Approaches for Organizational Learning: A Literature Review

Dirk Basten1 and Thilo Haamann1

Abstract
Organizational learning (OL) enables organizations to transform individual knowledge into organizational knowledge. Organizations struggle to implement practical approaches due to the lack of concrete prescriptions. We performed a literature review to identify OL approaches and linked these approaches to OL theories. We synthesized 18 OL approaches across three domains: people (seven approaches), processes (nine), and technologies (two). Furthermore, we suggest two directions for future research: referring to the evaluation of our results and addressing the contingencies of OL effectiveness. Our mapping guides organizations in the design of learning processes to improve long-term performance. Although relying on a single approach is unlikely to comprehensively enable OL, our mapping facilitates the combination of several approaches aligned with organizational culture and processes.

Keywords
organizational learning theory, organizational learning approaches, knowledge management, literature review, people, processes, technologies

Introduction
Organizations learn regardless of whether they apply systematic learning approaches. However, this does not imply that the approaches lead to a high effectiveness of organizational processes. Inadequate learning processes may result in misleading implications. Organizations therefore depend on systematic approaches to gain the ability for systematic learning. Such approaches can be found in the organizational learning (OL) discipline (Crossan, Lane, & White, 1999; Schneider, von Hunnius, & Basili, 2002). OL facilitates reflections on consequences of individual and organizational behavior, better understanding of organizational environments, and improved decision making (Yang, 2007). It is a central element that “represents the essence of [organizations’] competitive advantage” (Real, Roldán, & Leal, 2014, p. 201). Despite its relevance for performance, organizations still struggle to implement OL (Garvin, Edmondson, & Gino, 2008; Taylor, Templeton, & Baker, 2010) due to its highly conceptual nature with little practical guidance (Garvin et al., 2008; Reich, 2007; Taylor et al., 2010) as well as confusion about the OL concept (Wu & Chen, 2014).

Within the OL discipline, both a theoretical and a practical path exist. The former theoretically conceptualizes OL competences (e.g., single- and double-loop learning; e.g., Argyris & Schöns, 1978; Brown & Duguid, 1991; Garvin, 1993). However, an ideal learning organization has not been realized yet, which can be attributed to the lack of concrete prescriptions how to implement the competences suggested in literature (Garvin et al., 2008). Concerning the strategic process of OL, “[t]heory has yet to enlighten the work of practitioners with a more instrumental and comprehensive view” (Vera & Crossan, 2004, p. 236). The latter addresses systematic approaches (e.g., knowledge repositories, post-mortem evaluations) organizations apply to enable OL (e.g., Birk, Dingsøyr, & Stålhane, 2002; Desouza, 2003; Dingsøyr, 2005; García, Amescua, Sánchez, & Bermón, 2011; Garud & Kumaraswamy, 2005). These systematic approaches offer practical guidance on OL implementation but lack evaluability and comparability.

We continue previous research that is based on the idea of combining the theoretical and practical paths by matching the characteristic of the approaches to selected competences suggested in OL theories (e.g., Basten, Michalik, & Yigit, 2015; Dingsøyr, 2005; Hoegl & Schultze, 2005; Wu, Gordon, & Fan, 2010). As earlier works have focused on selected perspectives of both paths (i.e., few approaches, single theory), the challenge of a comprehensive evaluation of systematic approaches based on OL theories has yet to be accomplished.

1University of Cologne, Germany

Corresponding Author:
Dirk Basten, Assistant Professor, Department of Information Systems and Systems Development, University of Cologne, Albertus-Magnus-Platz, 50923 Cologne, Germany.

Email: dirk.basten@gmail.com

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For our purpose of combining the two paths of the OL discipline, we thus pose the following research questions:

**Research Question 1:** What approaches for OL are proposed in the literature?

**Research Question 2:** How do these approaches correspond to OL theory?

Although the first question aims to synthesize the prevailing ideas on how to practically implement OL, the second one completes the OL puzzle by linking the approaches to OL theory.

