Judith Schulz

Company-Wiki as a knowledge transfer instrument for reducing the shortage of skilled workers

Universität Bremen

Judith Schulz

Company-Wiki as a knowledge transfer instrument
for reducing the shortage of skilled workers

Bremen: Institut Technik und Bildung (ITB), Universität Bremen, 2009

ITB-Forschungsberichte 42/2009

Verantwortlich für die Reihe: Peter Kaune

Judith Schulz

Company-Wiki as a knowledge transfer instrument for reducing the shortage of skilled workers

Zusammenfassung:

Die Problematik des Fachkräftemangels im produzierenden Sektor der Metall- und Elektroindustrie ist in weiten Teilen Europas ein nach wie vor zentrales Thema. Verschiedene Faktoren und Einflüsse bedingen die Fachkräftesituation, die sich allmählich auch auf der Facharbeitsebene manifestiert hat. Diese Umstände sind ausführlich in einem Synthesebericht sowie einem Good-Practice Bericht (ITB-Forschungsberichte 36/2008 und 37/2008) beschrieben worden.

Der vorliegende Bericht basiert auf der Notwendigkeit von KMU nach einem Wissensmanagement-Instrument und demonstriert in einfacher Weise das Konzept einer Unternehmens-Wiki als Wissenstransfer-Instrument zur Sicherung und Weitergabe von fachspezifischem und erfahrungsbasiertem Wissen.

Abstract:

The problem of the shortage of skilled workers in the manufacturing sector of the metal and electrical industry is a central topic in many areas in Europe. Different factors and impacts cause the specialist situation, which gradually has manifested itself on the skilled work level. These circumstances are described in detail in a synthesis report as well as in a good-practice report (ITB research reports 36/2008 and 37/2008).

The available report is based on the necessity of SMEs for a knowledge management instrument and demonstrates in a simple way the concept of Company-Wiki as knowledge transfer instrument to secure and pass on specialist and experience-based knowledge.

Preface

Already for a long time a shortage of skilled workers in technical sectors appears in several regions in Europe. Despite continuous unemployment and the financial crisis the problem of the shortage expanded on the skilled worker level of the producing sector. Up until a short while ago the technicians' and the engineers' range were affected, and now, however the shortage of specialists on the skilled work level is predominantly increasing. Smaller and medium sized enterprises (SME's) are mainly affected, because they stand above the difficulty to both hire skilled workers and to constantly develop the qualification of the personnel. These companies often lack suitable instruments and operational resources to identify current as well as future requirements. This situation is intensified by the influence of the demographic change on the specialists supply (marginal offer of young personnel, fluctuation and retirement of elderly ones).

Against this background qualification and personnel development concepts were created and realised with enterprises of the producing sector (metal and electrical industry) in the European LEONARDO DA VINCI project »Shortage of Skilled Workers«. The project takes up the deficits mentioned and tends to develop concepts for the avoidance of the shortage. Partners from six European countries are cooperating In the Leonardo project. The task is to develop personnel-economic instruments in enterprises for the level of well-qualified skilled workers to prevent or avoid the shortage of specialists. Besides personnel development concepts (inclusive career and qualification plans), apprenticeship and further training in enterprises, internal and external recruitment strategies, the in-house transfer of know-how is an important starting point. The instruments developed in the project are intended to identify the potential need and qualification of specialists in enterprises in time and point out courses of action.

The threatening downward drift of experience-based and working process-oriented know-ledge required the development of a knowledge transfer instrument in this project being purposefully targeted at skilled workers in the producing industry.

This guideline illustrates the background, requirements and conditions as well as examples for installation and finally a proposal for implementation.

Table of contents

1. Background/Outline of the problem

Based on current results of the project »Shortage of Skilled Workers« an instrument should be developed which safeguards a sustainable preservation and transfer of experience-based knowledge of the skilled personnel on the level of skilled work of the manufacturing sector in the metal and electrical industry. In the medium and long term, this instrument could contribute to counteract and to reduce a shortage of skilled workers.

Already today companies are confronted with a knowledge drain caused by the retirement of older employees and by the »poaching« of skilled staff. Therefore it is a necessity to tackle the problem of knowledge drain at an early stage. With regard to the selection of an adequate instrument which safeguards both the preservation of knowledge and its transfer, the concept of a Company-Wiki should be considered to:

— identify problem-oriented/work process related knowledge of the skilled personnel and the creation of transparency of the existing knowledge,
— participate from the knowledge of other employees,
— sustain explicit knowledge.

The main problem for users is to explicit their knowledge, prepare and even share it. Knowledge mostly is not obvious and so people often do not know what they know. So it is necessary to identify in a simple way the implicit knowledge.

The Company-Wiki is based on the principles of the Wikipedia Encyclopaedia which is well known among the population. Thus the valued feature of a quick retrieval of information is familiar to most users and is another reason for choosing this instrument. Furthermore a Wiki is characterised by its linkage of information. In other company or content management platforms the information or knowledge stored is not connected with other divisions or domains. In Wikis the texts can refer to other texts or documents so that these can be connected among each other by keywords.

2. Application area and target group

With the help of a Company-Wiki, skilled workers as well as semi-skilled and unskilled workers will be supported in documenting and retrieving their specific work process-related knowledge for their own use and for the use by others. The Wiki-System is a compilation of documents and articles which are not only read, but also created and continuously updated by their users (skilled workers of the company). With this instrument joint texts and contents may be generated and revised, if necessary. The documentation of work process-related knowledge can thus contribute to the:

— description of processes of individual tasks/the operation of machines,
— description of proposals to deal with errors and problems,
— establishment of specific experience knowledge (e.g. by making knowledge transparent via problems and their solutions) and
— naming of »experts« such as contact persons who provide assistance within certain fields of work, processes and functions.

The information is posted on an open, non-hierarchical user platform. This kind of knowledge structuring allows the identification, the documentation and the transfer of specific knowledge. In addition to that the posted information can be expanded to work processes, specific problem solutions or special customer requirements by additions and revisions made by colleagues.

3. Structure and composition

The Company-Wiki is an alternative to complex electronic information and communication platforms that contain the possibility for documenting, structuring, saving and transferring specialised and experience-based knowledge as well. Like already mentioned the concept is based on the principle of a Wikipedia Encyclopaedia and well known. The Company-Wiki's articles and documents (e.g. of certain work processes) are adapted by the personnel. They can be downloaded, updated and revised/edited (see Bachner 2007[1]).

Apart from the preservation, transfer and further development of knowledge, a Wiki-System also offers »learning bridges« by making use of the available knowledge. Figure 1 outlines the generation process for knowledge in a simple way.
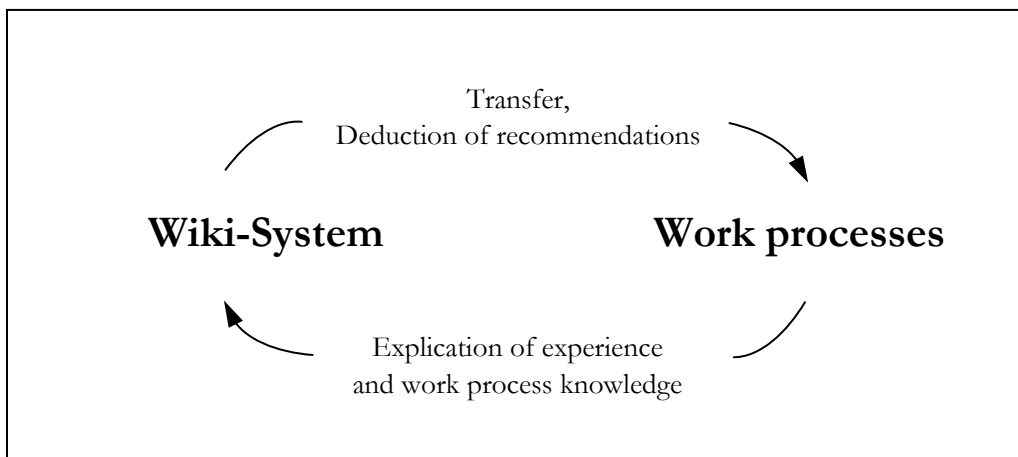
Figure 1:   Process of Wiki-based knowledge generation of work processes (based on the project Optilog)

The process is based on the explication of individual experience and knowledge of work processes which ought to be the subject of the Wiki-System. The knowledge documented in the Wiki-System is interpreted, processed and transferred into specific actions by other users and/or into the derivation of recommendations of actions which in turn may have an impact on the work processes. A Company-Wiki offers the opportunity to continuously improve work processes.

The advantage of a Company-Wiki is the fast access to and exchange of knowledge. With a computer with intranet access available, the system can be used and handled by all employees. The Company-Wiki is particularly focusing medium sized enterprises.

Together, management and specialists have to decide in which sections of the company the implementation of a Wiki-System is useful to achieve the biggest success.

---

[1]   Bachner, H.: Wiki-Systeme als Wissensmanagementtools. GRIN Verlag, Norderstedt 2007.

3.1 Benefits

The chosen Wiki-System offers extensive benefits for both the company and its employees.

A contribution can be made to the description of the course of several activities, to the description of mistakes and problem solving suggestions and the transfer of specific (experience-based) knowledge e.g. specific customer information. Furthermore so called »experts« can act as contact persons in certain fields of work.

The information is posted on an open, non-hierarchical user platform in the form of a knowledge database. The company benefits from the safeguarding and preservation of work process oriented knowledge. Additionally, the software is free of charge. Further advantages of the Wiki-System are:

— documentation of e.g. specific problem solving strategies and information about customers and therefore
— opportunity to avoid future errors,
— optimisation of work and business processes,
— avoidance of mistakes and identification of problematic issues and sources of errors,
— transfer of knowledge during initial and further training
— offering »learning bridges« by making use of the available knowledge of other persons,
— simple handling during the preparation/creation of documents.

3.2 Requirements

For the implementation of a Company-Wiki some few requirements need to be complied to, e.g. the initialisation of PCs with an intranet access for the personnel and the linkage of the free available software like »MediaWiki«. This software can be downloaded under http://www.mediawiki.org/wiki/MediaWiki/de. The homepage offers assistance for the creation of Wiki pages, including an instruction for the posting and updating of articles.

