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## Technological and Organizational Arrangements Sparkling Effects on Individual, Community and Organizational Learning

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**Abstract.** Organizations increasingly recognize the potentials and needs of supporting and guiding the substantial individual and collaborative learning efforts made in the work place. Many interventions have been made into leveraging resources for organizational learning, ultimately aimed at improving effectiveness, innovation and productivity of knowledge work in organizations. However, information is scarce on the effects of such interventions. This paper presents the results of a multiple-case study consisting of seven cases investigating measures organizations have taken in order to spark effects considered beneficial in leveraging resources for organizational learning. We collected a number of reasons why organizations deem themselves as outperforming others in leveraging individual, collaborative and organizational learning, measures that are perceived as successful as well as richly described relationships between those levers and seven selected effects that these measures have caused.

**Keywords:** Community, knowledge maturing, knowledge work, multiple-case study, organizational learning

### 1 Introduction

Although many concepts, models, methods, tools and systems have been suggested for enhancing learning and the handling of knowledge in organizations [1], there is only scarce information on the effects of these technological and organizational arrangements on the effectiveness of knowledge work [2-7]. While the share of

knowledge work [8] has risen continuously during recent decades [9] and knowledge work can be found in all occupations, the question remains open whether we can design IT-supported instruments that create positive effects on knowledge work independent of their field of application.

In this paper, we report on how organizations employ IT and organizational instruments to support knowledge work. We analyze these technological and organizational arrangements as levers that are employed and the effects they achieve. In line with dynamic models of organizational learning and knowledge creation, such as the spiral model of knowledge creation [10], the 4I framework [11] or the knowledge maturing (KM) model [12], we put a special focus on how organizations deal with critical knowledge they develop and maintain across the individual, community and organizational level. With a multiple case study that focused on organizations perceiving themselves as successful in sparking positive effects on learning on an individual, community and organizational level, we aim at answering the research question: What successful measures (IT-based and organizational) are applied to evoke positive effects on learning on an individual, community and organizational level?

In pursuing this aim, we relied on qualitative and interpretive methods, based particularly on observation and face-to-face interviews at the work places of the interviewees. The study was conceptualized as a case study with multiple instances the investigation of which relied on a single, coordinated framework of study topics and a common design. We gained multiple perspectives by interviewing several individuals in each case study that together provided rich empirical material on interventions into three levels of learning, traversed when knowledge is passed from individuals' learning and expressing of ideas over informal collectives such as communities to the formal level of organizations.

## **2 Individual, Community and Organizational Learning**

Knowledge is socially constructed and part of workplace practices. Therefore, top down approaches that view knowledge as a decontextualized entity have often met with little success. Thus, it is not surprising that many theories and models start out with learning at the level of individuals. Personal knowledge is defined as the contribution, individuals bring to situations which enables them to think, interact and perform [13]. The "objects" of individual learning include personalized versions of public codified knowledge, everyday knowledge of people and situations, know-how in the form of skills and practices, memories of episodes and events, self-knowledge, attitudes and emotions. The development of practice is reflective, forward-looking and dynamic and seems to work best within a culture that acknowledges the importance of developing practice, expertise and analytical capabilities in an inter-related way so as to be able to support the generation of new forms of knowledge. Those involved in such developments need to have a continuing commitment to explore, reflect upon and improve their practice [14]. At the same time, they play a key role in generating new knowledge and applying it when working in teams with colleagues with different backgrounds and different kinds of expertise [15].

A number of models that connect individual learning at the workplace with (supposed) effects on a community and organizational level have been proposed and discussed in the literature [16]. The 4I framework [11] conceptualizes organizational learning as a dynamic process. It consists of four categories (4Is) of social and psychological processes on different levels: intuiting (individual), interpreting (individual), integrating (group), and institutionalizing (organizational). One premise of the model is that organizational learning includes a tension between exploration (assimilating new learning) and exploitation (using what has already been learned).

The concept of Communities of Practice (COP) has been established as a linking mechanism between individual practice and organizational learning [17]. Individual and collective learning is to a large extent informal based on a continuous negotiation of meaning that takes place within the community [18]. This negotiation captures the way that individuals in the community make sense out of their experiences. Meaning of their experiences is not defined by any external authority, but it is constructed in the COP and constantly negotiated through collaborative processes. Recently, the authors suggested a number of community tools that support these processes [19].

