used as a multiplier to support the global roll-out, for instance the Siemens Graduate Program (which promotes dedicated graduates), or the global initiatives "Siemens Production System" and "Sustainability". They use TechnoWeb 2.0 to support the exchange of their global community, which overreaches Siemens, and also to gain popularity. Finally, the project team members presented TechnoWeb 2.0 at external conferences. For Siemens-internal acceptance, it is crucial that the own tool is appreciated by other large companies and is considered to be highly innovative, which is the case of TechnoWeb 2.0.

Table 2 summarizes the explained measures.

Table 2: Change Management Measures

Oct - Dec 2009	Launch of pilots Management information Internal communication in pilot areas Training and community management
Jan - Mar 2010	Publication interview with CTO Announcement of pilots on the intranet Training and community management
Apr - Jul 2010	Global roll-out Management presentation Article in employee magazine Sustainability-Initiative in TechnoWeb 2.0 Training and community management
Jul - Sept 2010	Publication of success stories Siemens Graduate Program in TechnoWeb 2.0 Viral video Training and community management

Result of the Roll-out

The aim was to have 8,000 users in the first year and 15,000 in the following year. The actual 10,515 users in the first year thus far exceeded the target. The impact of the above described promotional campaigns was followed by means of user numbers. The development of such numbers varied. The announcement of TechnoWeb 2.0 on the intranet resulted in a big user increase. The article in the print edition on the other hand has led to minimally observable results, likewise the road show in the staff canteens. The virtual conferences on how to use TechnoWeb were attended only by a few employees, suggesting that TechnoWeb 2.0 is in its functionality largely self-explanatory or is sufficiently explained in the video tutorials. In contrast, the individual training sessions regarding individual areas were well attended and received positive feedback, because they dealt with concrete usage scenarios in the specialized fields. The result of regular, local intranet articles and word of mouth is approx. 120 new users per week. This increase was consistent in the second half of 2010, and independent of total user numbers.

4.3 Ongoing Operation and Further Development

Currently (January 2011) the Chief Technology Office, in the field of open innovation networks, is globally responsible for TechnoWeb 2.0. All feedback from users and their requests for more functionality are principally examined on use cases. The same applies to changes proposed by the TechnoWeb team. The proposed changes are collected in a change request tool, and ranked for each sprint planning according to business relevance. Larger-scale further development is not planned at present. TechnoWeb 2.0 has to firstly prove itself over the next few months.

5 Experience (Ex-post Point of View)

5.1 User Acceptance and Actual Use

Almost 6,000 users registered after the official announcement of TechnoWeb 2.0 on the intranet. This number rose steadily to 10,479 by December. That represents about 500 new users per month. Precisely 5,191 selected messages (posts) were counted in March 2010. This number comprises migrated news from TechnoWeb 1.0 and news from pilot users. Since the official roll-out, the number of news has increased to 6,762. Considering the fact that the migrated news from TechnoWeb (1.0) was created over a time span of ten years, the rise of news in the first seven months of TechnoWeb 2.0 shows that the new system contributes significantly to more intense communication. The number of networks has increased from 567 to 855. While the migrated networks from TechnoWeb 1.0 were all IT-driven, because the tool was accessible only to employees of the IT division, TechnoWeb 2.0

is accessible across Siemens and therefore covers far more topics. The feature "urgent request" has been newly implemented in TechnoWeb 2.0. The 55 Urgent requests before the official go-live are therefore clearly assigned to the three-month pilot phase. The search for help use in the Siemens Group has also registered a steep increase, so that in December 2010 already 308 urgent requests were submitted to the system. When dealing with the usage of urgent requests, it is valuable and useful to mention that an urgent request receives eight responses on average.

The aim of TechnoWeb 2.0 was the better use of synergies and exploiting innovation potential as a result of stronger networking between Siemens sectors. The achievement of the goal can be observed through a detailed analysis of the network and their participants.

