Use of Knowledge Management in IDiAL

Emine Bilek
Institute for Digital Transformation of Application and Living Domains,
Fachhochschule Dortmund University of Applied Sciences and Arts, Germany

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Abstract: The paper deals with knowledge management and organizational learning in general and its possible application at the Institute for the Digital Transformation of Application and Living Domains (IDiAL) which focus is on the main topics digital transformation of application and living domains at Fachhochschule Dortmund University of Applied Sciences and Arts in particular. Firstly, the different forms of knowledge management and organizational learning are discussed, followed by a description of IDiAL, its development and its focus. In addition to the main areas of research and the transdisciplinary collaboration between the institute's scientists, this article describes how organizational learning is used at IDiAL by means of collaborative software with sample contents and how this has improved communication in general and administrative processes at the institute's head office.

1 INTRODUCTION

We all live in a world of organizations, for example we live in a family, work in a company and collaborate with customers and suppliers.

According to a Forrester report, employees reported spending 29% of their week searching for key information they needed to do their work (VB Staff, 2022). Knowledge Management is the way organizations collect, organize, update and share information with customers, employees and business partners. It is the process of making knowledge available for everyone in organizations, instead of having it reside in the heads of the few and causing information silos. Companies can more easily achieve their objectives by making better use of the knowledge that resides within their domain. They develop a culture of continuous learning and allow knowledge to flow freely throughout their organization.

In companies, every manager must organize something, e.g., a team, a project, a department or an entire company. In the past, organizing was done on the side and the quality of the organization did not play a decisive role. This has changed over time. In the coming years, organizing could become a key design element, as this is where the greatest potential for improving their effectiveness lies (Pfiffner, 2020).

Organizational learning is therefore particularly important for companies to be able to continuously develop and operate successfully in this way. It is important that organizational knowledge is retained within the company. After a project is completed, the newly acquired knowledge is often not recognized and remains unused on storage devices or shared drives (Tryon, 2012). To avoid this, the use of collaborative software is a good way of storing this knowledge and using it for new projects or to improve the organizational structure.

2 KNOWLEDGE MANAGEMENT

Globalization, digital transformation, but also the coronavirus pandemic show that knowledge management is becoming increasingly important. This is also evident in the areas of demographic change and Work 4.0. In the former case, there is a threat of knowledge loss due to employees retiring and the topic of Work 4.0 is associated with the flexibilization and mobilization of work with new forms of IT. Knowledge management is not only relevant for private sector organizations of all sizes and industries, but also for the public sector such as hospitals or universities, as it can be a decisive competitive advantage.

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How has knowledge management developed? The first time this term was used at McKinsey in 1987 for an internal study on the information handling and utilization (McInerney and Koenig, 2011). In 1993, knowledge management became public at a conference in Boston (Demarest 1997). But what exactly does knowledge management mean? Tom Davenport gave the famous definition of knowledge management: "Knowledge Management is the process of capturing, distributing, and effectively using knowledge." (Davenport, 1994).

2.1 Types of Knowledge Management

Knowledge can take many different forms, and it can also be applied in an effective way in practical work. Four types of knowledge can be distinguished: explicit, implicit, tacit and embedded. In the following these types will be described (Majumder and Dey, 2022):

2.1.1 Explicit Knowledge

Explicit knowledge is knowledge that can be easily documented and articulated in a formal way and is also mentioned as know-what. This knowledge is usually related to facts, processes, techniques, best practices, etc. And that is exactly why you can easily write down this knowledge, store it and share it with your staff (e.g. the use of knowledge management platform).

2.1.2 Implicit Knowledge

In contrast to explicit knowledge, implicit knowledge is referred to as know-how, which takes place at the subconscious level. This knowledge is deeply embedded in behaviours and skills and guides your decision-making and problem-solving processes. Implicit knowledge is the best method to learn something and gain knowledge.

2.1.3 Tacit Knowledge

Tacit knowledge is majorly experience-based knowledge and is hard to explain. This knowledge includes skills, insights, and judgments that you internalize over time, which makes it challenging to transfer to others through traditional means of communication. It can be said that the implicit knowledge is stored in the brain and therefore an access is not possible.