Apart from the software, permanent computer access is necessary for the system to be used by employees. Short instructions or brief training sessions focusing on the operation and the use of the system is recommended to become familiar with it. A trial phase is suggested during which the system can be practised and tested by employees.

3.3 Wiki options

Several Wiki systems are available for companies to create a Company-Wiki that are described below.

— MediaWiki
— Pbwiki
— DokuWiki
— TWiki

This list does not lay a claim on completeness, but for demonstration some opportunities are presented here.

3.3.1 MediaWiki

MediaWiki is a freely available open source software, which was originally written for the online encyclopaedia Wikipedia. This MediaWiki package is the basis of all Wikis of the Wikimedia Foundation as well as many other Wikis at the market.

3.3.2 PbWiki

Pbwiki (http://pbwiki.com/) is a collaboration service developed due to the impression that most Wiki systems are »overly complex for a layman to set up and manage, requiring an extensive knowledge of Linux, and their own server« (http://en.wikipedia.org/wiki/Pbwiki). One of the three founders of pbwiki came up with the idea of providing easy-to-use hosted Wikis through a website - which he named »PeanutButterWiki«, because he had the belief that setting up a Wiki ought to be »as easy as making a peanut butter sandwich«[2].

Pbwiki uses its own proprietary software which is under permanent development. Users are able to create free basic Wikis, or upgrade to a premium Wiki which offers additional features. The company claims: »A number of business and corporations use Pbwiki to create private Wikis for employees; one case study from CNN described a legal firm which had transitioned to PbWiki as a document management system in order to cut their IT costs«[3].

3.3.3 DokuWiki

Another system is called DokuWiki. Its characteristics are the standard conformity with the simplicity to handle and »which mainly tends to the development of documentations of all kinds« (Source: http://www.dokuwiki.org/de:dokuwiki). Further are to be mentioned its simple but powerful syntax that ensures the fact of a readable data outside the Wiki. This system allows simplifying the development of structured texts. No data base is needed, because of stored data in text files. Addressees are developer teams, working groups and small enterprises.

3.3.4 TWiki

Due to its flexible plug-in architecture TWiki ranks among the function-richest Wiki systems on the market. The system has established itself in the surroundings of enterprises, because it

---

[2] Hagopian, Peter (2007-09-10). »Everything You Need To Know To Get Started With Content Management Systems«. InformationWeek.

http://www.informationweek.com/news/internet/showArticle.jhtml?articleID=201805279&pgno=4&queryText=&isPrev=. Retrieved on 2009-03-23.

[3] Nussenbaum,   Evelyn   (2008-02-12).   »Boosting   teamwork   with   wikis«.   CNN   Money. http://money.cnn.com/2008/02/11/smbusiness/wiki_software.fsb/?postversion=2008021211.   Retrieved   on 2009-03-23.

allows the development of own Wiki applications and thus providing numerous fields of application. So, different company departments, external partners (suppliers), service providers and customers so can be involved.

TWiki is mainly used in enterprise intranets as corporate Wiki. With the software the coordination of working groups and project conditions, internal sequences and other information of relatively long-lasting relevance are illustrated, documented and further developed. TWiki arranges lived knowledge by using it as knowledge management platform.

The TWiki system offers many interfaces to existing systems. So it allows e.g. the authentication by an inhouse LDAP[4] as well as the connection to external data bases. »TWiki belongs to the Wiki systems of the second generation, with which own applications to Wiki basis can be provided. This becomes possible by the structured administration of metadata. Hence contents can be typed and provided with additional information. Furthermore, own applications can be developed within a short time that can be adapted to the respective needs of the company« (Source: http://www.kontextwork.de/wiki-systeme/twiki).

---

[4] Lightweight Directory Access Protocol is an application log in computer technology, with which the inquiry and the modification of information of a listing service (one in the network hierarchical data base distributed) is possible.

4. How to use the Wiki (in practice)

This paragraph outlines how a Company-Wiki can be used in a company. Therefore a Wiki via »pbwiki service«[5] has been created and an example for use will show the advantages.

No matter what size a company has, it is important to make the knowledge (consolidated and in constant development) visible, to share and to manage it. The adoption of ICT (information and communication technology) and web 2.0 concept[6] in particular suggest the discussion of the following aspects:

— the way through which the knowledge is created, shared and managed inside the company,
— the relevance of each person involved in the company, to produce knowledge, competences, skills (and culture).

Thus, the Company-Wiki conceived as a tool for knowledge management, can contribute to the promotion of a participatory approach. Employees do not only extend their knowledge/skills, but also help grow the companies' corporate knowledge by contributing to the companies' knowledge management (which in turn could promote their sense of affiliation).

For the installation of a Wiki tool in a company one has to be aware of the character of this system. The knowledge follows a process and needs to be managed. This is important against the background of implementation and because of the need of administrators who will be in charge of filtering the information that is given/written by the users. It is advisable to define roles and rights for groups of users, e.g. to clarify the rights for readers, writers and observers.

---

[5] For further information see: http://pbwiki.com/

[6] »The term Web 2.0 refers to a perceived second generation of web development and design, that aims to facilitate communication, secure information sharing, interoperability, and collaboration on the World Wide Web. Web 2.0 concepts have led to the development and evolution of web-based communities, hosted services, and applications; such as social-networking sites, video-sharing sites, wikis, blogs and folksonomies« (Source: Wikipedia, Web 2.0, see the following url: http://en.wikipedia.org/wiki/Web_2.0).

5. A Wiki example »Leonardo project: Shortage of Skilled Workers«

As outlined above the project partners of the »Shortage of Skilled Workers« project have set up a Company-Wiki in a pilot scheme by using pbwiki service. Below the steps for its development are demonstrated.

1) Go to the pbwiki site and create your own account.
2) Receive via mail a confirmation about the success of your registration
3) Click on the link related to your Wiki and
4) Start to customize your Wiki as you prefer.

By adding logos or pictures it is possible to give the Wiki site an individual appearance.
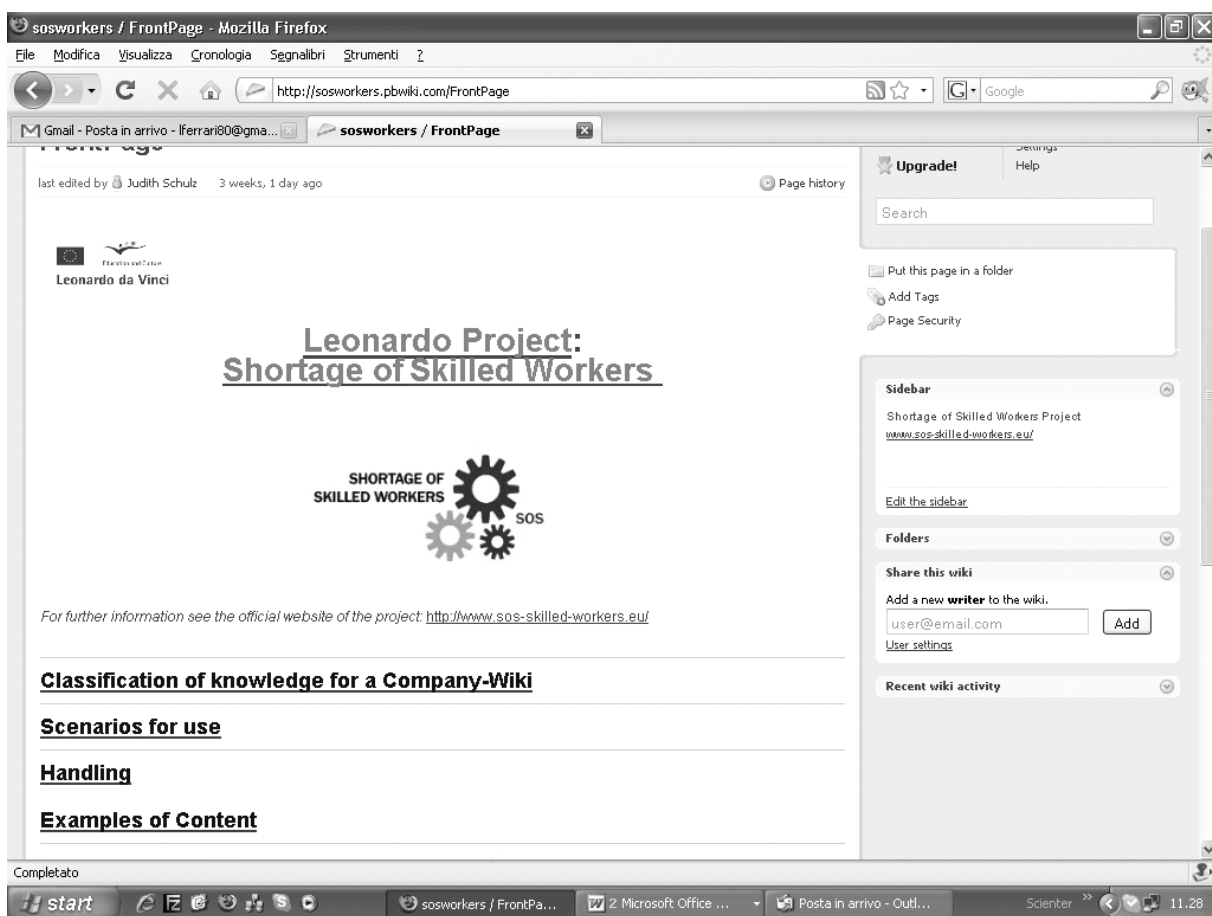

Figure 2:   Screenshot »Front Page« of the SOS-Wiki

The figure above shows the front page of the Company-Wiki created within the Leonardo project. As it can be seen, the page presents four sections composed with a series of sub-sections. In this case the sections are:

— Classification of knowledge for a Company-Wiki,
— Scenarios for use,
— Handling and

— Examples of Content.

The sections are replaceable by any categories that are suitable for a company.