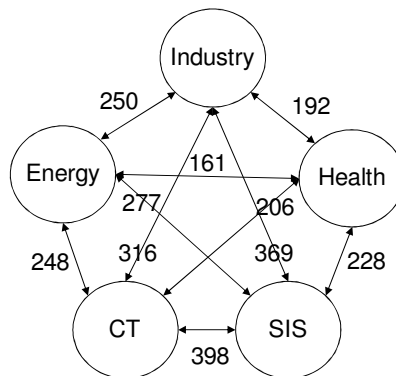


Figure 3: Networking between Siemens sectors by TechnoWeb 2.0

The result of the assessment (Figure 3) shows how individual sectors and cross-sectoral units are networked together. There are for example 398 networks in with both employees of CT and SIS members (see connection between CT and SIS in Figure 3). In 121 networks all five sectors of Siemens are represented. Bringing employees from different sectors together who deal with the same topic has been implemented very successfully through TechnoWeb 2.0.

Whether Siemens has thereby become genuinely innovative or efficient may be verified using a precise analysis of the usage contents. A study has been carried out on this topic, in which news in TechnoWeb 2.0 were evaluated according to content [Richter et al. 2011]. The contents of the news could therefore be classified into four main categories as per Table 3.

This survey clearly shows that expectations regarding intended use cases have been met in the full consideration. The reason why the proportion of "information shar-

ing" is so high is that the responses to "search for support" as well as "sharing information" were evaluated, and there were often more responses to one search. The aim of TechnoWeb 2.0, to network all divisions and sectors of Siemens stronger together, is achieved.

It helps employees to quickly and effectively find information and experts. The extent to which Siemens is genuinely more innovative cannot be evaluated. Positive indicators can however be found in "discussing", "information sharing", and "solving a technical problem."

Table 3: Application Scenarios of TechnoWeb 2.0

application scenario	all
information sharing	49%
news / status messages	20%
invitations	4%
passing on links to articles, ...	11%
information about a contact person	5%
passing on experience	10%
discussing	28%
search for discussion partner	3%
request	4%
expressing opinion	20%
further development of an idea	1%
looking for support	9%
solving a technical problem	3%
decision-preparation	2%
search for a reference	1%
identification of a contact person	3%
marketing	6%
key initiatives	4%
internal services, new technologies or methods	2%

5.2 Realized Usage and Effectuated Changes

The realized benefit may be derived from the above mentioned application scenarios. It is for instance possible to observe from the frequency of seeking help that users benefit from it. If the requests are left without response, the users regard the system very quickly as not very helpful and do not use it. The project team put special success stories into concrete terms, and reworked them as showcases.

Example of Successful Sale

Such a success story is for instance the positive outcome of a customer business, which could be finalized only through cross-sector cooperation in TechnoWeb 2.0. An employee from Munich, who works in the IT sector, urgently needed a customer reference for a tender concerning fleet management. He wrote an urgent request in TechnoWeb 2.0: "Do we have references / customer success stories for fleet management solutions provided / developed by Siemens?" He received 15 responses within the next five days from eight different units and eight different countries. One of the responses matched exactly the needs of the customer and has been praised for excellent quality. According to the salesperson, the request saved him at least three working days and also improved the quality of work.

Example of Successful Innovation

Another colleague from the health care sector was dealing with an innovation that should significantly help examining patients in a gentler way. For this, he needed expertise in the field of RFID, which was not present in his environment. He found a network in TechnoWeb 2.0 that deals with RFID and posted his request. Within a few days he was able to find the right contact persons within the group. These persons have helped him in the development of his innovation. According to the employee in the development, he was able to clarify critical technical issues fast and with high-quality thanks to TechnoWeb 2.0.

It is not possible to give a precise measurement of the benefits solely through such success stories, but the business benefit is hereby very clear for management and other colleagues. The immediate benefit of TechnoWeb 2.0 is no longer in doubt. Both the use cases as well as the success stories show that the actual benefit of TechnoWeb 2.0 lies in the quick search for the right contact person. That in turn leads to faster and high-quality responding to requests, as well as the exchange of experience of expertise as a prerequisite for innovation, and a more efficient organization of work processes.

5.3 Investments, Profitability and Figures

Implementation costs can be divided into one-time investments and running costs of operation and maintenance. There are no licensing fees as TechnoWeb 2.0 is based on open source software. Running costs include the operation of two servers, application management, and a hotline (1st level support). Maintenance costs of the software represent only about 10 percent of the one-time investment costs.

Non-recurring costs are for internal communication, change management, consulting with the operating units, and internal coordination, for instance data protection, export control, intellectual property rights, and the IT strategy of the group. Fur-

thermore, the creation of product strategy, requirement engineering, as well as usability engineering for TechnoWeb 2.0 are included in these costs.