The spiral model on organizational knowledge creation [10], [20] claims that knowledge creation is a social process moving and transforming knowledge from the individual level into communities of interaction that cross organizational boundaries.

The KM model [12] frames a similar stance on this process as goal-oriented learning on a collective level. The model describes knowledge development as a sequence of phases. In its early phases, expressing ideas and appropriating ideas, the model is concerned with learning on an individual level. Similar to [17], the KM model views communities as the main connection between the individual and organizational level in which learning takes place in informal activities, termed distributing phase, yet, might also involve artifacts such as boundary objects [21], created in the formalizing phase, specifically if the boundaries of such communities should be crossed. Communities sometimes also provide the social constellation of choice for ad-hoc training and piloting of new products, processes or practices. Finally, on the organizational level, the model depicts formal training as well as institutionalizing, and ultimately, standardizing. The KM model has been iteratively developed based on evidence gained in an ethnographically-informed study of KM processes and the individual and collaborative activities that happen at the workplace [22] and a survey of a large sample of European companies [23]. The latter study was also used to identify successful examples for KM and companies that were particularly successful.

The present study was conducted in order to gain an in-depth understanding of why and how these cases were successful. This was done mainly by introducing interviewees to the model, guiding them in relating the model with phenomena in their own organizations and then conducting the interview based on these perceived and concrete occurrences of KM. Because the model resonated well with the respondents as the previous studies on the KM model [22], [23] and a pretest had shown, this allowed us to elicit rich stories about concrete cases of KM that were perceived as successfully fostered by deliberately applied technological and organizational arrangements. The results of this analysis should act as a guideline for organizations willing to support KM appropriately.

### 3 Study Design and Data Collection

To study technological and organizational arrangements, we agreed upon the following topics as the main focus: (1) reasons for better *performing* KM than others; (2) *organizational measures* that are deemed to support KM; (3) ways to overcome *barriers to KM*; (4) *IT-oriented measures* that are deemed to support KM. As the four topics were deemed rather complex and context-specific, we chose the case study approach [24], [25]. For detailed in-depth data collection, multiple sources of information were used, in our cases interviews and observations as well as documents and reports [26]. We followed a holistic multiple-case study approach which is deemed to be more robust than a single-case study design and, furthermore, provided evidence is often seen to be more compelling [25], [27].

We followed a purposeful sampling approach [28] by choosing organizations identified as successful through our previous studies. The unit of analysis is individuals that work and learn in a collective towards a common goal. The plural is important as we did not focus on a single person, but according to the definition of KM on goal-oriented learning on a collective level. This allowed us to triangulate practices within the targeted collective of people and to get a multi-faceted picture of the studied organization. Six European organizations and one network of organizations were investigated. Between two and 15 representatives took part in each case study. The studied cases varied with respect to country, size and sector (see table 1).

**Table 1.** Studied cases, for classification criteria see OECD and EUROSTAT [29]

Case	Sector	Size	Country	No. of Participants
C1	Service	small	Austria	3
C2	Service	large	Germany	5
C3	Service	large	Poland	7
C4	Service	[network]	United Kingdom	14
C5	Industry	large	Germany	15
C6	Industry	large	Germany	5
C7	Industry	large	Germany	7

Each case study concentrated on collectives of individuals working across departments, subsidiaries or even organizations. To get access to these collectives, interviewees were selected based on a snowball sampling [28]. We defined criteria that interviewees needed to fulfill which helped us to gain valuable data from people who had a broad and informed view about their organization. Interviewees had to have, e.g., a high share of knowledge work; experience in different organizational settings, access to a variety of technical systems; good command of conceptual and management tasks; and strong communication, coordination and cooperation needs.