5.1 Classification of knowledge

In the first section shows several categories giving an overview of possible volumes that are identified in the project to reflect and refer to problem-oriented and working process-related knowledge.
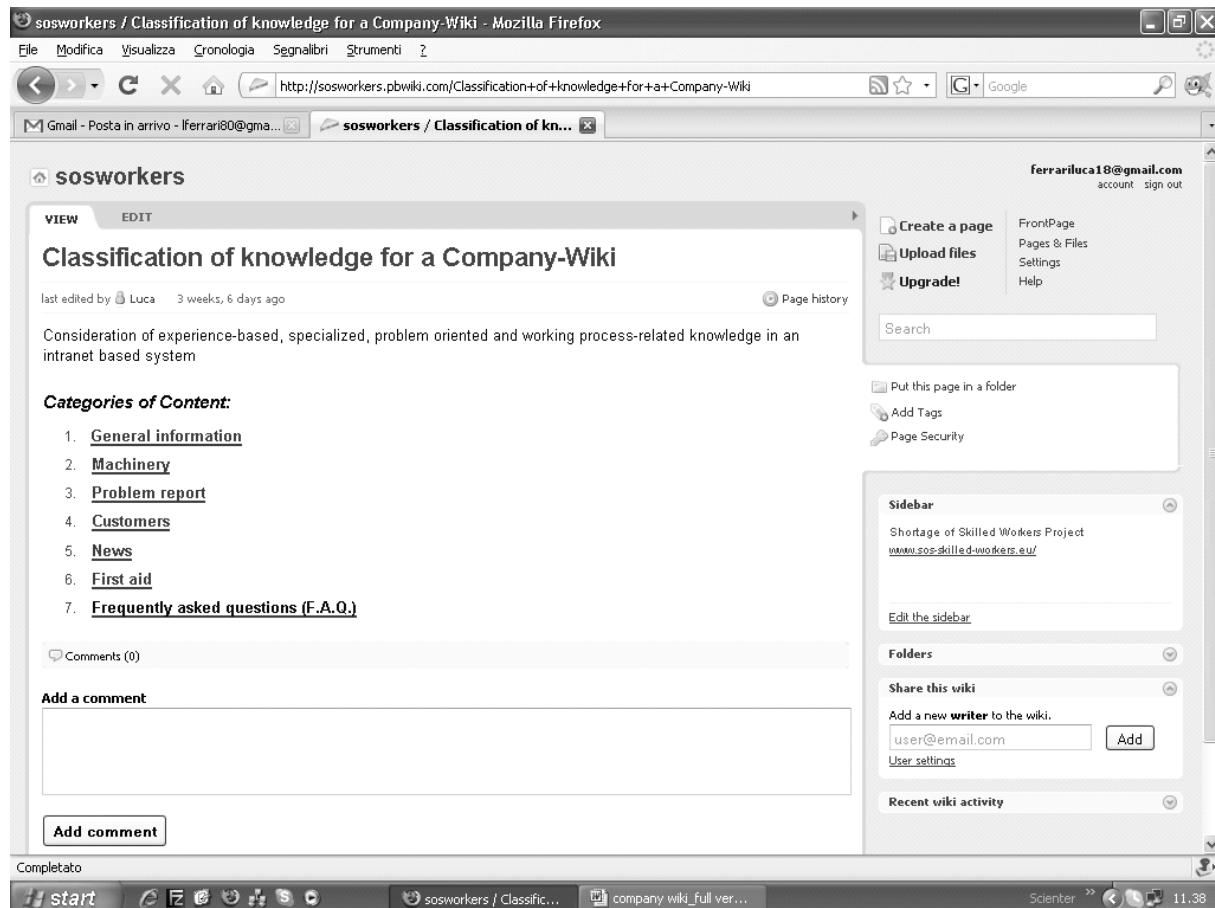

Figure 3:   *Screenshot »Classification of knowledge for a Company-Wiki«*

The first subsection, *General information*, contains the following sub-categories:

— Company sector/domain: in this sub-section information related to the company can be positioned, such as: its story, its mission/vision, its characteristics in relation to the labour market (number of employees, kind of products, technology used and customers).

— Organigram/organisation plan: in this section an internal organisation chart can be set up; this is particularly recommended for medium-sized and big enterprises as it provides employees with an instant view of the complex organisational structure.

— <u>Internal standards and regulations:</u> in this section internal documents related to the standards and regulations of the company can be uploaded. Each document needs to be visible for all employees and should be editable and continuously updated by the company's management

In the second sub-section, *Machinery*, detailed information can be given about job descriptions, maintenance and specific characteristics:
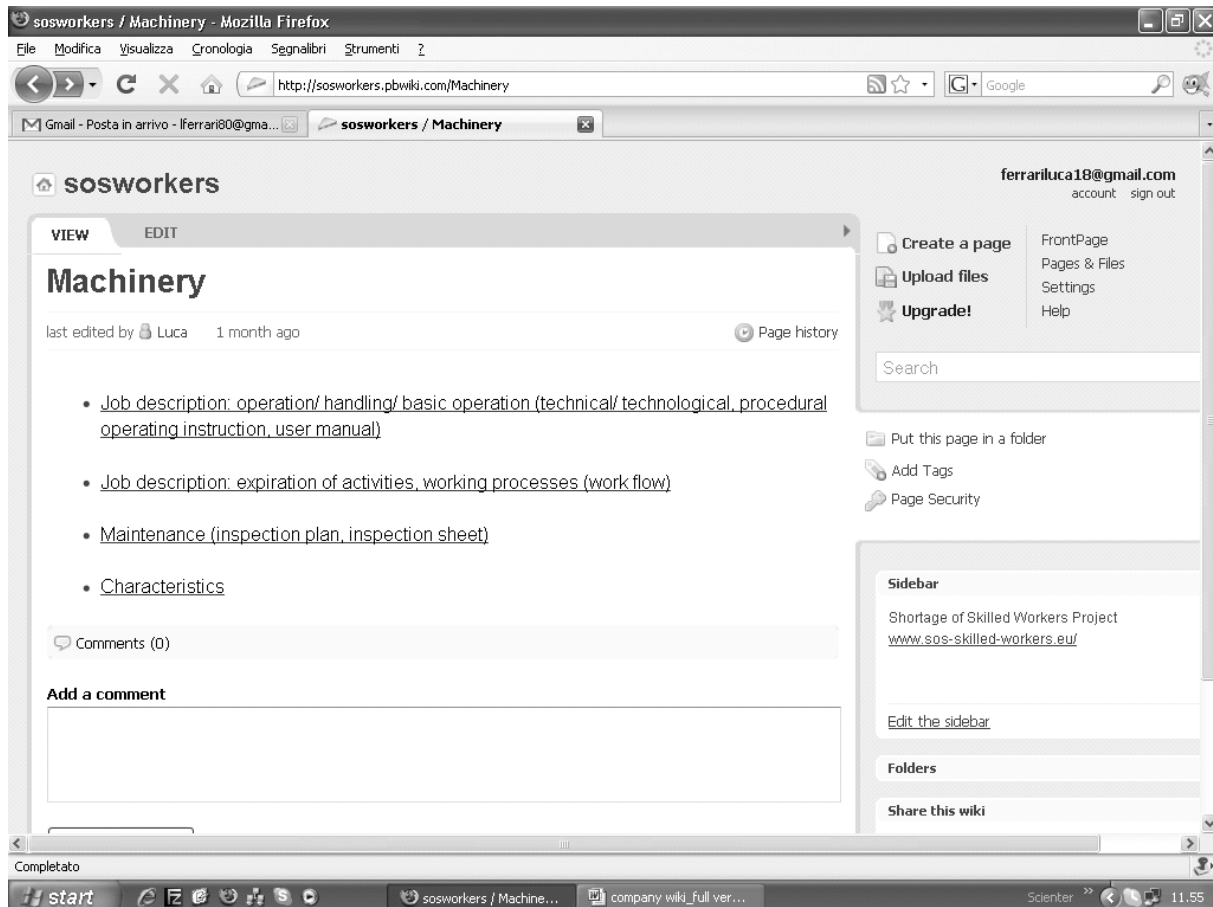

Figure 4:   *Screenshot „Machinery"*

In one sub-category of the *job description* (on the micro level) skilled workers can describe all information related to the tasks necessary to carry out a task with the help of his/her head of department, such as: basic operation, technical procedures etc.

In the other sub-category the *job description* (on the meta level) is documented with reference to the expiration of activities and information concerning the working process. These two pages of job descriptions need to be updated constantly.

The page *Maintenance* can provide information of how to maintain/manage machineries. Also, basic instructions on how to act in case of problems can be put in here as well. Here it is important to specify the names of professionals who can assist with the machineries (and how to activate their assistance).

The last sub-category *Characteristics* contains details about specific characteristics of certain machineries (year, monthly assistance etc.).