### Theoretical Background

#### Related Work

OL is “the process through which organizations change or modify their mental models, rules, processes or knowledge, maintaining or improving their performance” (Chiva, Ghauri, & Alegre, 2014, p. 689). It aims to adapt organizational processes through targeted activities (Templeton, Lewis, & Snyder, 2002). OL is crucial for organizations operating in unpredictable environments to respond to unforeseen circumstances more quickly than their competitors (Garvin et al., 2008). Due to its nature as a process of developing new perspectives, OL is a source for the development of new organizational knowledge (H. Cheng, Niu, & Niu, 2014; Chiva et al., 2014). This ability is continuously gaining importance due to the complexities and dynamic changes of business environments (Loermans, 2002).

OL can be perceived as a management task that involves controlling and planning. Its areas of focus include organizational strategic creation, capture, and internalization of knowledge. OL requires the management of information for positive impact on performance (Cheng et al., 2014). As a parallel but closely related research stream, knowledge management (KM) is a systematic process intended to improve productivity and effectiveness of organization members through systematic acquisition, organization, and communication of knowledge (Alavi & Leidner, 1999). In KM, OL is established as an important organizational means for continuous improvement of knowledge creation and utilization (Wu & Chen, 2014). Knowledge creation, retention, and transfer processes can be found at the intersection of the complementary KM and OL fields (Loermans, 2002; Reich, 2007; Vera & Crossan, 2007; Wu & Chen, 2014).

Understanding individual learning processes is necessary to understand the learning process of organizations (Wang & Ahmed, 2003). However, the organizational context is more complex than the individual learning environment. It “is not simply a collectivity of individual learning processes, but engages interaction between individuals in the organisation, and interaction between organisations as an entity, and interaction between the organisation and its context” (Wang & Ahmed, 2003, p. 15). Although early research used to consider OL as simple process, contemporary works describe OL as a “richer and more heterogeneous phenomenon” (Rerup & Levinthal, 2014, p. 38). Despite agreement that it concerns internal adaptation triggered by external challenges and competitive environmental pressures, “the concept of [OL] seems to be [either] ill-defined or theoretical confusion and disorder” (Wu & Chen, 2014, p. 1148). This confusion might be a consequence of the highly conceptual nature of OL in the relative absence of practical guidance (Garvin et al., 2008; Reich, 2007; Taylor et al., 2010). Evidence concerning the relationship between organizational design and OL is limited (Real et al., 2014; Schilling & Fang, 2014). Research to date does not provide instrumental and comprehensive guidance for successful OL implementation (Vera & Crossan, 2004).

The absence of practical guidance has led researchers to match practical approaches with aspects of OL theory (e.g., Basten et al., 2015; Dingsøyr, 2005; Hoegl & Schulze, 2005; Wu et al., 2010). Analyzed approaches include information technology (Basten et al., 2015; Wu et al., 2010), postmortem reviews (Dingsøyr, 2005), and communities of practice (CoP; Hoegl & Schulze, 2005). OL theory is typically considered from the perspective of Nonaka’s (1991) knowledge creation theory (see Basten et al., 2015; Dingsøyr, 2005; Hoegl & Schulze, 2005; Wu et al., 2010). The matching of practice and theory in these studies provides guidance concerning OL implementation. Various approaches have been proposed concerning the dimensions of people (e.g., mentoring; Mavrinac, 2005; Ragins, 1997; Ragins & Cotton, 1999; Singh, Bains, & Vinnicombe, 2002), processes (e.g., postmortem evaluations; Birk et al., 2002; Desouza, Awazu, & Baloh, 2006; Dingsøyr, 2005), and technology (e.g., knowledge repositories; Desouza, 2003; García et al., 2011; Garud & Kumaraswamy, 2005). However, studies matching practical approaches with OL theory focus on selected approaches, whereas no comprehensive review of the literature exists to date.

### OL Theory

We acknowledge the existence of research emphasizing the differences between OL frameworks and theory (Crossan, Maurer, & White, 2011). Although the question whether a theory of OL exists remains to be answered, we use the term “theory” to indicate what organizations should master for effective OL. Although literature offers diverse theoretical OL perspectives (see overview in Bontis, Crossan, & Hulland, 2002), we focus on selected viewpoints to achieve a valuable trade-off between representativeness and depth of analysis as appropriate for our investigation. As we aim to cover a representative set of theories and each theory has its raison d’être, we argue for the inclusion of selected theories because of their seminal character and impact on OL research instead of arguing for the exclusion of particular theories. We do not intend to depreciate theories not included in our
selection. Rather, we aim to cover a representative set of theories in the OL domain. We chose the selected theories due to their seminal character and the high impact they have on research in the OL domain. Our selected theories include single- and double-loop learning (Argyris & Schön, 1978), organizational knowledge creation theory (Nonaka, 1991), and Garvin’s (1993) five building blocks. Although the theories are most commonly referred to in the analyzed literature, we justify their relevance below.