Data collection was done face-to-face at the workplaces of participants wherever possible. This allowed for direct observation of phenomena in the context of participants' workplaces [28]. We intended (1) to provide cues for participants about important facets surrounding support of KM by technological and organizational arrangements (e.g. by observable artifacts in the participants' work environments), (2)

to support the researchers' understanding of the work environments of participants as well as (3) to facilitate joint meaning-making of the technological and organizational arrangements between participant and researcher. To facilitate data collection on the agreed four topics, an interview guideline was developed and adopted by case study teams investigating different organizations. The first page of the interview guideline supported the interviewer in explaining the concept of KM and contained a figure depicting the KM model [12] which was discussed with the interviewees in the context of their organizations. The second page was dedicated to the four topics which were investigated in the sequence described above. The semi-structured interviews were recorded, if allowed, transcribed and analyzed with qualitative content analysis. Besides interviewing, in some cases further methods for data collection, such as focus groups [28], were employed. Between the authors, several face-to-face meetings and teleconferences provided opportunities to exchange lessons learned on case selection, data collection and data analysis.

After conducting the field work, each team analyzed the collected data and created an individual case report structured according to a common template. Once the main findings were summed up and each case study team was aware of results from all case studies, we jointly developed cross-case conclusions, again in a series of teleconferences and face-to-face meetings.

#### 4 Levers, Effects and their Relationships

We triggered a reflection on certain preconditions that the represented organization meets for performing KM successfully by asking participants about reasons for performing KM better than others in the first topic of the interview. In multiple rounds of joint data analysis [25], we distilled seven effects of interventions for learning on an individual, community and organizational level (see table 2).

**Table 2.** Effects

Individual	<i>Increased willingness to share knowledge (C2, C3, C4, C5, C6, C7).</i> Comprises a communicative environment as well as an attitude of being open-minded towards colleagues' requests and an active provision of knowledge possibly needed by others.
	<i>Openness to change (C1, C3).</i> Describes an organizational culture that prevents the development of permanent consensus. Comprises defrozen thought patterns, overcome rigidity of thinking and sticking in convenient but ineffective action patterns.
	<i>Positive attitude towards knowledge maturing itself (C3, C5, C6, C7).</i> Employees across the organizational hierarchy reflect on potential benefits of putting efforts into KM which is deemed to depend greatly on employees involved in daily work activities and their attitude towards and reflexiveness about it.
Community	<i>Improved accessibility of knowledge (C3, C4, C6, C7).</i> Quick accessibility and easy retrieval of knowledge is deemed to positively affect the goal oriented and non-redundant transfer of knowledge within and across communities.
	<i>Strengthened informal relationships (C1, C2, C3, C4, C6).</i> Denote personal ties between colleagues that are usually used to circumvent or shortcut formal procedures in the hierarchical structure. Informal relationships help collaborative reflections upon learning processes and distribution of ideas and information about current activities.

Organization	<p><i>Availability of different channels for sharing knowledge (C1, C4, C6, C7).</i> Availability of different methods or systems used for sharing knowledge that can be related to IT or to organizational measures.</p> <p><i>Improved quality of workflows, tasks or processes (C3).</i> Process improvement instruments, such as best practice process-descriptions, are applied in order to gain improvements with respect to cost, time and quality.</p>
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By analyzing the measures that respondents perceived as causing these effects, we surfaced the levers in the sense of technological and organizational arrangements positively impacting the performance of KM. As a result of the cross-case analysis, we structured these levers into five groups (see table 3): (1) soliciting, i.e. levers that trigger employees to provide solutions and ideas for addressing issues present in the organization; (2) guiding, i.e. levers that increase awareness for best practices and standard operating procedures and/or influence the direction or quality of knowledge work; (3) converging, i.e. endorsement of further development of a topic by legitimating to allocate time to an initiative or project where knowledge stemming from different origins can be amalgamated; (4) regular sharing, i.e. the recurring endorsement of sharing knowledge in a defined procedure that could be implemented as a recurring event or as a permanent measure; (5) transferring, i.e. support transmission of knowledge from one group or community to another, for re-use.

