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THE PROJECT IS OVER - THE KNOWLEDGE IS LOST? DLR'S PROJECT DATABASE.

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Abstract

The German Aerospace Centre Center (DLR, Deutsches Zentrum für Luft- und Raumfahrt) reorganized its knowledge management processes with an initiation project called "Establishing an integrated knowledge management system" (EIWis) to close identified critical knowledge gaps. One of the biggest issues was the availability of project data for other project managers during and especially after the project.

More than thousand projects are realized in DLR per annum. This means that there is much project knowledge from the past and present which could help to start a new project, to realize it and to achieve success. Lessons Learned from other projects exist somewhere, which can be valuable for a new project. Many project managers work in DLR who could help to solve specific problems in the project realization. Others are experts in their fields, but not easy to identify in a big organization, which has a large variety of research topics.

The challenge was to build a network between people, project information and the organization. Approaches to link people and the organization were already part of the EIWis project. Therefore DLR introduced a people's directory and knowledge sharing workshops. For information sharing, another component of EIWis was very fruitful: the DLR.Wiki. But the Wiki alone was not capable to fulfill the demands of project managers, who need more detailed and structured information about projects. That meant for us that the DLR.Wiki was a solid base for a Project Database, but the final Project Database needed more enhancements.

The purpose of the paper is to show how DLR developed its own Project Database according to the needs of project managers and where the advantages and limitations are. Besides, an overview of the Project Database interaction with the other components of the Knowledge Management System will be given.

Keywords: (Project Database, knowledge management, networking)

1. Introduction

DLR is Germany's Space Agency planning and implementing the German space program and representing Germany's interests internationally. This way it contributes the scientific and technical know-how that it has gained. It promotes the next generation of scientists and provides advisory services to the German government. As the national research center DLR does extensive research and development work in aeronautics, space, transportation, energy, defense and security being integrated into national and international cooperative ventures. Approximately 8000 people work within 33 institutes and facilities at 16 locations. More than thousand projects are realized in DLR per annum. [1]

The wide range of activities makes it obvious that many synergies can be raised if there is an inter-branch knowledge management (KM) that supports the distribution and exchange of knowledge.

DLR's output is always knowledge. Even though the "products" are not always declared as knowledge output, they are always in a context of research and bound to the knowledge of DLR. The knowledge-output itself can be e.g. in the form of prototypes, services, project results, scientific statements, applications, papers etc. DLR needs knowledge as a first input. It needs knowledge in every process step to create new knowledge as an output and is therefore a knowledge organization.

1.1 DLR's methodical knowledge in processes

But also the internal methodical knowledge, for instance how to manage a project, is an important value for DLR. New employees need to be able to get all information to work motivated and efficiently. Any forgotten knowledge, e.g. during a change of IT devices, is a waste of time and money, which must be avoided. Besides, it should be prevented that all employees do

any redundant work that has already been done by someone else. Since DLR has already established a quality management system and is widely organized in processes, the internal preconditions at DLR for knowledge management are already set. [2]

With this groundwork, a foundation was laid to establish a KM system that intends to bring the right knowledge to the right people whenever they need it. Therefore the board of DLR launched the project called “Establishing an Integrated Knowledge Management System” (EIWis). [3]

This establishing project was finished 2015 and since then two employees take responsibility in a KM group located in the strategy department.

1.2 DLR’s Knowledge Management Concept

The German Aerospace Center established KM processes to close identified, critical knowledge gaps. Essential was the stakeholder analysis and a survey among all employees. The results of the survey were interpreted, and then adequate components to meet the requirements were found and brought into a concept. This concept got approved by the advisory board (see Fig. 1).

These components were implemented by a team of central DLR divisions, e.g. human resources, IT management and strategy. The complete system was sequentially rolled out to all employees component by component coming along with information campaigns and activities to raise participation. In June 2016 the last component “Project Database” was rolled out finishing the implementation phase, but the marketing activities still continue.

The employees voted for a balance between components which are IT tools and components that help to exchange knowledge personally. This indicates that employees do not want to communicate only via IT-tools. The conclusion was that personal contact between social beings is essential in communication and cannot be substituted by IT like E-Mail and Wikis. [3]

So the IT role is to provide more transparency in communication and draft work as well as showing interconnections between topics and data silos to support finding the knowledge, experts and information that already exist.

For the personal knowledge exchange some methods were implemented like an exchange-oriented workshop/meeting design focusing on network effects and gathering insights and perspectives. Additionally,

card sets with learning elements were created as well as a set of debriefing scenarios for leaving employees.