**Single-loop and double-loop learning.** As one of the most cited seminal theories (e.g., Lichtenstein, 2000; Lim & Chan, 2004; Pedler, 1995; Remedios & Boreham, 2004), we consider single-loop and double-loop learning (Argyris & Schön, 1996). Here, this work is particularly suitable because it focuses on human behavior through its “theory of action” perspective.

**Single-loop learning.** Single-loop learning is “instrumental learning that changes strategies of action or assumptions underlying strategies in ways that leave the values of a theory of action unchanged” (Argyris & Schön, 1996, p. 20). An example is the identification and subsequent correction of a production defect. Engineers modify the respective product specification to avoid the defect in the future (i.e., the result of a single feedback loop). Single-loop learning compares existing problems and organizational values and norms to develop an adequate solution (see Figure 1).

**Double-loop learning.** If defect correction requires adaptations of organizational values and norms, then double-loop learning is required. The double loop refers to two feedback loops that connect observed effects with strategies and values served by those strategies. Potentially divergent organizational performance requirements could cause conflicts among individuals in the organization. Such conflicts could be solved by developing new performance strategies, examining trade-offs between divergent perspectives, or in the case of incommensurable requirements, analyzing the individual beliefs underlying these perspectives. A feedback loop exists “which connects the detection of error not only to strategies and assumptions of effective performance but [also] to the values and norms that define effective performance” (Argyris & Schön, 1996, p. 23).

**Organizational knowledge creation theory.** Researchers emphasize the dynamic process of knowledge creation as a critical OL component (Cheng et al., 2014; Loermans, 2002; Real et al., 2014). Accordingly, we contemplate organizational knowledge creation theory, which views OL as dynamic process of knowledge processes concerning tacit and explicit knowledge. Whereas explicit knowledge can be articulated, codified, and communicated using symbols or language (e.g., in documents), tacit knowledge is highly personal as it is deeply rooted “in an individual’s commitment to a specific context” (Nonaka, 1991, p. 98). Tacit knowledge contains both technical skills and mental models which “profoundly shape how we perceive the world around us” (Nonaka, 1991, p. 98). The theory has been considered to “have the potential to stimulate the next wave of research” (see the quote by Arie Y. Lewin in Nonaka (1994, p. 14). Accordingly, it has been widely used by researchers who link practical approaches to OL theory (e.g., Basten et al., 2015; Dingsøyr, 2005; Hoegl & Schulze, 2005; H. Wu et al., 2010).

The creation of organizational knowledge is seen as a spiral that is continuously repeated in four phases (Nonaka, 1991, 1994; Nonaka & Konno, 1998). Figure 2 illustrates the interplay of these phases within the tacit and explicit knowledge dimensions.

**Socialization.** Socialization is the sharing of tacit knowledge among individuals (e.g., a trainee learning by observing and imitating a mentor). It is limited concerning organizational knowledge creation because knowledge never becomes explicit and cannot be easily utilized by the overall organization.

**Externalization.** Externalization “requires the expression of tacit knowledge and its translation into comprehensible
forms that can be understood by others” (i.e., explicit knowledge; Nonaka & Konno, 1998, p. 43). This process requires techniques to “express ideas or images as words, concepts, figurative language (such as metaphors, analogies, or narratives), and visuals” (Nonaka & Konno, 1998, p. 44). Externalization involves the translation of highly individualized or specialized professional knowledge into an explicit form.

Combination. Explicit knowledge is transformed into more complex and explicit knowledge by recombining, sorting, or categorizing bodies of explicit knowledge held by different individuals. A group’s internal knowledge might be combined with knowledge from external sources. Typically, combination involves the dissemination of knowledge among the members of organizations, for example, through meetings or computerized communication networks.