**Table 3.** Levers

Soliciting	<p><i>Acting as 'claimant' (C1, C7).</i> A new idea often needs support from someone creating a demand for it and pulling it towards realization. Ideally, this role is performed by a person who has the capability and authority to stress his/her demand and thus be a proponent for the new idea.</p> <p><i>Fostering competition-based idea management (C3).</i> Employees present contributions electronically or in an exhibition and the best ideas are awarded. Thus, all members of the organization will learn about other projects and ideas.</p> <p><i>Maintaining a best practice database (C3).</i> A database providing a collection of best practice process-descriptions that have been approved according to a quality assurance concept aimed at improving tasks or processes.</p>
Guiding	<p><i>Enabling awareness and orientation (C2, C3).</i> Continuously documenting (all) business processes and thereby providing transparency for these processes. This is in line with requirements imposed by quality management initiatives.</p> <p><i>Offering guidance by supervisors and management (C3, C7).</i> Raising employees' awareness of knowledge management in general and integrating KM-related topics into the process of management by objectives.</p> <p><i>Performing benchmarks (C2, C3, C5, C7).</i> By performing benchmarks, different units within and across organizations are compared against each other to identify gaps, foster competition foster discussion on possible future measures aiming at an improvement.</p> <p><i>Providing organizational guidelines (C2, C3, C7).</i> Shared sets of rules regarding common ways of performing knowledge work. This includes, e.g., organizing and naming documents and folders on file shares, for approving business process related documents.</p>

Converging	Allocating competence in projects (C1, C3, C7). <i>People with different backgrounds working together are perceived as very fruitful because time and legitimation of action is provided which empower project teams to pursue project goals and introduce changes.</i>
	Conducting workshops on specific topics (C2, C3, C7). Topic-oriented meetings where selected employees are brought together to drive a specific topic or to focus on developing a specific skill-set.
	Enabling collaborative learning (C1, C4, C5, C6, C7). Providing tools and services for creating, presenting, discussing, tagging and collecting resources enabling synchronous and asynchronous sharing of information.
Regular sharing	Conducting regular (team) meetings (C2, C3, C5, C7). Knowledge transfer is supported by an established procedure of regular team meetings, ensuring fast and target group oriented diffusion of knowledge in both directions along the hierarchy.
	Offering formal trainings at regular intervals (C2, C3, C7). Topics of training courses that are typically selected with respect to identified gaps between employees' competence profiles and needs of organizational units or projects the employee works for.
	Providing a flexible working space (C2). Employees who want or need to work together (e.g. working on a new product or for discussing issues) have the possibility to choose their working place and thereby increase communication effectiveness.
Transferring	Employing technology-enhanced boundary objects (TEBOs) (C3, C4). TEBOs (i.e. software-based interactive digital media, which support mediating knowledge sharing across organizational boundaries) are conceived as tools which support situated learning.
	Fostering communities of practice (C1, C2, C3, C4, C6). Regular topic-based meetings for exchanging lessons learnt that were created by employees. These communities of interest are mostly based on informal relationships between members.
	Fostering reflection by enabling purpose-oriented task groups (C2, C3, C4, C6). Groups operating at boundaries between different communities help in extending and deepening the communication. Thus, they enable 'boundary crossing' of knowledge.
	Improving access to documented knowledge (C1, C2, C6, C7). Providing better transparency for finding knowledge contained in documents stored on network drives and by creating a "knowledge library" (e.g., in a wiki) easy to access by knowledge workers.
	Installing one supervisor for teams in different subsidiaries (C7). Leading teams responsible for performing similar tasks in different subsidiaries fosters the transfer of knowledge between them, the development of COPs and facilitates benchmarking.

The relationships between levers and effects that we present in the following were interpreted as causal based on the evidence provided by the perceptions of several interviewees across cases and by a number of stories we obtained supporting them. We provide one selected story of one case study for each effect describing the levers perceived to cause the effect in detail. Moreover, we provide further evidence by one short story reflecting a selected additional case where this effect was also observed. Finally, we discuss the lever-effect relationship in the light of related research.

**Increased willingness to share knowledge.** In C6, *topics are fostered by community of practice meetings*. Attending a high number of such meetings is accepted by employees of this organization as necessary and helpful to create an efficient working environment and a joint understanding. Open discussions are allowed and supported by different tools like forums and blogs. This technological support is strengthened by giving individuals and teams more responsibility for their projects, for example, negotiating various budget allocations, and offers opportunities to discuss more work- and project-related ideas in the forums within communities. This effect was also observed

in case C2. Employees who were more willing to answer colleagues' requests and took part in *community of practice meetings*, fostered by the organization, were supposed to perform "better" with respect to KM. These observations are in line with experiences from other big companies, where knowledge-sharing became a part of organizational culture and thus lead to more efficiency [30]. Also the less hierarchical and formal organizational structure leads to the absence of punishment for not following organizational rules and therefore is also beneficial [31].