The knowledge iceberg (Figure 1) best describes the difference between these three types of knowledge. Only explicit knowledge is visible in this iceberg – this knowledge is easy to transfer to others in the organization, e.g. data, documents and files. The other types are hidden under the water. Implicit knowledge that lies beneath the surface of the sea, is knowledge obtained by applying explicit knowledge. Examples of this are lesson learned, beliefs or generalized rules.

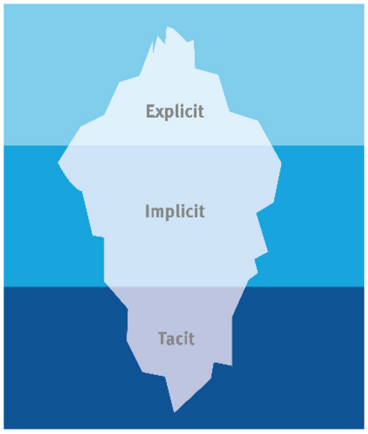

Figure 1: Difference between explicit, implicit and tacit knowledge.

Tacit knowledge is difficult to transfer, because it is usually acquired through experience, e.g. knowledge, organizational values or competences.

2.1.4 Embedded Knowledge

Embedded knowledge refers to the knowledge that is locked in processes, products, culture, routines, artifacts, or structures (Horvath, 2000, Gamble and Blackwell, 2001). Embedded knowledge can be divided into formally on the one hand and informally on the other hand. Formal embedded knowledge is like an initiative to formalize a particular useful routine, and informal embedded knowledge is used when organization uses and applies the other two knowledge types.

2.1.5 SECI Model

The SECI model describes the four processes of knowledge creation in organizations, which include the interplay of tacit and explicit knowledge. This model emerged from studies on successful innovations in Japanese companies in the 1980s and 1990s (Nonaka and Takeuchi, 1995). The following section takes a closer look at the model that represents the knowledge spiral as a model for the generation of knowledge in companies (Figure 2). The spiral starts with the Socialization mode, in which the tacit knowledge transfer through direct interaction

between individuals, e.g. learners learn from their teacher. In the next mode, Externalization, the tacit knowledge is converted into explicit knowledge through reflection, articulation, and documentation. The next mode Combination involves the integration of explicit knowledge to create new knowledge. In this mode the use of computerized communication networks or large-scale databases can facilitate the knowledge conversion. The SECI spiral ends with the Internalization. This mode involves the process of transforming explicit into tacit knowledge, e.g. reading documents and or manuals about the company and reflecting about them. (Müller, 2022, Farnese et al. 2019).

With this model description, the importance of tacit and explicit knowledge in the process of knowledge creation becomes clear. This model clearly shows that the process of knowledge creation is a continuous and iterative process.

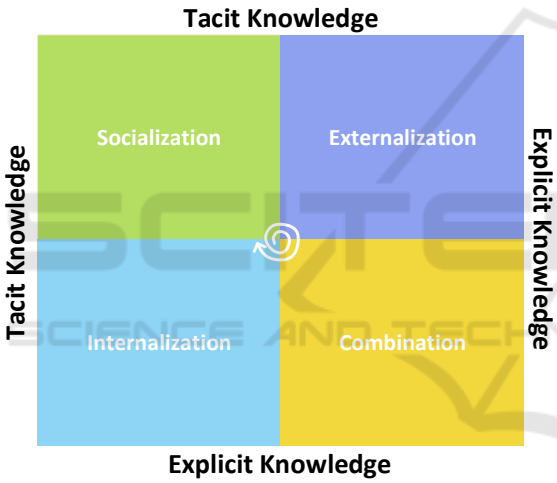

Figure 2: The SECI model of knowledge creation.

There are many ways in which companies can integrate this model into their day-to-day operations. Each phase of the SECI spiral offers different methods for knowledge development. The knowledge spiral provides companies with a tool to make the tacit knowledge of their employees explicit. In this way, the joint exchange of knowledge is strengthened, and new solutions are found.

2.2 Connection Between Knowledge Management and Organizational Learning

According to W.R. King, organisational learning is complementary to knowledge management (King, 2009). An early description of organizational learning was "…encoding inferences from history into routines that guide behaviour" (Lewitt and March, 1988).