The profitability of TechnoWeb 2.0 can be estimated only with examples, when users give information about how much time they saved by using TechnoWeb 2.0. As described above in the example of the successful sale, an employee taking five minutes to post a request on the TechnoWeb can save three days' work.

6 Success Factors

6.1 Specialties of the Solution

TechnoWeb 2.0 differs in some important points from today's common platforms, which are designed mainly on collaboration, such as IBM Lotus Connections or Microsoft Sharepoint. The following peculiarities were observed:

- *People-to-topic relation*: Not "who knows whom" but "who knows what" is the main idea of knowledge networking. Hence the focus lies not on individuals (i.e. Xing or LinkedIn) but on *topic-oriented* networks.
- While traditional collaborative environments provide especially an infrastructure for closed groups with a specific business aim, TechnoWeb 2.0 supports only *exchange in open networks*. Possible collaboration functionalities, such as joint working on documents, can be integrated and retain individual authorization structures within TechnoWeb 2.0.
- The *formation of partner networks* enables the structuring of topics and topic areas, which simplifies the search. There is also the possibility for hierarchical network structures, for example a network dealing with a general topic can have sub-networks with more specific topics. It also allows clustering of networks based on the regional characteristic of a topic.
- With the help of *urgent requests*, urgent cases can be put not only to networks, but also to the wider group of users who work in a specific subject area. The probability of a fast and high-quality answer is therefore higher.

6.2 Reflection of the Barriers and Success Factors

The selection of the official pilot unit (from the energy area) represented a barrier for the roll-out in the first months. The potential for an intense exchange of knowledge e.g. in the topic of computer simulations was not immediately clear to the operatively active personnel at the time of the pilot. Therefore, the challenge was in the practical correlation of employees' daily tasks and the use cases in Tech-

noWeb. Considering these difficulties, use case workshops have been conducted to address these issues. For a broad roll-out in large organizations however, these workshops are not practical and can be only selectively carried out.

An important success factor was the migration of TechnoWeb 1.0 content and users to the new platform. In this way, networks from the very first day were available to which other users could connect, and a relatively large number of users who had ten years' experience with knowledge networking and who could now serve as an example to new users. If TechnoWeb 2.0 started with empty content, it would surely be more difficult to motivate employees to participate.

In summary, it can be noted that the implementation of a solution like TechnoWeb is particularly useful if a company either has globally spread employees or is divided into independent specialized fields. In both cases, knowledge sharing is encouraged by TechnoWeb, as it will facilitate individual employees to contact colleagues around the world who are working on similar topics. A critical size for such an internal company solution is required however, because employees in small businesses know and can directly contact each other.

6.3 Lessons Learned

The following factors can be defined as lessons learned by implementing TechnoWeb 2.0 at Siemens:

Critical Mass of Activities

The use of social media also shows in the corporate context similar, though not as strong trends, as described in 90-9-1 rule [Nielsen 2006]. It was therefore important that TechnoWeb 2.0 produces clear added value even at low user number and low frequency of usage. Therefore, the aim was to make it as simple as possible to find contact persons on specific topics..

The following distribution of activities can be considered for the fulfillment of the intention of TechnoWeb 2.0: it is sufficient to have 10 percent of users who create networks and moderate them, 20 percent of the users write and comment on news, evaluate contributions, put content into structure through tags, regularly update their profile, and join networks. If these conditions are fulfilled, the remaining 70 percent of users also profit from contents by finding the right contact person for specialized topics in TechnoWeb 2.0. They do not even have to be logged into TechnoWeb 2.0.

From the Beginning Open to all Employees

The opening of platform to all employees even in the pilot phase has had a positive effect. TechnoWeb 2.0 had a good influx from those divisions that did not partici-

pate officially as a pilot, as they became involved in the project thanks to their colleagues.

Integration of the Data Protection Commission

Another important component of the decision process was the integration of the data protection commission of the central workers council. It was known, from previous experience, that it is very important to involve the workers council as early as the pilot phase. Many experts are for example convinced that an *anonymous* participation in specialized networks in the enterprise context most likely doesn't work or works worse compared to ascribed comments. It was written in the operating agreement in this regard that participation in TechnoWeb 2.0 is voluntary, that the list of activities of every employee must be explicitly released by him, and that the transaction data are deleted after six months. The operating agreement regarding TechnoWeb 2.0 was at that time the only valid operation agreement regarding a Siemens-wide social media application. This was a necessary condition for the release of the official roll-out of TechnoWeb 2.0 in March 2010.