**Openness to change.** In the software company investigated in C1, an internal Wiki acts as a mindtool that reveals and relate thoughts of different people. Originally implemented to *improve access to documented knowledge*, the wiki additionally provides software support that *enables collaborative learning* processes in early phases of software development. When the wiki has been introduced, the management has *acted as a claimant* influencing the employees to externalize their ideas and problem solutions in form of wiki entries. *Workshops on specific topics* have been proven to defreeze organizational thought patterns as they connect employees with different perspectives and opinions. The wiki-based distribution of ideas among organization's members uncovers different perspectives, fostering diverging thinking during work and preparing employees for a constructive discussion of project meetings. In C3, a Wiki and a *competition-based idea management* scheme is used to collect innovative ideas and put these via discussion and reflection into practice. As an effect, the employees' attitudes towards continuous improvement and open mindedness for organizational changes are fostered. De-freezing thought patterns by means of the Wiki is driven by the complementary processes of accommodation and assimilation [32]. Revealing different perspectives in form of Wiki entries positively affects interpersonal conflicts at a cognitive level. If different perspectives of individuals come into conflict, accommodative processes become operative: an existing conception of a particular problem gets extended and differentiated.

**Positive attitude towards knowledge maturing itself.** In C7, senior management actively communicated interest in the prospects of KM. Through *guidance by supervisors* the number of KM-related ideas and projects arose. Also the attitude of supervisors and (middle) management of the organization was positively affected, resulting in evolving projects related to the knowledge management. In this respect, senior management enabled middle and lower level managers to *act as claimants* for further development of selected ideas. In C6, a positive attitude towards KM was evident. This has been expressed by staff and senior management. Especially, an effort was made by fostering topics by *conducting community of practice meetings* and by *fostering reflection by enabling purpose-oriented task groups*. An individual's attitude affecting its intention to act is also discussed in literature. Gee-Woo, Zmud [33] show that attitudes affect individuals' intention to share knowledge. They relied on the theory of reasoned action [34] stating that an individual's decision to engage in a specific behavior is determined by its intention to perform that behavior, which is determined also by its attitude towards it.

**Improved accessibility of knowledge.** For C3, it was possible to improve access to documented knowledge by a company-wide Wiki which is available for employees and contains unrestricted information about all business activities of the company.

This wiki allows a quick access to information for all employees. A positive effect arose through *allocating competence in projects* appropriately, through fostering topics by *conducting communities of practice meetings* and *fostering reflection by enabling purpose-oriented task groups*. In C6, knowledge bases and Web 2.0 tools were perceived as essential for *enabling collaborative learning* by fostering the exchange of information about project and company-related aspects. The organization *improved access to documented knowledge* by making project-related information accessible to other departments. The accessibility of knowledge is subject to many individual, organizational and technical obstacles [35]. Despite general cultural and hierarchical issues [31], the quality of social networks is an important key factor for the ability to interact with others and therefore enable access to knowledge from others [36].

**Strengthened informal relationships.** The organization of case C2 *provides office spaces for flexible use* for its employees. Employees are encouraged to choose office spaces close to colleagues they need to communicate with often, from whom they want to learn something. Hence, employees got to know more colleagues which lead to an improvement in their social networks and helped building (informal) relationships. Improved communication channels meant quicker and less bureaucratic answers so that employees are able to ask directly for comments on issues. This is also supported by the organization *fostering topics* by allowing employees to *conduct community of practice meetings* that took place between a number of employees working on similar topics and exchanging lessons learnt and best practices. In C7, *workshops on specific topics* are conducted to foster the creation of informal relationships. Supervisors of different departments or subsidiaries meet regularly to identify employees who might have similar interests/roles/tasks. During one-day workshops, a topic is further developed, participants get to know each other and build informal relationships. Informal relationships are generally considered to be important for informal learning in organizations. The success of the activities participation in group activities, working alongside others, tackling challenging tasks and working with clients is mainly responsible for informal learning dependent on the quality of relationships in the workplace [13]. These informal relationships can be seen as individual social capital, which is considered to be the basis of the social capital of the organization [37].