Knowledge Management enables individual learning which then contributes to the organizational learning process (Fernandes and Machado, 2021). Organisational learning is based on knowledge management. Knowledge management involves extracting information from various relevant sources to enhance the learning process, while organisational learning is the application of knowledge gained through knowledge management to enhance organisational capabilities (Somasundaram, 2024).

2.2.1 Organizational Learning

Organisational learning (OL) is described as a purposeful organisational process in which individuals are the learning agents for the organisation (Chuah and Law, 2020). There are different definitions for organizational learning. The best definition is the following "Organisational learning is a collective learning process regulated by the organisation, in which individual and group-related learning experiences are transferred into organisational routines, processes and structures that have an impact on the future learning of individual members of the organisation." (Schilling and Kluge, 2013). Crossan et al. (1999) see organizational learning as a dynamic process that takes place in recursive feedback and feedforward loops at individual, team and organizational level (Kaudela-Baum, 2022).

Based on Lawrence et al. (2005), several types of barriers to organizational learning can be distinguished:

- action-orientated-personal barriers.
  These barriers refer to the thinking, attitudes and behavior of individuals.
- structural-organizational barriers
  These barriers are rooted in the strategy, culture, technology and formal regulations of organizations.
- social-environmental barriers
  These barriers describe negative influences of the organizational environment.

2.2.2 Forms of Organizational Learning

It is therefore important to institutionalize and coordinate the exchange of knowledge and learning among employees. Different forms of organizational learning can be defined for companies - as with people. Four forms of organizational learning are

briefly presented below (Franken and Franken, 2023; Schreyögg and Koch, 2014):

- Organizational Learning through experience
  This form learning is probably the best-known way of acquiring knowledge. In this form, you try something out and learn from your own experience, how the learning form of individuals.
- Mediated learning in companies
  This learning occurs when companies can learn from the experience of another company, e.g., through contacts at trade fairs or conferences.
- Incorporation of new knowledge
  This refers to learning that is based on the acquisition and integration of new knowledge. This can take place through the recruitment of experts or the acquisition of innovative technology.
- Learning as the generation of new knowledge
  This form of learning takes place through the insight of individuals, i.e., you learn without trying things out and without imitating. This learning process was described by Nonaka and Takeuchi, which means that a company develops innovations on its own.

The stronger emphasis on knowledge led to a concentration on knowledge management. The aim is to link the acquisition and creation of new knowledge with methods of distributing and making knowledge available. In this way, organizational learning was merged with the use of modern communication and information technologies. Organizational knowledge can therefore be better digitized and recorded through the connection with information technology.

3 IDiAL

IDiAL was founded in 2017 by the Faculties of Electrical Engineering, Computer Science, Economics and Information Technology at Fachhochschule Dortmund University of Applied Sciences and Arts.

3.1 IDiAL and Its Development

Increasing digitalization can make an important contribution to addressing current challenges in the areas of global competition or keeping work, education, supply channels and contacts going in the areas of climate and demographic change different application domains like health and demographic change, civil security and rescue technology, production and logistics, mobility and resource efficiency and digital competence.

This change in living and working environments offers many opportunities, but also risks in the social, economic, and ecological spheres. IDiAL develops scientific findings and solutions to turn these opportunities into benefits for the economy and society and to address the emerging challenges in terms of social and economic transformation processes. The use of digital innovations for the good of the population and the economy in various living and working environments raises several application-related research questions. The institute performs tasks in research, development, and teaching in the fields of Digital Transformation of Application and Living Domains in connection with the scientific disciplines of computer science, electrical engineering, and economics.

For a better understanding of digital transformation, the next section explains the difference between digitization, digitalization und digital transformation. Digitization is the process of converting analog information into digital information. Examples for digitization are the transfer of music from CD to MP3 format or the transfer of paper documents to digital documents. Digitalization, on the other hand, is the use of digital technologies to change a business model (Gartney IT Glossary, 2024). One example of its application are the digital payment methods such as PayPal or Apple Pay, which helped to make paying with cash and with credit cards increasingly rare. Characteristic of the digital transformation is the process of switching from traditional business models and working methods to digital technologies and processes. One of the most prominent examples of the digital transformation is the electric car-maker Tesla. The company has positioned itself as a change agent within the automotive industry by infusing technology into all facets of the driving experience (TechTarget, 2024).