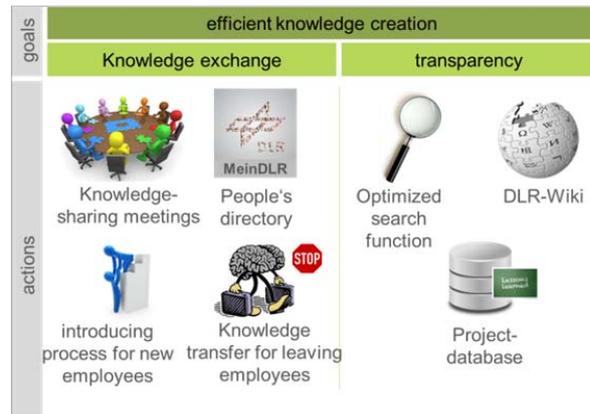


Fig. 1 DLR’s knowledge management concept

2. The Project Database

The Project Database was designed to be like a collection of wanted posters for all DLR projects which are published to the employees through the Intranet. Selective information shall be filtered out of the internal accounting system which contains all administrative project information, but is not publicly available. Each project manager is encouraged to add further relevant project information from his perspective if he is willing to share them additionally. The project description shall be taken from databases used in the processes and must be added manually if not provided automatically. An important feature is the upload function for Lessons Learned documents. That means that project information and project experience will be shared with others and the project managers can be contacted for collaboration, follow-on-activities or any knowledge exchange.

As there are also sensitive projects and projects with non-disclosure agreements (NDA) not everything can be shared. The project managers themselves can decide simply not to publish certain information or to restrict the project page to a whitelist user group which is allowed to know about the project – depending on what the contract allows.

3. Limitations and Barriers

Implementing the Project Database was challenging. On the one hand, the data that we wanted to access and make visible in project context was not in an expected quality.

Accessing the administrative information was no problem but the way they were stored from business management perspective. Some data was never used

outside the existing databases. To solve this adequately means to rethink the existing data architecture.

The project descriptions are not stored in the business management databases. They are stored in separate databases used for managing certain processes. These separate databases store different data depending on how we finance our projects. This demands the conception of a multisource interface just to include descriptions automatically for a subset of projects. Our processes collect project descriptions only for initiation purpose and only if necessary to minimize the effort. That means we won't be able to deliver the descriptions for every project registered. Furthermore the semantic information content might not fit and it is not clear which sensitive information is stored there, because it is mainly entered for administrative purposes. The interesting descriptions are not stored in the management databases. They are located in separate documents which are not archived in a structured way so that they can be accessed automatically. These documents are usually created before initiating a project request: documents like proposals, contracts or Memorandums of Understanding (MoU), where the aim of a collaboration or project idea is already explained to win project partners.

Furthermore there exist a lot of manual project lists as an overview for a specific management task.

On the second hand, many doubts and concerns were addressed. The biggest concerns were about NDAs which are declared in a contract similarly to military secret levels. They define what has to be kept secret and vary widely from certain product information up to the name of the project. If NDA projects would be included in the Project Database then each contract had to be scanned individually to find out what is not allowed to share. That reduces possible automated solutions.

Another big concern was the purpose why existing descriptions are created: in the initiation process they explain the project aims to the business managers. That enables them to mitigate risks and these risk descriptions are stored to justify their decisions. This is what could be accessed. The concern is that these administrative descriptions don't have the scientific depth and wording for the expected use within the Project Database. But the descriptions have the purpose to explain projects to a target group of non-scientists similar to articles or publications in magazines. They can give a first view on the project for any person inside DLR.

Then a final framework requirement was set during the tendering procedure for the Project Database: no

implementation of a database interface. The users must show their demand with participation before the interface is implemented. This requirement meant obviously manual copy paste effort.

4. Result: Our Concept

The stated situation forced us to ease our requirements if we wanted to deliver a solution at all. This minimized version of the Project Database covers the requirements without the mentioned concerns.

The Project Database is a collaborative space in our wiki platform. As we cannot avoid manual redundant work in our concept, we chose to use collaboration to distribute the workload among the users.