**Availability of different channels for sharing knowledge.** In C7, IT-related and organizational measures are performed to provide different channels for sharing knowledge. From an IT perspective, all subsidiaries are connected via a network and employees are equipped with laptops for *improving the access to documented knowledge*, as well as cell phones and software and hardware for conducting voice and video calls via the Intranet and Internet, hence provide *software support for collaborative learning*. From an organizational perspective, knowledge transfer between different levels of hierarchy is supported by an established procedure of *regular team meetings*. Furthermore, *workshops on specific topics* are used as another medium for. In C4, IT-related and cross-organizational measures were used to provide a range of different channels for sharing knowledge. Use of collaborative software and providing spaces for cross-organizational meetings represented the provision of tools and services for creating, presenting, discussing, tagging and collecting resources enabling synchronous and asynchronous sharing of information. Setting up measures aiming at

this effect goes well along with the implications drawn by [38] who emphasizes that different channels are needed for sharing different types of knowledge.

**Improved quality of workflows, tasks or processes.** In C3, the only case study which provided us with evidence on this effect, there exist a variety of activities to improve the client’s business processes according to a Business Process Model and a best practice model. The *best practice database* maintained by the organization provides a collection of process-descriptions that were approved according to quality assurance procedures. The transition (i.e. the outsourcing) of business processes of the organization’s clients is organized according to a highly formalized procedure that is based on experiences of former engagements with other clients. For quality analysis of the revised business processes, key performance indicators are provided. These enable *performing benchmarks* across similar business processes at different clients and were used to identify differences in the performance of different projects with regard to efficiency, effectiveness, value, control etc. Using best practices as an instrument for transferring knowledge between individuals in an organization in order to improve organizational processes is also named for example in [1].

## 5 Discussion and Limitations

An aggregated view of levers and sparked effects is provided in figure 1. The outer columns depict the levers, grouped according to the five dimensions. The middle column presents the seven effects, mapped to individual, community and organizational level. The arrows represent selected relationships between levers and effects and reflect the stories described in section 4. The levers and effects we are suggesting here may be misunderstood as simple cause and effect relationships. The case descriptions in section 4 show, though, that levers form an intricate network of cause and effect relationships, each of which dependent on the other measures that have been taken. In this sense, all measures need to be carefully designed in cooperation with other levers.

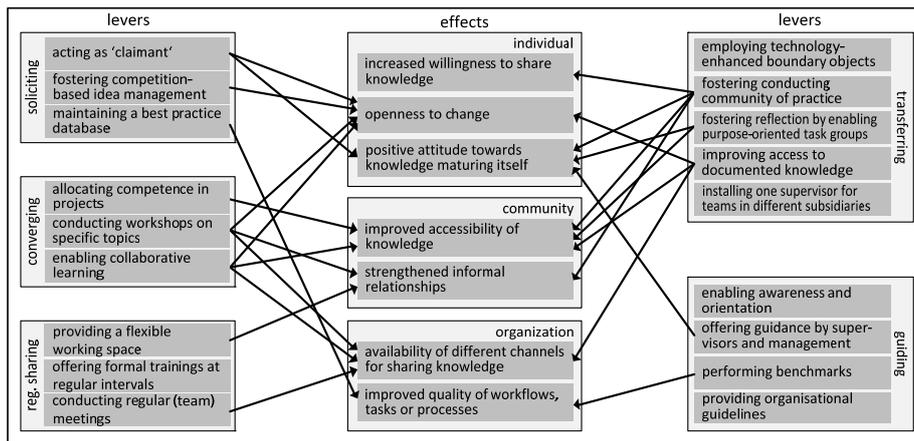


Figure 1. Levers, effects and relationships

Organizations perceiving themselves as successful support persistent collective learning across individual, community and organizational levels. The levers and arrangements that establish persistent learning across these levels can also be viewed to move a collective such as a community or an entire organization between different poles, e.g., (a) participation and reification, (b) togetherness and separation, (c) individual and group [19], (d) grassroots developments and organizational guidance as well as (e) opening up and filtering. The studied organizations seem to be successful in bridging these typical polarities. For example, cases C1, C3 and C6 illustrate bridging participation and reification (a) when they combine improvements of the accessibility of knowledge through databases or wikis (reification) with formal and informal COP meetings and topical workshops (participation). C7 illustrates bridging togetherness and separation (b) by offering a broad range of synchronous and asynchronous means of communication. And the focus on flexible working and seating arrangements in C2 nicely illustrates flexibly balancing individual and group focus (c).