3.2 Organizational Learning at IDiAL

IDiAL has various research specialisms. The merger of the four different faculties in IDiAL often results in transdisciplinary collaboration in projects. Based on existing expertise and networks IDiAL is concentrating on the following domains:

- Health and Demographic Change
- Civil Security and Rescue Technology
- Production and Logistics
- Resource Efficiency and Sustainable Energy
- Digital Competence and Education

- Mobility and Infrastructure
- Project Management

At the start, a rapid build-up in different areas was necessary. The researchers focused on their work and wanted to make progress.

3.2.1 Choice of the Collaboration Tool

There are several collaboration tools, which can be used for document sharing, collaboration and knowledge management. At the beginning, a tool was sought to support the institute in its collaboration and to record and store information centrally. Several requirements were defined during the selection process, such as the use of a digital knowledge platform, a collaborative software in which users create and jointly edit pages and entries. Further requirements are centralized workspace for team collaboration, documentation, and project management. According to McKinsey & Company, employees spend 20% of their workday hunting for information, which they require in disorganized repositories or coworkers' minds (Chui et al., 2012). Therefore a centralized tool like the following three tools Google Docs, Microsoft SharePoint and Confluence offer the possibility of structured and organized data.

Firstly, these are briefly described and then the possibility of using them as collaboration tool and knowledge management. Google Docs is an online word processing programme from Google that was launched on the market in 2006. With this programme (Figure 3, (Workspace, n.d.)), documents can be created, formatted and edited together with others. Google Docs can also be used to show presentations in real time.

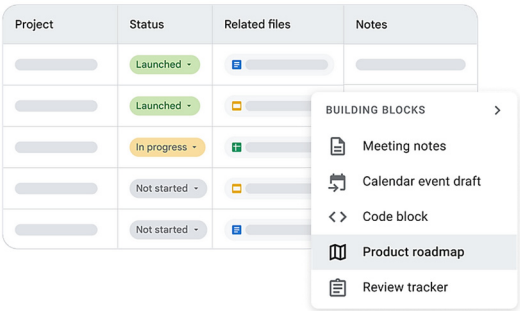

Figure 3: Google Docs: Example Page.

Microsoft SharePoint offers various functions like saving, structuring, sharing and accessing information and thus enables a comprehensive tool for document management, the intranet and process automation (Figure 4, (Was Ist SharePoint Online?, n.d.)).

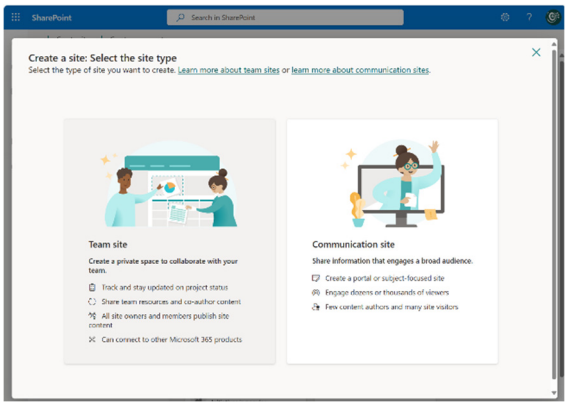

Figure 4: Microsoft SharePoint: Example Page.

Confluence is a web-based corporate Wiki and a product of Atlassian Corporation, which is an Australian-American software company that develops various products. Confluence offers a networked workspace, designed for collaboration and built to last. This tool can be used for information exchange across the entire company for remote work. Through this tool, team members can collaboratively manage and complete tasks and projects.

With the use of Confluence, it is easy to centralize information gathering and share knowledge to keep everyone in sync (Figure 5, (Atlassian, n.d.)).

In the end, the choice fell on Confluence, as this tool best fulfils the institute's requirements (communication, centralization and customization) in knowledge management and project management. Confluence offers the possibility that the team members can create and share different content, e.g. meeting notes or research reports, and the managers can also provide direct feedback on the content.

In IDiAL, we use Confluence for documentation and for collaboration on reports or project applications and for quickly locate information, this enables transparent communication.

With Confluence IDiAL cannot only store knowledge, but actively manage, share and further develop it. In this way, constant changes can be accommodated. Regarding to the knowledge iceberg, the use of Confluence allows knowledge about different areas and projects to be collected and stored so that the knowledge can remain in the institute when employees leave (e.g. no contract renewal or career changes).