4.1 collaborative aspects

- There is a page for each project serving as the one reference in the Intranet. It explains at least what the project name means.
- This project page contains the contact persons, the participating institutes and a short summary of the project. But: there is a lot of space for additional contributions.
- The names of the contributors are stored. Even if a user finds insufficient information – he can consult the contact person and the contributors.
- If there are questions regarding empty pages, a simple comment will involve the project's contact person who is usually the project manager. He will always get notifications when someone is active on his project page. That is a simple basis for communication.
- Everyone being able to see a page can tag it to create a list of projects for any reason.
- Project information can be linked from anywhere easily.
- The project page can be used to give access to Lessons Learned.

4.2 organisational aspects

- Every project manager is encouraged to create a page for each of his projects. He decides to show his/their expertise on his own.
- Each institute can decide to show its expertise portfolio in the Project Database. For that they can create own guidelines for their project managers.
- Creating a project page is voluntarily. If institutes are interested in complete lists then they can integrate the Project Database into their processes.
- A short project summary of up to three sentences is sufficient for an institute management. That keeps project lists short and clear. An export function allows to centralize descriptions in the Project Database and to synchronize it back into own

applications. Any additional information creates additional benefit for the project team (see 4.4).

- Sensitive project information is not allowed to be shared.
- If a project itself is sensitive then either the project page will not be created or the project manager will restrict access to those people who are involved. Institutes have a user role which cannot be excluded by restrictions for projects where they participate.
- All stakeholders who are responsible for a certain project list in their management context are free to integrate their applications. This centralizes project explanations from multiple independent lists. The Project Database can become an alternative communication channel to be notified about new projects if communication partners are also involved in the activities.

We collaborated with the University of Hagen, where a student conducted a master thesis about the motivation to participate in the DLR.Wiki [4]. Two major conclusions from that are important for our solution: 1) Good use cases help your colleague to have a good effort-benefit-analysis for his own. If the benefit is seen, people are willing to do effort. 2) Supervisors have extreme influence to those people who don't have wiki experience. They are the best triggers but also the best showstoppers, so they are the key personnel that has to be involved in the process.

4.3 technical aspects

The Project Database uses a Confluence wiki platform and is equipped with sufficient social and collaboration tools. This software also delivers some features to structure the unstructured information called page properties. They allow to create lists of projects dynamically filled with data entered in the project page. But these robust features needed to be extended by a few Add-Ons to implement the organizational aspects (see 4.2). Therefore we added three plugins:

- Table filter allows to easily search long lists of projects with their descriptions: a global filter hides all non-matching entries.
- The Metadata-Plugin is more advanced than page properties and allows to generate lists with queries on explicit values, e.g. projects conducted by institute A. This plugin delivers the export functionality, too.
- An own plugin contains necessary configuration and implementations for the institute role which cannot be excluded by page view restrictions. Furthermore a project based search page is implemented.

4.4 unique selling proposition

We had to rethink the individual benefit. Therefore it was necessary to answer the question "What additional benefit appeals to our colleagues despite that obviously unavoidable workload?".

We focused on what only wikis are delivering as a fruitful feature: linking terms in the descriptions. All the other administrative data is more or less only relevant to filter project lists. There will be not much specific project data on the project pages so we have to concentrate on the description.

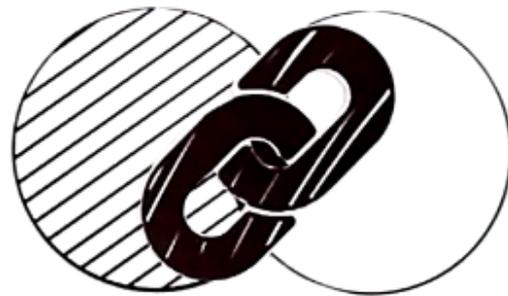


Fig. 2 wiki links make similar content visible

The true benefit for our employees are the relations of linked pages. The project descriptions introduce the terms which are relevant for the project itself. Following the links to the terms enables users to find the description of the term. This linked page can be used for questions and to contact colleagues who are engaged in the same topic. Wikis store the information what page links where. This relation can automatically be listed on the linked pages to show which projects deals with the context. In that way the Project Database makes interconnections between scientific topics visible to everyone. As a result more information and pages can be delivered: other projects, scientific fields, products to use and tools to work with. The desired knowledge exchange will take place on these additional pages. Competent persons are brought together there. Thus we connect people with topics using the project context and found a solid solution for the five moments of need. [5]

Since our solution is collaborative, we set the focus on collegial support between project members. For that the Project Database provides pages for scientific context linked from the project pages. If a user needs consultation he must find a page for that. Such a page offers questioning via comments, a list of projects dealing with that scientific context, at least the contributor's name and maybe some collaboratively added information.