Internalization. Internalization is “the conversion of explicit knowledge into the organization’s tacit knowledge” (Nonaka & Konno, 1998, p. 45). Individuals gather explicit knowledge that they identify as relevant to their domain to extend their tacit knowledge (e.g., by studying process documentation). They extend and reframe their tacit knowledge as documented and verbalized experiences facilitate the internalization of knowledge.

Five building blocks. As the concept of a learning organization actively supports learning among its members to generate competitive advantages or greater effectiveness, we consider the five building blocks described by Garvin (1993) that organizations need to master for effective OL. Garvin’s (1993) work was one of the first to coin the concept of a learning organization. Garvin aimed to overcome previous literature, which he observed as “too utopian and unpractical” (Easterby-Smith, 1997). The five building blocks (see Table 1) include systematic problem solving, experimentation, learning from past experience, learning from others, and transferring knowledge.

Systematic problem solving. Systematic problem solving involves reliance on scientific methods to diagnose problems. Rather than relying on guesswork, organizations use, for instance, techniques for generating and testing hypotheses. Systematic problem solving is fact based, and decisions are made based on data rather than assumptions.

Experimentation. Experimentation is the systematic search for and testing of new knowledge (e.g., through a research and development unit). Concerning this activity, organizations may choose between two types: ongoing programs or demonstration projects. Ongoing programs aim to

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**Table 1. Five Building Blocks of OL (Garvin, 1993).**

| Building block        | Description                                                                                                                                 |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Systematic problem solving | Decisions are based on scientific methods to diagnose problems. Accuracy and precision are critical. Experimentation with new approaches includes the systematic search for and systematic testing of new knowledge. This activity comprises both one time (e.g., demonstration projects) and continuous (e.g., research and development) experiments. |
| Experimentation       |                                                                                                                                              |
| Learning from past experience | Learning from individual experience and history requires constant reflection upon successes and failures to provide implications applicable to all individuals. Learning should result from careful planning (e.g., postmortem evaluations) rather than chance. |
| Learning from others  | Learning from the experiences and best practices of others comprises benchmarking with clients or other external organizations to develop new ideas. Managers need to be open to criticism and new ideas. |
| Transferring knowledge| Transferring knowledge quickly and efficiently throughout the organization through written or oral reports, personnel rotations, or training. |

Note. OL = organizational learning.
gather incremental knowledge through a continuous series of small experiments. Such programs constantly require new ideas and incentives to take risks (e.g., creation of automotive designs). Contrarily, demonstration projects are larger, more complex, and usually designed from scratch. They focus on system-wide changes to develop organizational capabilities or to embody principles that organizations aim to adopt holistically.

**Learning from past experience.** Taking a retrospective approach involves systematic and constant assessment of and learning from past experiences. Lessons learned need to be stored and openly accessible to the members of the organization. Considering that failure is the ultimate teacher and enabler of subsequent success, it is important to consider both successes and failures. As reflections of experiences can be perceived as time-consuming and because managers are indifferent or react to failures in a hostile way, learning should occur as a result of careful planning rather than chance.

**Learning from others.** Learning from others presumes that new perspectives from external sources can provide powerful insights. A typical example is benchmarking, which refers to the inclusion of ideas from other organizations. It involves the search for best practices aiming to derive recommendations based on thoughtful comparisons with other organizations. Customers provide another source of ideas because they are experts in what they do. In any case, organizations will only learn in a receptive environment, where members of the organization are open to criticism or bad news.

**Transferring knowledge.** Transferring knowledge ensures that learning is not a local affair and that knowledge is spread “quickly and efficiently throughout the organization” (Garvin, 1993, p. 87). Disseminating knowledge to many individuals helps ideas reach maximal effectiveness. Written, oral, and visual reports, as well as site visits and tours are popular mechanisms for knowledge transfer. However, these methods can be problematic because some messages can be difficult to comprehend without direct communication. Although training can transfer knowledge effectively, subsequent application to real-life problems is important.