Colleagues were already using Confluence for joint projects, for example to record the status of the project. Meeting notes and instructions can also be found there, as well as information on software installations. The head office also uses Confluence to keep a structured record of administrative processes

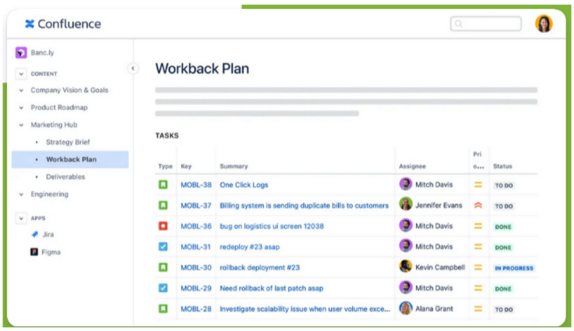

Figure 5: Atlassian Confluence: Example Page.

(contact persons, instructions, such as the procurement process, etc.). After identification, the process is documented, often in conjunction with the development of optimizing measures.

The following illustration shows the administration information from the head office that colleagues can access and read at any time.

For a better understanding the process of onboarding will be described. Figure 6 shows a screenshot on which the contents of the onboarding can be partially seen.

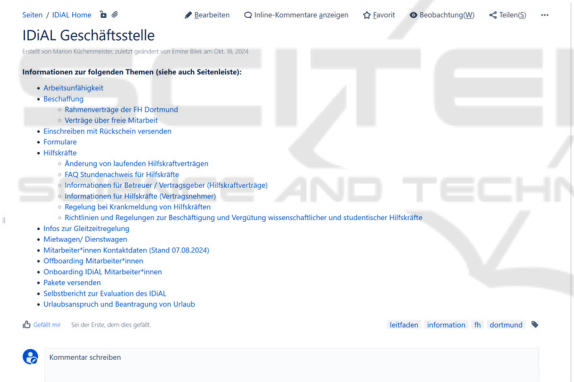

Figure 6: Entry page IDiAL.

On this page, colleagues can find information on various areas (telephone, IT procurement, keys, flexitime, but also ordering business cards, holiday days and business trips) and contact persons with contact details. This information is adapted in the event of changes or updates. By collecting internal knowledge in this way, colleagues can either quickly acquire knowledge or quickly gain access to the information they need. The task of the head office is to ease research by advising and supporting researchers in the administrative aspects. The office acts often as a bridge between science and administration. Confluence is also a useful tool for informing new colleagues about IDiAL and its processes as part of onboarding, Confluence is a good tool to help new colleagues to take a self-guided tour to acquire their knowledge about onboarding documents, branding guidelines. So they can settle in more quickly and familiarise themselves with the institute's processes. Figure 7 shows one page of the onboarding content. The new team member gets here different information about how to get an account of the institute, to get a telephone number and to get IT tools, etc. A contact person is also provided for each issue so that contact can be made immediately to clarify the matter.

Figure 7: Content of the onboarding process.

4 CONCLUSIONS

With the help of knowledge management, companies can collect and secure information and data and in this way share knowledge with employees and, if necessary, with customers. Organizational learning then uses the knowledge gained from knowledge management to improve organizational skills.

In IDiAL the use of organizational learning has resulted in two possibilities: firstly, the storage of information and finding documents quickly and secondly, the preservation of knowledge or better to say the preservation of the institutional memory. Importantly, the knowledge of colleagues who leave is retained within the institute in this way. By using the web-based corporate wiki Atlassian Confluence

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the information is stored centrally and can be accessed by all employees at any time. In this way, new team members can be familiarised more quickly, as they can learn the information in a self-guided tour at their own pace and the information can be called up at any time if it is still missing. Confluence enables information to be updated quickly and easily and the data can be adapted to the new information immediately. The use of Confluence also enables collaboration within a national or international research project, so that the exchange between the partners runs smoothly and each partner can view the development of the project at any time, work on their tasks and work together on a research report. Confluence can also be used to support the planning of events with national and international partners, who are also given access to Confluence. The head of office is considering further possible uses of Confluence to support the work and optimisation possibilities (e.g. coordination tasks or documentation).

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