The third sub-section *Problem report* contains several strategies to avoid possible problems. In case of occurring problems, the skilled workers (as well as all the other employees) can follow the deposited instructions. The users can also extend the Wiki by adding information solving problems. The page below shows the possible structure of a problem report.
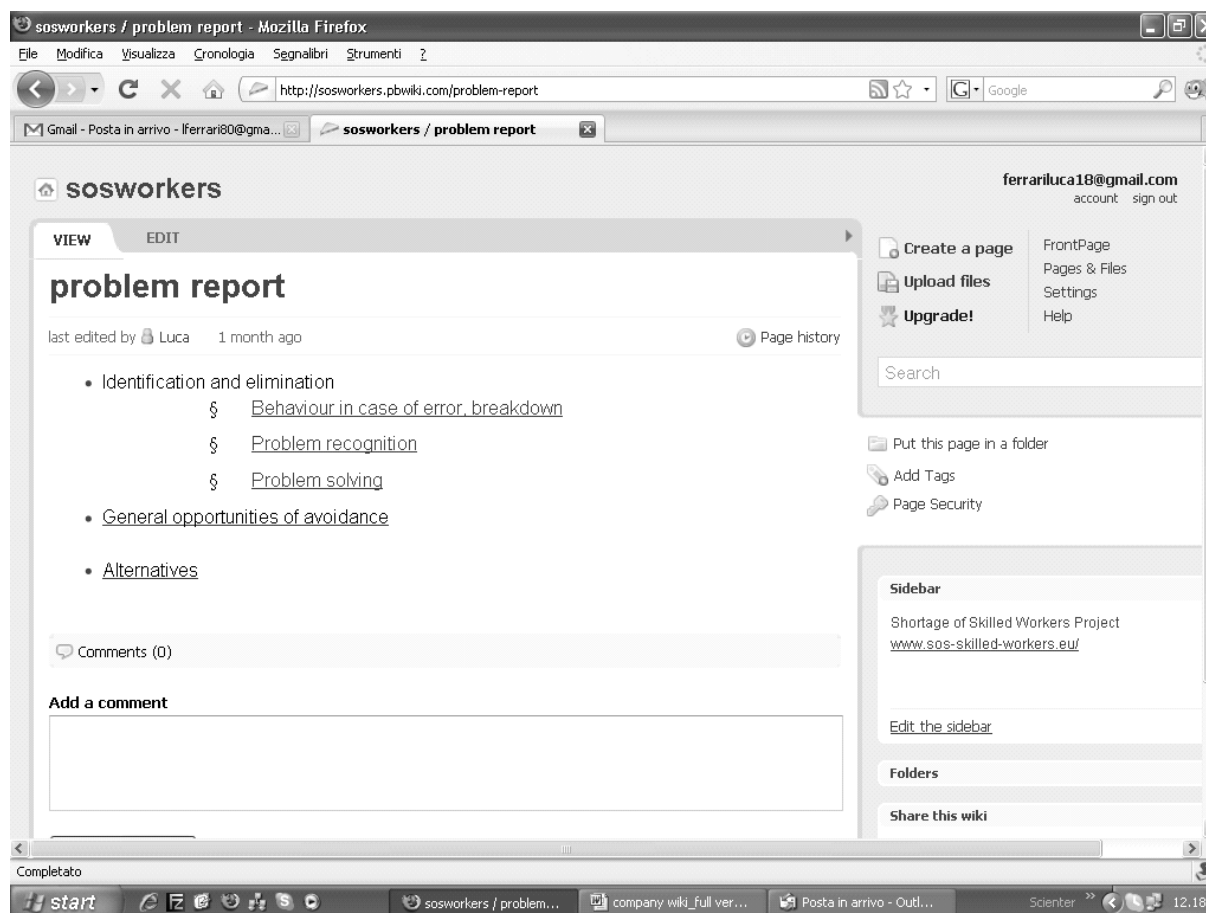

Figure 5:   *Screenshot »Problem Report«*

The forth sub-section *Customers* could be a strategically »agora« open not only for the company-employees, but also for the customers. In fact the Company-Wiki allows the creation of a bidirectional communication channel between the company and its internal or external partners.

The fifth sub-section *News* provides information about the current status of the staffing in the company. It lists which employees for example are absent due to holidays or further training. Other sub-categories are e.g. an instruction for shift changeover, further training initiatives and pages of so called experts (persons who can be contacted for certain tasks, processes etc.).
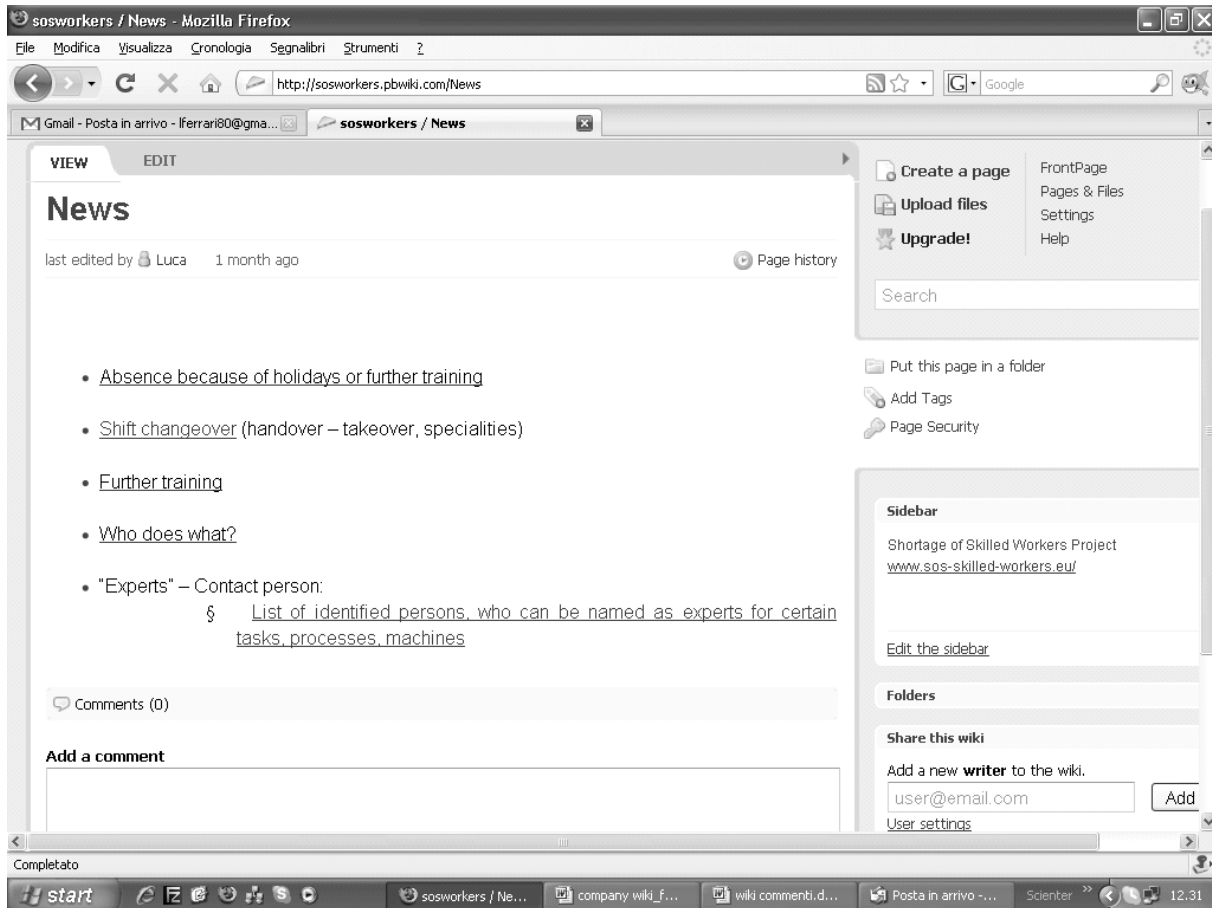
Figure 6:   *Screenshot »News«*

The sixth sub-section contains the procedures the employees have to follow in case of First aid, such as:

— Behaviour in case of emergency;
— Medical first aid guide.

The last section *Frequently asked questions* (F.A.Q) contains answers to common questions and problems. This section should be updated constantly, from both the management and employees.

5.2   Scenarios for Use

The Wiki system can be used in several ways and for several purposes. In the case of the outlined target group four usages are possible. First of all a Company-Wiki can be used for the documentation of a company's knowledge. Here, different approaches are possible: documentation in written form or with pictures, drawing or a mixed model. The second possible use is the creation of knowledge pools (adding new content, changing/updating existing content). The Wiki-System can also be used for contacting and interacting with customers. Problem solving is one further alternative. In problematic situations or in case of questions, skilled workers can search the Wiki for answers or possible solutions.

Two more scenarios are possible, that are applied preferable for management positions in medium sized enterprises. One is for the use of the system as a tool for project management, allowing for the coordination and management of steps and groups. Therefore, a report of success, failures, experiences and useful references can make the project work perfect.

The second scenario is the use of the system to organize meetings and conferences. The Wiki-System can make further contributions regarding the organisation of discussions and meetings. While information is communicated (e.g. by so-called news tickers) or send by newsletter regularly, people can be invited or pointed to meetings, discussions, conferences etc. and further procedures can be planned, coordinated and organised.

5.3 Handling

<u>Adding of new contents/changes of existing contents</u>

Ideally, in a first step the skilled worker takes handwritten notes of the information that need to be changed, corrected or taken up. If necessary the skilled worker draws a sketch or makes a convincing photo that completes the notes in a suggestive way. According to the situation different processes are possible:

a) On occasion the skilled worker enters the information directly into the Wiki system (e.g. in a workspace). In order to ensure a quality control this can happen at first on a discussion platform. Then, the positioned text can be adopted into the content platform by a moderator after being proved and edited. Maybe, an intermediate step is necessary, whereby the skilled worker adds and completes information by himself or after demand by the moderator.

b) The skilled worker hands on his handwritten information to the moderator, whereas further information can be conveyed verbally and comprehension problems can be clarified in a direct dialogue. Subsequently the moderator enters the information into the Wiki-System.

c) The skilled worker prepares the information for the Wiki-System on his own. For this purpose, he uses either a private computer or one provided by the company. The prepared side will be tested for the facts of the case and maybe edited by the moderator before its activation.