4.5 what users have to do

The individual effort can be scaled several times if someone decides to participate. Any further activities can be taken over by the community.

- The absolute minimum is a page describing the project name which is usually an acronym.
- The recommended minimum consists of: the project manager as the contact person, the involved institutes and a short text describing the project in three sentences. This meets the criteria of a useful project list.
- To add benefit for the project team the user has to copy paste a description from proposals or other documents into the project page.

We distinguish the benefit for management level and benefit for the project team. The management's benefit is a project list with easy-to-understand project summaries. The team's benefit emerges only if there is descriptive text where links can be created. The links and additional pages mustn't be created by the team itself. But the text is necessary that also a third person can do this linking.

5. Conclusions

The effort to build up a Project Database was much higher than expected.

The concept itself seems simple: we connect project managers and collect their project information to make projects visible to others for connecting and helping each other.

As often noticed, there is a big difference between theory and reality. Many ideas were added to the initial concept, but a lot of them were extracted afterwards because they were not easy to realize.

The automatic data-handover from other databases was critical, because much project information was never meant to be given away into other systems and was stored in a special format which is hard to handle automatically. After many discussions about legal questions it is still an issue to deal with project data that was meant for a different purpose and up to now only valid for administration.

However, it helped us to talk to many stakeholders during the development of the Project Database. We discussed the issue with the representatives of nearly all institutes and other stakeholders and got valuable feedback from them. This confirms that it is absolutely necessary to involve as many stakeholders as early as possible. Additionally, close consultation was needed

with internal experts like IT, administration, legal support etc.

In the end we decided to step back to a more simple solution in a wiki system where the project managers can insert their project information on their own with only a few regulations. That system has just begun and ca. 100 projects were inserted after a short period of time. As it is the case with many KM projects we still need to do internal marketing for the Project Database to encourage project managers to contribute their project data. The benefit of the Project Database will only appear if we overcome a critical mass of entries. The first step was to begin with a simple Project Database. Further enhancements will follow to make the data sharing easier for the project managers.

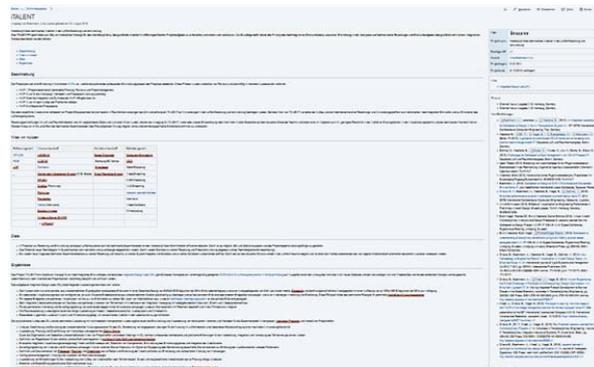


Fig. 3 Example project page

It is possible to upload Lessons Learned from projects to publish them for other project managers. Temporarily, this is rarely done. Therefore it will also be necessary to enhance the Lessons Learned culture. It is not only the question whether Lessons Learned are available – they have to be made publicly available in the organization for inter-project learning across institute borders. Another step forward is to check if these Lessons Learned have consequences on existing regulations like internal processes or technical norms.

The fruits will be seen some time afterwards – connected project managers, information and Lessons Learned will be the result. In that way, there is big potential in the Project Database to save effort, time and money. Our next step will be a deeper integration into the processes.

References

- [1] DLR at a Glance (accessed 01.09.2016)
http://www.dlr.de/dlr/en/desktopdefault.aspx/tabid-10443/637_read-251/#/gallery/8570
- [2] Ruediger Suess: "Coordination of the information/knowledge flow concerning project management issues within a process-oriented organization – a

- case study of the German Aerospace Center DLR”, IAC-11-D5.2.11, DLR 2011
- [3] Uwe Knodt: “Bottom-Up! – Social Knowledge Sharing in DLR. A case study of collaboration in the German Aerospace Center DLR”, IAC-14-D5,2,2-x23888, DLR 2014, p. 3
- [4] Katrin Wolter: “Motivation for Knowledge Exchange in an Interorganizational Wiki – Investigation of Influence Factors for Participation and Knowledge Exchange” Master Thesis, University of Hagen & DLR 2016
- [5] Bob Mosher & Conrad Gottfredson: “Innovative Performance Support: Strategies and Practices for Learning in the Workflow” MacGraw-Hill Companies 2011