Concerning the poles *organizational guidance* and *grassroots developments* (d), various measures of *organizational guidance* had an important role in aligning and structuring organizational practices and processes, and can be a result of formal organizational arrangements, as well as consequence of informal leadership, e.g. through installing best practice guidelines in C3. At the same time, these same organizations strike a balance with measures that allow grassroots developments and the emergence of new ideas, e.g. with idea competition also in C3. Levers and effects on *opening up* and *filtering* (e) also resonate with the polarity between diverging and converging ideas, e.g., in C1 and C3. Knowledge seems to mature along a meandering process between these poles, starting out with opening up for new ideas, filtering those that are handed on to a community, opening up in the community for developing them evolutionarily, filtering those that are formalized into boundary objects, opening up for a competition of good practices identified in several communities and filtering those that are institutionalized as organizational processes.

We did not specifically ask for roles that are seen to be supportive for KM. However, the levers need to be handled by people and a number of roles were explicitly described in the interviews. The role of promoter was mentioned stressing the importance of having management support for levers or, moreover, their involvement in levers was highlighted in several cases and is also reflected by some levers, e.g., *installing one supervisor for teams in different subsidiaries* and *offering guidance by supervisors and management*. The only role that was directly mentioned in one case was the 'claimant'. Furthermore, we found evidence for people acting as boundary spanners in several cases. These roles are formally implemented in the organization, for example in case of *one supervisor for teams in different subsidiaries* where a single employee functions as a boundary spanner. In contrast, the role of a 'claimant' is performed voluntarily without any formal implementation. Interestingly, no dedicated knowledge management roles, of the type outlined for example by Davenport and Prusak [39], were mentioned. After a period of heightened attention to an institutionalization of knowledge management in projects or separate departments, these dedicated organizational units seem to not play an important role in leveraging resources for individual, community and organizational learning. Instead, every employee was

seen to be responsible for handling knowledge efficiently and differences between this egalitarian take on knowledge management can be attributed to the primary roles that employees play with respect to the business processes and work practices performed in the organisations.

Although we relied on a sound method and compared the results in a comprehensive cross-case analysis, a few limitations need to be acknowledged. Generally, the limitations are in line with those of comparable empirical studies using purposeful and convenient sampling [28], interviews and observations for data collection and a qualitative methods for data analysis. As the number of seven cases is low, the results of the study are not representative. However, the topics of this study are developed based upon results of a previous study, which involved 139 organizations throughout Europe [23]. Each case study aimed at (parts of) organizations and only a limited number of participants could take part in the study. In this respect, the participants' personal scopes (e.g., responsibilities, interests) may have influenced their perceptions. However, even selecting one person representing a whole organization is a common practice in business and management studies [40]. We relied on at least two interviews per case and selected only interviewees who had a good command of knowledge and learning management in their organization and had gained experience through work being based on offering and applying expertise in different organizational settings. By following these selection criteria, we ensured to gain multiple perspectives on the state-of-play of performed or planned levers to positively affect KM.

## **6 Conclusions and Future Work**

This paper presents the results of seven case studies from four countries using a common set of instruments in order to explore potentials of deliberately applicable technological and organizational arrangements and perceived effects of these levers on individual and organizational learning. The validity of these claims rests on selecting cases that were previously identified as perceiving themselves as particularly successful. The strength of rich stories gathered in interviews conducted directly on the work places of carefully selected multiple individuals per setting is considered a vital aspect for understanding KM processes. Yet the focus on seven cases means that the ways the processes operate in the different contexts are necessarily underplayed. This provides an avenue for future research testing on the one hand the validity of the levers and effects across organizational settings and on the other hand investigating what contextual factors explain differences in the effectiveness of technological and organizational arrangements between organizational settings. The stories report on levers and the effects they spark on learning on an individual, community and organizational level and thus help organizations to select concrete measures to improve individual to organizational learning that are postulated as beneficial if not necessary in a number of theories and models [10-12]. The identification of a temporal order of how to introduce such arrangements of levers that fit well together and ideally intensify their positive effects as well as more in-depth knowledge about how to navigate communi-

ties and organizational knowledge bases between the identified poles are further encouraging aspects to be covered in future work.

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