5.4 Examples of Content

The page *Examples of Content*, contains a series of practical examples related to the use of the Wiki in companies. The following four sub-categories »shift changeover«, »Who does what?«, »Experts« and »Other examples« are indicated below:
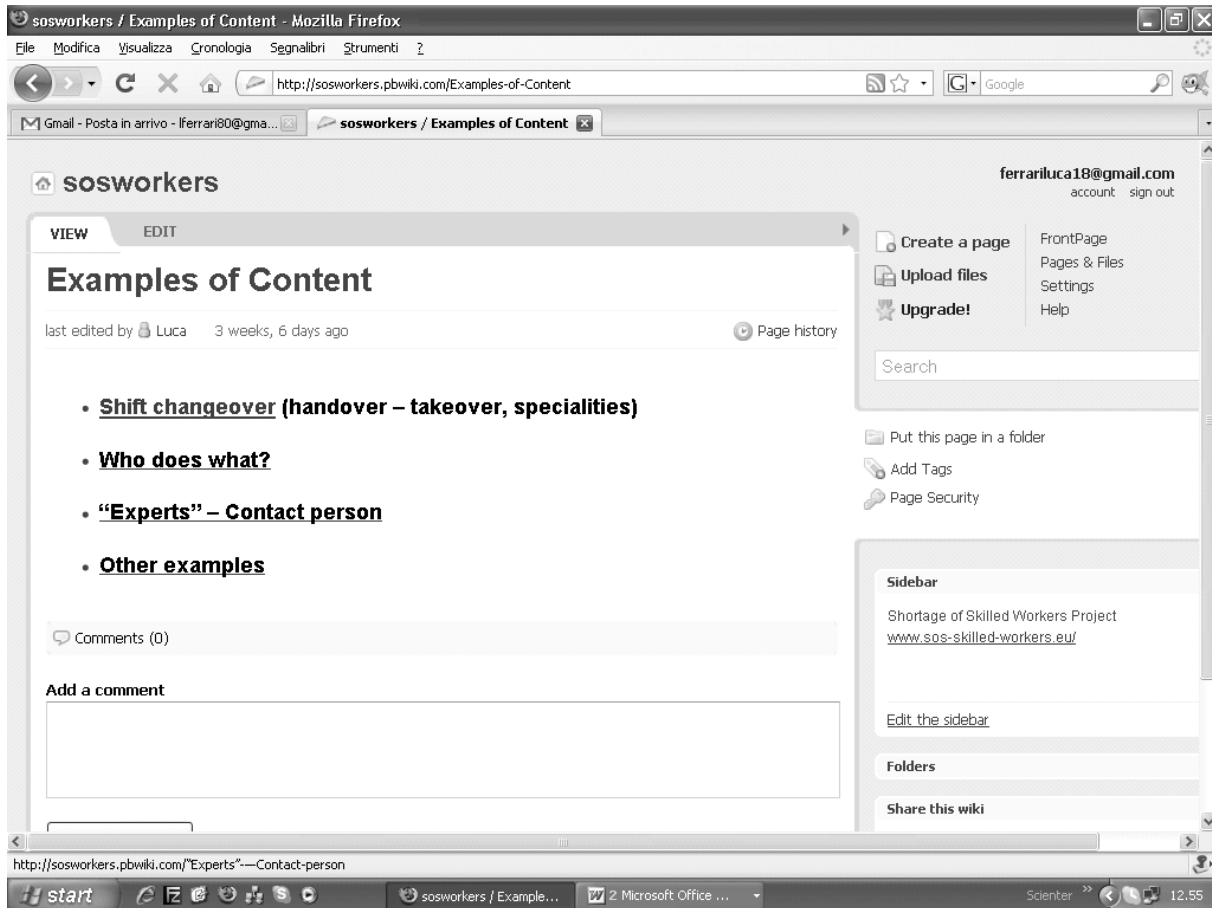
Figure 7: *Screenshot »Examples of Content«*

In the sub-category *Shift changeover* information can be entered over and shared by sections and domains of the stuff, e.g. from the morning to the late shift.

In the second sub-category *Who does what?* a grid or a list of can be put in, with which certain relationships become obvious, e.g. who is involved in which task, in which section. For instance, this section could be useful for the foremen/head of the department during the work planning.

Within the third sub-section *Experts* the opportunity is given to upload and share a list of professionals that is split up for sections/domains, positions and functions, names etc.
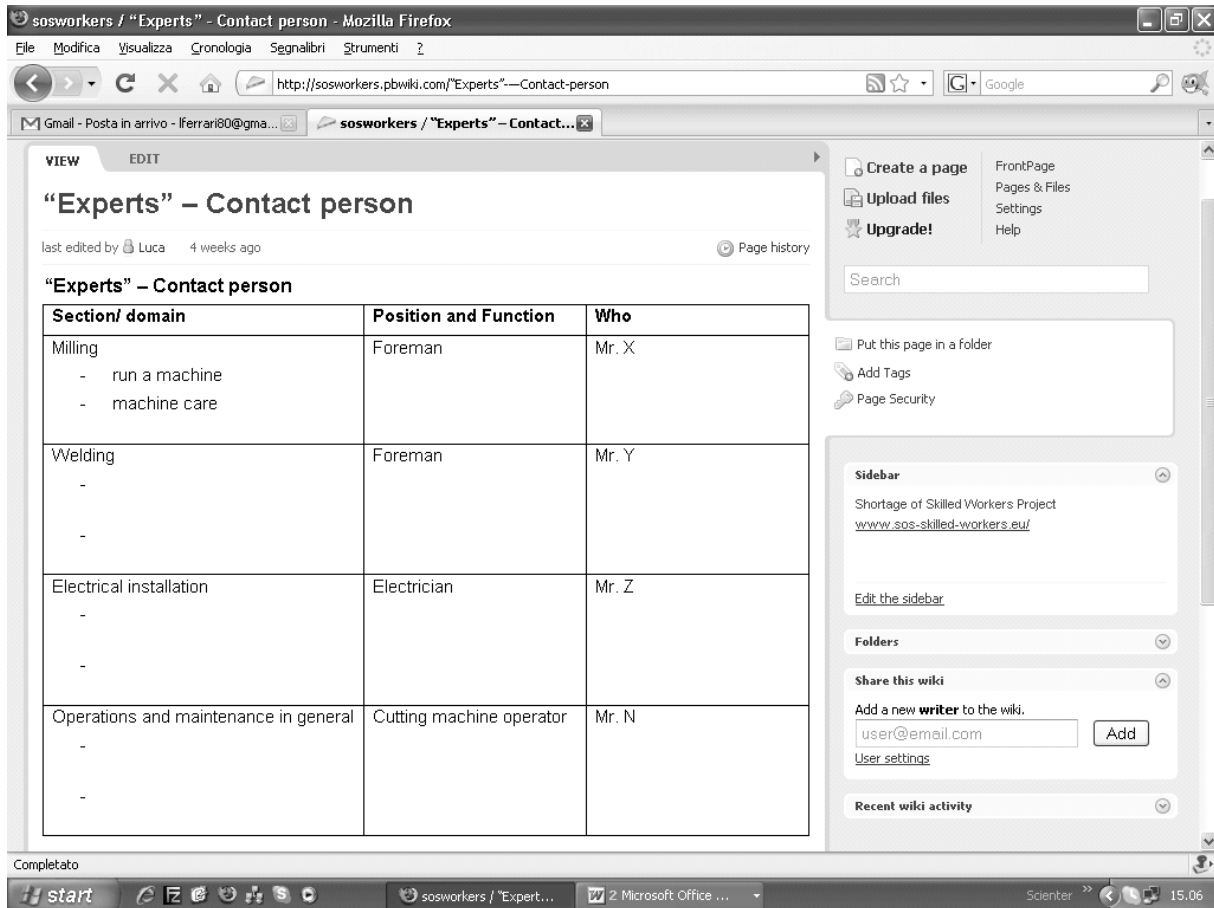
Figure 8: *Screenshot »Experts« - Contact Person*

The last sub-section »Experts« presents two other examples that contain a description regarding »Quality Assurance« and a configuration/list of specific content concerning the »shift change«.

6. Approach to introduction and realisation

The successful implementation of a Wiki-System in companies requires a comprehensive planning process and the consideration of different aspects. Figure 9 shows the implementation process:
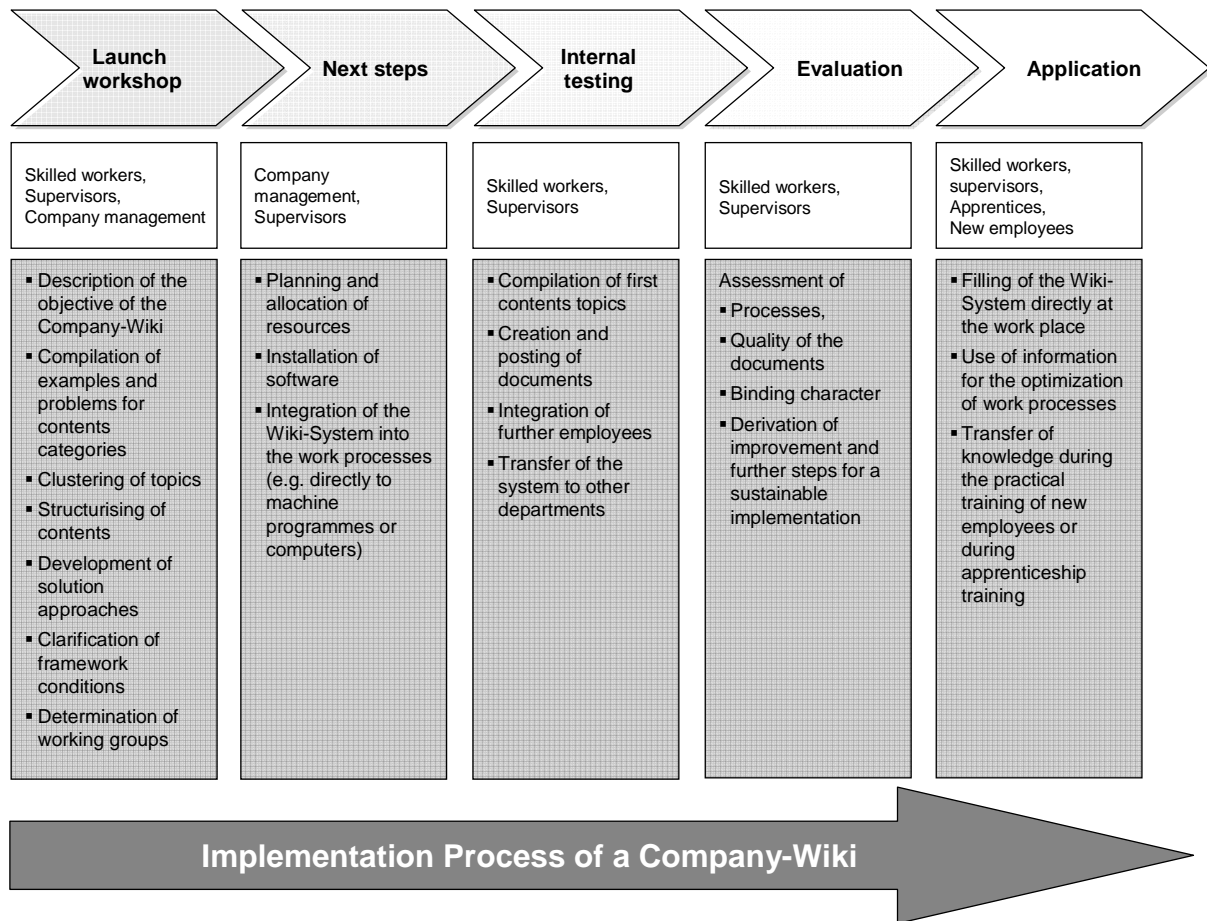
Launch workshop	Next steps	Internal testing	Evaluation	Application
Skilled workers, Supervisors, Company management	Company management, Supervisors	Skilled workers, Supervisors	Skilled workers, Supervisors	Skilled workers, supervisors, Apprentices, New employees
▪ Description of the objective of the Company-Wiki ▪ Compilation of examples and problems for contents categories ▪ Clustering of topics ▪ Structurising of contents ▪ Development of solution approaches ▪ Clarification of framework conditions ▪ Determination of working groups	▪ Planning and allocation of resources ▪ Installation of software ▪ Integration of the Wiki-System into the work processes (e.g. directly to machine programmes or computers)	▪ Compilation of first contents topics ▪ Creation and posting of documents ▪ Integration of further employees ▪ Transfer of the system to other departments	Assessment of ▪ Processes, ▪ Quality of the documents ▪ Binding character ▪ Derivation of improvement and further steps for a sustainable implementation	▪ Filling of the Wiki-System directly at the work place ▪ Use of information for the optimization of work processes ▪ Transfer of knowledge during the practical training of new employees or during apprenticeship training