Use of Existing Standards

The usage of pre-existing technical corporate standards, such as the entitlement services for registration or the automatic synchronization with the corporate directory, has increased acceptance among users. These company-specific adjustments could at that time be easily made in the open source software Liferay, because for many features that have been completed no solutions existed.

However, significant changes were also made in the software, which makes it difficult now to upgrade to a new version of the open-source solution, and so to use new and interesting standard functions.

Continuous Development

Users were positive about the fact they could bring their own ideas for new functions during the pilot phase, which were then implemented by the development team. The continuous development of the beta version was greatly driven by the application scenarios and by their resulting expected benefits .

References

- Richter, A.; Mörl, S., Trier, M., Koch, M. (2011): Anwendungsszenarien als Werkzeug zur (V)Ermittlung des Nutzens von Corporate Social Software, in: 9. Internationale Konferenz Wirtschaftsinformatik, Zürich, 2011.
- Nielsen, J. (2006): Participation Inequality: Encouraging More Users to Contribute, [http://www.useit.com/alertbox/participation_inequality.html]. [accessed on 12/01/2010].

Brief profiles of the Publishers and Authors

Susanne Mörl (susanne.moerl@siemens.com)

Susanne Mörl was responsible for the roll-out and communication of the social networking platform (TechnoWeb 2.0) in Siemens AG. Her focus was primarily on the development of use cases and the accompanying change process. In this position she has made a decisive contribution to the adoption of the Web 2.0 culture. As an extra occupation, she is working on her doctorate from the University of Federal Armed Forces in the field of cooperation systems. She was responsible for the introduction of a supply chain reference process at Siemens Healthcare prior to her current role. Previously, she introduced SAP in the assembly of a car manufacturer as a consultant for Accenture. She studied business administration at the University of Bayreuth.

Michael Heiss (michael.heiss@siemens.com)

Dr. Michael Heiss studied electrical engineering at the Technical University of Vienna, graduated as a doctor of technical sciences in 1989, and received his habilitation in the field of control engineering in 1995. He worked at the electronic diesel control at Bosch in 1986-1990; he was a visiting scientist at the Massachusetts Institute of Technology (MIT) in 1990-1991, and has been at the Vienna University of Technology since 1991 where he has been associate professor since 1995. He started at Siemens AG Austria in development in 1996 and became the Vice President for Knowledge, Innovation and Technology in 1998. He became the project manager of TechnoWeb 2.0 in 2009. He joined the Siemens Chief Technology Office at the headquarters in 2010, where he has been globally responsible for the topic of open innovation networks.

Alexander Richter (alexander.richter@kooperationssysteme.de)

Dr. Alexander Richter works as a post-doctoral in the collaboration systems (CSCM) research group at the University of the Federal Armed Forces in Munich. He is very interested in the implementation of social software in many German companies and is involved through CSCM in many projects. He has (co-)published more than 50 articles in academic publications, conference proceedings, and journals, including the book "Enterprise 2.0: Planung, Einführung und erfolgreicher Einsatz von Social Software in Unternehmen".

Documentation of Data collection

The author of the case study, Susanne Mörl, was a member of the implementation team of the solution at Siemens throughout the reported time. As part of her dissertation, she conducted a qualitative data analysis (genre analysis) of a sample of urgent requests and network contributions (June 2010). In addition, the second author, project manager Michael Heiss, was responsible for the implementation of TechnoWeb 2.0 at Siemens. For this reason, most of the information of the case study comes from the personal experience of the authors. Gerhard Käfer has delivered, in addition as a product owner, input on the technical details. The third author, Alexander Richter, was involved in several workshops during the implementation, as well as qualitative data analysis and familiarized himself with several live demonstrations regarding the system. In addition, the authors had all project documents and various reports of the use of the solution at their disposal.

The research works were carried out partly under the competence of the network Softnet Austria II (www.softnet.at, COMET K-project) and funded by the Austrian Federal Ministry for Economy, Family and Youth (bmwfj), by the federal state of Styria, by the Steirische Wirtschaftsförderungsgesellschaft mbH. (SFG), and by the city of Vienna through the Center for Innovation and Technology (CIT).