Implementation Process of a Company-Wiki

Figure 9:   Implementation process of a Company-Wiki in the manufacturing sector

The first step of implementation is a workshop aimed at the information of the company management, skilled workers and supervisors on the objectives and expectations of a Company-Wiki. This is very important with regard to the background of the importance and the sustainable implementation of the instrument. If the whole purpose of the implementation of this instrument is understood and tangible, this will have a positive impact on the acceptance by the employees and the later use of the system. This is why the skilled workers – the prospective users of the system – will be directly involved in the development and the design of the Company-Wiki. Furthermore, examples and problems for contents categories will be compiled. The following topics could be used as contents categories:

— handover of tasks on the occasion of changes of shifts and vacations,
— given facts, problems and requirements for the handling of customers,
— optimization of the work processes,

— description of task processes and the operation of machines,
— trouble shooting and problem solving strategies (cause-effect-analysis),
— specific experience knowledge.

After the definition of content categories, the indicated topics will be clustered, i.e. summarized and structured according to themes and contents. This facilitates the derivation of solution approaches to be developed later. It is very important to clarify certain framework conditions. For example: Who prepares which documents at what time and how can the benefits, the amendments, the differentiation and the updating of the Wiki-contents be ensured? Finally working groups will be assigned certain topics to deal with and which will take care of the formulation of contents categories.

The company management and the supervisors have to take care of the planning and provide the necessary resources for the implementation process. This includes a sufficient number of personal computers and the direct integration into the work processes, e.g. via processing programmes of machines and plants. Additional supporting measures can be offered in the form of prepared information and via the Internet.

An internal Company-Wiki test will be carried out by the skilled workers and their supervisors. These groups of persons compile the first topics for the documents to be prepared and feed them into the system. After an initial testing phase, more employees of the company will be involved. They will be supported and instructed by the experienced users of the system. In this way the transfer of the system to other departments of the company can be accomplished.

The assessment of the system by skilled workers and supervisors is the next step of the implementation process. In this phase the individual processes and the quality of the documents are discussed and validated, as well as the binding character of the available documents. Ideas for improvement and further steps towards a sustainable implementation of the system into the company will be derived. The objective is to stepwise replenish the Wiki-System with contents.

The Company-Wiki will be eventually used by all employees in the company, including apprentices. The Wiki-System will be filled directly at the work place and this is where all required information is directly accessible. The use of the system can thus directly contribute to the optimization of work processes.

Such an implementation process requires a comprehensive planning effort and a permanent communication within all individual implementation steps. These are the prerequisites for a sustainable and successful implementation of a Company-Wiki.

7. Summary and prospects

The Company-Wiki has been »tested« in four of the six countries that are involved into the project. Throughout the use of the test platforms field reports have been prepared, that give information about and an overview of several opinions in companies.

In Germany the Wiki-System was visualised and presented with all its specific characteristics, requirements, benefits and all necessary steps within a company in southern Germany, in Baden-Württemberg. This company has been visited in the context of the case studies at the beginning of the project in order to analyse the skilled workers' situation and practiced initiatives and measures to reduce the shortage of specialists. The system was tested by seven members of the company (work council, human resources manager, personnel specialist, head of apprenticeship and further training, trainer, IT and one co-worker of the domain quality assurance/knowledge management).

The necessity to introduce and implement a knowledge management system was supported by all participants. Due to the own experiences of the enterprise mainly critical points and difficulties were discussed concerning the realisation. Up to now the company failed with the implementation, because they tried to document quite complex processes and elements of knowledge. This happened on the middle level in the enterprise. During the discussion it becomes apparent that the level of skilled workers was not in the focus of the management so far. To give reasons the difficulty of the knowledge transfer from elderly members of the staff having specific know-how as well as a marginal acceptance of the platform were indicated. Together with all participants ideas and domains were identified, which could be interesting for a Company-Wiki. The emphasis was to come up with a simple process that can be implemented more easily in the company. Based on this experience, it can be recommended to start the construction of a Company-Wiki with simple processes in the company. Before an implementation into all domains can take place the provision and introduction should first occur in divisions separately.

Apart from the consideration of many aspects and the answering of numerous questions in the company, a »sensitive« and integrating handling/introduction as well as a good communication seems to be necessary for implementing a Wiki system in a company. Based on this fact it is important to identify and integrate further aspects allowing the Wiki-System to be accepted and thus contribute to success.

In the Netherlands the Wiki has been tested in two companies (in a sheet metal plating company with 1000 employees and its own company school and another metal company for cutting and shaping metal, with about 45 employees).

In both companies the Wiki-System has been evaluated as a suitable and effective tool for the use in companies, although for one company it seems to be safer to use the intranet only for transportation of information.

To sum up, the visited companies contemplate the implementation of such an instrument. However, a few questions have to be answered before. Furthermore the Wiki-System has to be filled with some content in order to show the character and to make it easier for the users to practice with it. In addition to that a list with hints (not too long) available on aspects that

need attention in a view of the specific situation can be a suitable solution. The list can be indexed e.g. to material and machines that are used, the size, production specifications etc. The interviewed companies indicated that a section with field and experience reports of the use of enterprises would be a good addition. Nevertheless the aspect of motivation has to be considered in a special way in order to think about incentives for the users to keep in practice. A full description of the instrument and its certain steps has to be prepared or customised.

The results of the testing in Slovenian companies led to the same suggestions as the two outlined above. Although the four interviewed companies, contacted for the case studies in the beginning of the project, gave positive feedback about the discussed approach, there were some critical aspects. It has been mentioned that this instrument will hold a lot of benefits, but some expenses concerning time and a detailed planning were expected. Slovenian countries already use intranet-based systems for the information of employees that contents several costs. However, this is not perceived as a barrier to companies, the cost of software is negligible in comparison to all other expenses of introducing such a system. These companies will choose reliable software that allows considering their specific aspects and needs:

— engineer portal (technical information, standards and technical legislation),
— offer of education for employees, calendar of courses,
— forum for new ideas and opportunities,
— definition of technologies which are implemented in a company,
— presentation of company business,
— bureaucracy (forms, samples of documents which are used in a company etc),
— internal acts, standards and regulations,
— instructions for training of apprentices,
— research (what research is in progress at the company, reports, articles etc).

Companies that already use this kind of software do not want to change it. Otherwise the possibility of introducing another system is given, but usually intranet and intranet-based instruments are maintained and restricted for a narrow circle of authorized employees who are responsible for publishing all contents in the intranet. Roles and functions are regularised to certain groups of employees, skilled workers are not involved in the utilisation.

In Italy the validation and evaluation of the Company-Wiki focused on two aspects, the technical framework and the content. With regard to these the Wiki has been treated as a useful and efficient instrument. The involvement of employees in the manufacturing sector as target group will permit to adjust the Wiki-System according to their requirements and features, in particular with respect to their daily work.

Considering the technical framework some concrete conclusions can be made. They can be entitled as:

— user friendliness,
— plug-ins, Modules or Extensions (to adjust the system to individual needs)
— traceability,
— amount of memory,

— template.

To improve the content that is lodged, the following recommendations can be specified:

— adding a list of competencies/skills with the aim of creating a sort of job profile, according to the capacities for each role and function;
— consideration of safety aspects;
— adding a guideline for the workers on how to write their notes;
— more detailed and specific description of examples in order to help employees; models and templates would help to conceptualise the roles, profiles and required skills of the users;
— clarification of responsibilities concerning the content, the function of each user and the roles; establishment of a small focus group that tests and learns to practice with the instrument;
— clarification of knowledge management structuring and organisation in companies (in order to guaranty efficiency); familiarisation of a moderator (»knowledge moderator«) in order to take advantage of the inputs, to categorise the knowledge material and to provide it.

These four national summaries of feedback clearly show the possibilities of introduction and implementation of a Company-Wiki as well as its necessary improvements. Considering the aspects mentioned this instrument is suitable for the practice to collect, structure, manage and transfer certain knowledge domains.

Nr. 1 **Bernd Haasler, Olaf Herms, Michael Kleiner:** *Curriculumentwicklung mittels berufswis-senschaftlicher Qualifikationsforschung*
Bremen, Juli 2002, 3,– €, ISSN 1610-0875

Nr. 2 **Fred Manske, Yong-Gap Moon:** *Differenz von Technik als Differenz von Kulturen? EDI-Systeme in der koreanischen Automobilindustrie*
Bremen, November 2002, 3,– €, ISSN 1610-0875

Nr. 3 **Felix Rauner:** *Modellversuche in der beruflichen Bildung: Zum Transfer ihrer Ergebnisse*
Bremen, Dezember 2002, 3,– €, ISSN 1610-0875 X

Nr. 4 **Bernd Haasler:** *Validierung Beruflicher Arbeitsaufgaben: Prüfverfahren und Forschungsergebnisse am Beispiel des Berufes Werkzeugmechaniker*
Bremen, Januar 2003, 3,– €, ISSN 1610-0875

Nr. 5 **Philipp Grollmann, Nikitas Patiniotis, Felix Rauner:** *A Networked University for Vocational Education and Human Resources Development*
Bremen, Februar 2003, 3,– €, ISSN 1610-0875

Nr. 6 **Martin Fischer, Philipp Grollmann, Bibhuti Roy, Nikolaus Steffen:** *E-Learning in der Berufsbildungspraxis: Stand, Probleme, Perspektiven*
Bremen, März 2003, 3,– €, ISSN 1610-0875

Nr. 7 **Simone Kirpal:** *Nurses in Europe: Work Identities of Nurses across 4 European Countries*
Bremen, Mai 2003, 3,– €, ISSN 1610-0875

Nr. 8 **Peter Röben:** *Die Integration von Arbeitsprozesswissen in das Curriculum eines betrieblichen Qualifizierungssystems*
Bremen, Juli 2003, 3,– €, ISSN 1610-0875

Nr. 9 **Philipp Grollmann, Susanne Gottlieb, Sabine Kurz:** *Berufsbildung in Dänemark: dual und kooperativ?*
Bremen, Juli 2003, 3,– €, ISSN 1610-0875

Nr. 10 **Bernd Haasler:** *»BAG-Analyse« – Analyseverfahren zur Identifikation von Arbeits- und Lern-inhalten für die Gestaltung beruflicher Bildung*
Bremen, Juli 2003, 3,– €, ISSN 1610-0875

Nr. 11 **Philipp Grollmann, Morgan Lewis:** *Kooperative Berufsbildung in den USA*
Bremen, Juli 2003, 3,– €, ISSN 1610-0875

Nr. 12 **Felix Rauner:** *Ausbildungspartnerschaften als Regelmodell für die Organisation der dualen Berufsausbildung?*
Bremen, Juli 2003, 3,– €, ISSN 1610-0875

Nr. 13 **Philipp Grollmann, Susanne Gottlieb, Sabine Kurz:** *Co-operation between enterprises and vocational schools – Danish prospects*
Bremen, Juli 2003, 3,– €, ISSN 1610-0875

Nr. 14 **Felix Rauner:** *Praktisches Wissen und berufliche Handlungskompetenz*
Bremen, Januar 2004, 3,– €, ISSN 1610-0875

Nr. 15 **Gerald A. Straka:** *Informal learning: genealogy, concepts, antagonisms and questions*
Bremen, November 2004, 3,– €, ISSN 1610-0875

Nr. 16 **Waldemar Bauer:** *Curriculumanalyse der neuen Elektroberufe – 2003*
Bremen, November 2004, 3,– €, ISSN 1610-0875

Nr. 17 **Felix Rauner:** *Die Berufsbildung im Berufsfeld Elektrotechnik-Informatik vor grundlegenden Weichenstellungen?*
Bremen, Dezember 2004, 3,– €, ISSN 1610-0875

Nr. 33 **Simone Kirpal, Roland Tutschner:** *Berufliches Bildungspersonal: Schlüsselakteure lebenslangen Lernens*
Bremen, September 2008, 3,– €, ISSN 1610-0875

Nr. 34 **Heike Arold, Claudia Koring, Lars Windelband:** *Qualifizierungsbedarfe, -ansätze und -strategien im Secondhand Sektor – Ein Europäischer Good-Practice-Bericht*
Bremen, Oktober 2008, 3,– €, ISSN 1610-0875

Nr. 35 **Heike Arold, Claudia Koring, Lars Windelband:** *Qualification Needs, Approaches and Strategies in the Second-Hand Sector – A European Good Practice Report*
Bremen, Oktober 2008, 3,– €, ISSN 1610-0875

Nr. 36 **Lars Windelband, Judith Schulz:** *Qualifizierungs- und Personalentwicklungskonzepte zur Reduzierung des Fachkräftemangels im produzierenden Sektor*
Bremen, Dezember 2008, 3,– €, ISSN 1610-0875

Nr. 37 **Judith Schulz, Lars Windelband:** *Fachkräftemangel in der Metall- und Elektroindustrie im europäischen Vergleich*
Bremen, Dezember 2008, 3,– €, ISSN 1610-0875

Nr. 38 **Klaus Ruth, Philipp Grollmann:** *Monitoring VET Systems of Major EU Competitor Countries – The Cases of Australia, Canada, U.S.A. and Japan*
Bremen, Januar 2009, 3,– €, ISSN 1610-0875

Nr. 39 **Klaus Ruth, Philipp Grollmann:** *Monitoring VET Systems of Major EU Competitor Countries – The Cases of China, India, Russia and Korea*
Bremen, Januar 2009, 3,– €, ISSN 1610-0875

Nr. 40 **Gerald A. Straka, Gerd Macke:** *Neue Einsichten in Lehren, Lernen und Kompetenz*
Bremen, Februar 2009, 3,– €, ISSN 1610-0875

Nr. 41 **Simone Kirpal, Wolfgang Wittig:** *Training Practitioners in Europe: Perspectives on their work, qualification and continuing learning*
Bremen, Mai 2009, 3,– €, ISSN 1610-0875

Nr. 42 **Judith Schulz:** *Company-Wiki as a knowledge transfer instrument for reducing the shortage of skilled workers*
Bremen, Mai 2009, 3,– €, ISSN 1610-0875

Nr. 43 **Roland Tutschner, Wolfgang Wittig, Justin Rami (Eds.):** *Accreditation of Vocational Learning Outcomes: Perspectives for a European Transfer*
Bremen, Mai 2009, 3,– €, ISSN 1610-0875

Reihe ITB-Arbeitspapiere

Nr. 1   **G. Blumenstein; M. Fischer:** *Aus- und Weiterbildung für die rechnergestützte Arbeitsplanung und -steuerung*
Bremen, Juni 1991, 5,23 €, ISBN 3-9802786-0-3

Nr. 2   **E. Drescher:** *Anwendung der pädagogischen Leitidee Technikgestaltung und des didaktischen Konzeptes Handlungslernen am Beispiel von Inhalten aus der Mikroelektronik und Mikrocomputertechnik*
Bremen, 1991, 3,14 €, ISBN 3-9802786-1-1

Nr. 3   **F. Rauner; K. Ruth:** *The Prospects of Anthropocentric Production Systems: A World Comparison of Production Models*
Bremen, 1991, 4,18 €, ISBN 3-9802786-2-X

Nr. 4   **E. Drescher:** *Computer in der Berufsschule*
Bremen, 1991, 4,67 €, ISBN 3-9802786-3-8   *(Vergriffen)*

Nr. 5   **W. Lehrl:** *Arbeitsorganisation als Gegenstand beruflicher Bildung*
Bremen, März 1992, 5,23 €, ISBN 3-9802786-6-2

Nr. 6   **ITB:** *Bericht über Forschungsarbeiten (1988-1991) und Forschungsperspektiven des ITB*
Bremen, 1992, 5,23 €, ISBN 3-9802786-7-0

Nr. 7   **ITB:** *Bericht über die aus Mitteln des Forschungsinfrastrukturplans geförderten Forschungsvorhaben*
Bremen, 1992, 5,23 €, ISBN 3-9802786-8-9   *(Vergriffen)*

Nr. 8   **F. Rauner; H. Zeymer:** *Entwicklungstrends in der Kfz-Werkstatt. Fort- und Weiterbildung im Kfz-Handwerk*
Bremen, 1993, 3,14 €, ISBN 3-9802786   **(Vergriffen)**

Nr. 9   **M. Fischer (Hg.):** *Lehr- und Lernfeld Arbeitsorganisation. Bezugspunkte für die Entwicklung von Aus- und Weiterbildungskonzepten in den Berufsfeldern Metall- und Elektrotechnik*
Bremen, Juni 1993, 5,23 €, ISBN 3-9802786-9-7   *(Vergriffen)*

Nr. 11   **ITB:** *Bericht über Forschungsarbeiten 1992-1993*
Bremen, 1994, 6,78 €, ISBN 3-9802786-5-4

Nr. 12   **M. Fischer; J. Uhlig-Schoenian (Hg.):** *Organisationsentwicklung in Berufsschule und Betrieb – neue Ansätze für die berufliche Bildung. Ergebnisse der gleichnamigen Fachtagung vom 10. und 11. Oktober 1994 in Bremen*
Bremen, März 1995, 5,23 €, ISBN 3-9802962-0-2 **(Vergriffen)**

Nr. 13   **F. Rauner; G. Spöttl:** *Entwicklung eines europäischen Berufsbildes „Kfz-Mechatroniker" für die berufliche Erstausbildung unter dem Aspekt der arbeitsprozeßorientierten Strukturierung der Lehr-Inhalte*
Bremen, Oktober 1995, 3,14 €, ISBN 3-9802962-1-0

Nr. 14   **P. Grollmann; F. Rauner:** *Sccenarios and Strategies for Vocational Education and Training in Europe*
Bremen, Januar 2000, 10,23 €, ISBN 3-9802962-9-6   *(Vergriffen)*

Nr. 15   **W. Petersen; F. Rauner:** *Evaluation und Weiterentwicklung der Rahmenpläne des Landes Hessen, Berufsfelder Metall- und Elektrotechnik*
Bremen, Februar 1996,4,67 €, ISBN 3-9802962-3-7   *(Vergriffen)*

Nr. 16   **ITB:** *Bericht über Forschungsarbeiten 1994-1995*
Bremen, 1996, 6,78 €, ISBN 3-9802962-4-5   *(Vergriffen)*

Nr. 17   **Y. Ito; F. Rauner; K. Ruth:** *Machine Tools and Industrial Cultural Traces of Production*
Bremen, Dezember 1998, 5,23 €, ISBN 3-9802962-5-3   *(Vergriffen)*

Nr. 18   **M. Fischer (Hg.):** *Rechnergestützte Facharbeit und berufliche Bildung – Ergebnisse der gleich-namigen Fachtagung vom 20. und 21. Februar 1997 in Bremen*
Bremen, August 1997, 5,23 €, ISBN 3-9802962-6-1

Nr. 19   **F. Stuber; M. Fischer (Hg.):** *Arbeitsprozeßwissen in derProduktionsplanung und Organisati-on. Anregungen für die Aus- und Weiterbildung.*
Bremen, 1998, 5,23 €, ISBN 3-9802962-7-X *(Vergriffen)*

Nr. 20   **ITB:** *Bericht über Forschungsarbeiten 1996-1997*
Bremen, 1998, 6,78 €, ISBN 3-9802962-8-8

Nr. 21   **Liu Ming-Dong:** *Rekrutierung und Qualifizierung von Fachkräften für die direkten und indirek-ten Prozessbereiche im Rahmen von Technologie-Transfer-Projekten im Automobilsektor in der VR China. – Untersucht am Beispiel Shanghai-Volkswagen.*
Bremen, 1998. 6,76 €, ISBN 3-9802962-2-9

Nr. 22   **ITB:** *Bericht über Forschungsarbeiten 1998-1999*
Bremen, 2000, 12,78 €, ISSN 1615-3138

Nr. 23   **L. Hermann (Hg.):** *Initiative für eine frauenorientierte Berufsbildungsforschung in Ländern der Dritten Welt mit Fokussierung auf den informellen Sektor.*
Bremen, 2000, 7,67 €, ISSN 1615-3138

Nr. 24   **Mahmoud Abd El-Moneim El-Morsi El-zekred:** *Entwicklung von Eckpunkten für die Berufsbildung im Berufsfeld Textiltechnik in Ägypten.*
Bremen, 2002, 10,50 €, ISSN 1615-3138

Nr. 25   **O. Herms (Hg.):** *Erfahrungen mit energieoptimierten Gebäuden.*
Bremen, 2001, 7,67 €, ISSN 1615-3138

Nr. 26   **Yong-Gap Moon:** *Innovation für das Informationszeitalter: Die Entwicklung interorganisationa-ler Systeme als sozialer Prozess – Elektronische Datenaustausch-Systeme (EDI) in der koreanischen Automobilindustrie.*
Bremen, 2001, 11,76 €, ISSN 1615-3138

Nr. 27   **G. Laske (Ed.):** *Project Papers: Vocational Identity, Flexibility and Mobility in the European Labour Market (Fame).*
Bremen, 2001, 11,76 €, ISSN 1615-3138

Nr. 28   **F. Rauner; R. Bremer:** *Berufsentwicklung im industriellen Dienstleistungssektor.*
Bremen, 2001, 7,67 €, ISSN 1615-3138

Nr. 29   **M. Fischer; P. Röben (Eds.):** *Ways of Organisational Learning in the Chemical Industry and their Impact on Vocational Education and Training.*
Bremen, 2001, 10,23 €, ISSN 1615-3138

Nr. 30   **F. Rauner; B. Haasler:** *Berufsbildungsplan für den Werkzeugmechaniker.*
Bremen, 2001, 3. Aufl., 7,67 €, ISSN 1615-3138

Nr. 31   **F. Rauner; M. Schön; H. Gerlach; M. Reinhold:** *Berufsbildungsplan für den Industrie-elektroniker.*
Bremen, 2001, 3. Aufl., 7,67 €, ISSN 1615-3138

Nr. 32   **F. Rauner; M. Kleiner; K. Meyer:** *Berufsbildungsplan für den Industriemechaniker.*
Bremen, 2001, 3. Aufl., 7,67 €, ISSN 1615-3138

Nr. 33   **O. Herms; P. Ritzenhoff; L. Bräuer:** *EcoSol: Evaluierung eines solaroptimierten Gebäudes.*
Bremen, 2001, 10,23 €, ISSN 1615-3138

Nr. 34   **W. Schlitter-Teggemann:** *Die historische Entwicklung des Arbeitsprozeßwissens im Kfz-Servide – untersucht an der Entwicklung der Service-Dokumentationen*
Bremen, 2001, 12,78 €, ISSN 1615-3138

Reihe ITB-Arbeitspapiere

Nr. 35 **M. Fischer; P. Röben:** *Cases of organizational learning for European chemical companies*
Bremen, 2002, 7,67 €, ISSN 1615-3138

Nr. 36 **F. Rauner; M. Reinhold:** *GAB – Zwei Jahre Praxis.*
Bremen, 2002, 7,67 €, ISSN 1615-3138

Nr. 37 **R. Jungeblut:** *Facharbeiter in der Instandhaltung.*
Bremen, 2002, 10,50 €, ISSN 1615-3138

Nr. 38 **A. Brown (Ed.) and PARTICIPA Project Consortium:** *Participation in Continuing Vocational Education and Training (VET): a need for a sustainable employability. A state of the art report for six European countries.*
Bremen, 2004, 10,00 €, ISSN 1615-3138

Nr. 39 **L. Deitmer, L. Heinemann:** *Skills demanded in University-Industry-Liaison (UIL).*
Bremen, Neuaufl. 2003, 8,67 €, ISSN 1615-3138

Nr. 40 **F. Manske, D. Ahrens, L. Deitmer:** *Innovationspotenziale und -barrieren in und durch Netzwerke*
Bremen, 2002, 8,67 €, ISSN 1615-3138

Nr. 41 **S. Kurz:** *Die Entwicklung berufsbildender Schulen zu beruflichen Kompetenzzentren.*
Bremen, 2002, 7,67 €, ISSN 1615-3138

Nr. 42 **ITB:** *Bericht über Forschungsarbeiten 2000-2001*
Bremen, 2002, 6,78 €, ISSN 1615-3138

Nr. 43 **F. Rauner, P. Diebler, U. Elsholz:** *Entwicklung des Qualifikationsbdarfs und der Qualifizierungswege im Dienstleistungssektor in Hamburg bis zum Jahre 2020*
Bremen, 2002, 8,67 €, ISSN 1615-3138

Nr. 44 **K. Gouda Mohamed Mohamed:** *Entwicklung eines Konzeptes zur Verbesserung des Arbeitsprozessbezugs in der Kfz-Ausbildung in Ägypten*
Bremen, 2003, 10,50 €, ISSN 1615-3138

Nr. 46 **FAME Consortium:** *Project Papers: Work-Related Identities in Europe. How Personnel Management and HR Policies Shape Workers' Identities.*
Bremen, 2003, 8,00 €, ISSN 1615-3138

Nr. 47 **M. Fischer & P. Röben:** *Organisational Learning and Vocational Education and Training. An Empirical Investigation in the European Chemical Industry.*
Bremen, 2004, 9,00 €, ISSN 1615-3138

Nr. 48 **ITB:** *Bericht über Forschungsarbeiten 2002-2003*
Bremen, 2004, 6,80 €, ISSN 1615-3138

Nr. 49 **S. Kirpal:** *Work Identities in Europe: Continuity and Change*
Bremen, 2004, 9,00 €, ISSN 1615-3138

Nr. 50 **T. Mächtle unter Mitarbeit von M. Eden:** *Bremer Landesprogramm. Lernortverbünde und Ausbildungspartnerschaften. Zwischenbilanz.*
Bremen, 2004, 10,00 €, ISSN 1615-3138

Nr. 51 **A. Brown, P. Grollmann, R. Tutschner, PARTICIPA Project Consortium:** *Participation in Continuing Vocational Education and Training.*
Bremen, 2004, 5,00 €, ISSN 1615-3138

Nr. 52 **Bénédicte Gendron:** *Social Representations of Vocational Education and Training in France through the French Vocational Baccalauréat Case-Study.*
Bremen, 2005, 5,00 €, ISSN 1615-3138

Nr. 53 **Kurt Henseler, Wiebke Schönbohm-Wilke (Hg.):** *Und nach der Schule? Beiträge zum »Übergang Schule-Beruf« aus Theorie und Praxis*
Bremen, 2005, 5,00 €, ISSN 1615-3138

Nr. 54 **A. Brown, P. Grollmann, R. Tutschner, PARTICIPA Project Consortium:** *Participation in Continuing Vocational Education and Training. Results from the case studies and qualitative investigations.*
Bremen, 2005, 5,00 €, ISSN 1615-3138

Nr. 55 **Philipp Grollmann, Marja-Leena Stenström (Eds.):** *Quality Assurance and Practice-oriented Assessment in Vocational Education and Training: Country Studies*
Bremen, 2005, 5,00 €, ISSN 1615-3138

Nr. 57 **Bernd Haasler, Meike Schnitger:** *Kompetenzerfassung bei Arbeitssuchenden – eine explorative Studie unter besonderer Berücksichtigung des Sektors privater Arbeitsvermittlung in Deutschland.*
Bremen, 2005, 5,00 €, ISSN 1615-3138

Nr. 58 **Felix Rauner:** *Berufswissenschaftliche Arbeitsstudien. Zum Gegenstand und zu den Methoden der empirischen Untersuchung berufsförmig organisierter Facharbeit.*
Bremen, 2005, 5,00 €, ISSN 1615-3138

Nr. 59 **Institut Technik und Bildung:** *Bericht über Forschungsarbeiten 2004-2005*
Bremen, 2006, 5,00 €, ISSN 1615-3138

Nr. 60 **Eileen Lübcke, Klaus Ruth, Il-Sop Yim:** *Corporate Social Responsibility »Made In China« – Eine explorative Studie zur Bedeutung arbeitspolitischer Dimensionen für die gesellschaftliche Verantwortung deutscher und koreanischer multinationaler Konzerne in China*
Bremen, 2007, 5,00 €, ISSN 1615-3138

Nr. 61 **Heike Arold, Claudia Koring:** *Neue berufliche Wege und Qualifikationen zur Professionalisierung des Secondhand-Sektors*
Bremen, 2008, 5,00 €, ISSN 1615-3138

Nr. 62 **Heike Arold, Claudia Koring:** *New Vocational Ways and Qualifications for Professionalisation in the Second-Hand Sector*
Bremen, 2008, 5,00 €, ISSN 1615-3138

Nr. 63 **Institut Technik und Bildung:** *Bericht über Forschungsarbeiten 2006-2007*
Bremen, 2008, 5,00 €, ISSN 1615-3138