**Research Approach**

We conducted a concept-driven (Webster & Watson, 2002), narrative (King & He, 2005) literature review. Considered as most qualitative review technique (Guzzo, Jackson, & Katzell, 1987), narrative reviews serve to advance models and direct future research by focusing on conclusions derived from multiple studies (King & He, 2005). Although narrative reviews are common in management research, they have also been criticized for potential bias (Tranfield, Denyer, & Smart, 2003) because “[n]o commonly accepted or standardized procedure for conducting a narrative review exists” (King & He, 2005, p. 667). To overcome this issue, we followed guidelines for systematic reviews in management disciplines (Levy & Ellis, 2006; Tranfield et al., 2003; Webster & Watson, 2002). We used these guidelines for our approach of (a) searching (i.e., identification of approaches for OL), (b) aggregating (i.e., merging and grouping of identified approaches), and (c) analyzing (i.e., matching approaches to OL theory) previous literature (see Figure 3).

**Data Collection**

As a comprehensive, unbiased search is one of the pillars of concept-driven literature reviews (Tranfield et al., 2003) and as approaches for OL can be found in a variety of research streams (Argote, McEvily, & Reagans, 2003; Crossan et al., 1999), we relied on a comprehensive set of databases for our research. These included the electronic library of The Association for Information Systems (AISel; http://aisel.aisnet.org), ProQuest (http://search.proquest.com), IEEE Digital Library (http://ieeexplore.ieee.org), ACM Digital Library (http://dl.acm.org), ScienceDirect (http://www.sciencedirect.com), and EBSCOhost (http://search.ebscohost.
Due to the strong linkage between KM and OL research, we designed our search to account for both streams. Given the databases used, we performed a keyword-based search (Levy & Ellis, 2006) that focused on learning and knowledge in organizations (i.e., OL, KM, and learning organizations) and their respective approaches. We applied the following search string to titles, abstracts, and keywords:

(“organisational learning” OR “organizational learning” OR “knowledge management” OR “learning organisation” OR “learning organization”) AND (“approach*” OR “method*” OR “procedure*” OR “technique*” OR “practice*” OR “strategy*” OR “instrument*” OR means)

This search yielded 20,006 potentially relevant publications. We removed duplicates, editorials, and non-English publications. After this filtering, 19,479 publications remained. Both authors considered these publication titles and abstracts to determine inclusion or exclusion. Combining the analysis of both authors resulted in 648 publications potentially relevant for our inquiry. If both authors agreed on exclusion or inclusion, the publication was handled accordingly. In the case of discrepancies (i.e., one author arguing for inclusion, the other for exclusion), the full text was analyzed to make a final decision. As a result, we obtained a set of 405 publications for further analysis.

Aggregation of Approaches

We relied on a double extraction process (Tranfield et al., 2003) in which both authors independently analyzed the full text of the 405 publications identifying different types of OL approaches. We found articles discussing a single approach as well as those that provide an overview of several approaches. In total, we identified 45 approaches (e.g., job rotations, CoP) which were aggregated in case of different descriptions for the same concept. For instance, we aggregated corporate “Town hall” meetings (Mayfield, 2010) and informal events (Hoegl & Schulze, 2005) as events for informal interactions. Another example was the treatment of coaching (Stone, 2007) and mentoring (Mavrincac, 2005) as dyadic relationship approach.

As we used categories of people, processes, and technology that are commonly referred to in the OL and KM context (Bhatt, 2001; Mehta, Oswald, & Mehta, 2007), we excluded approaches that did not fit any of the categories. For instance, we excluded knowledge maps because they do not refer to people, processes, or technology. Although such approaches might have a link to OL theory, we did not include them in our analysis because we considered them to be supporting rather than stand-alone approaches. The aggregations and removals led to a total of 18 OL approaches.

Data Analysis

For data extraction, we applied a three-step approach for each of the 18 approaches. First, we searched for additional publications addressing the approaches. Although our general search string was aimed at identifying OL approaches, we aimed here to retrieve publications which specifically addressed single OL approaches to characterize these approaches (e.g., publications addressing job rotations). We used the aforementioned information sources (see “Data Collection”) and additionally performed backward and forward searches (Levy & Ellis, 2006; Webster & Watson, 2002). We reviewed publications cited in the identified works and publications citing the identified works. We relied on a double extraction process (Tranfield et al., 2003) in which both authors independently read the identified publications to determine text passages which described the design, purpose, and applicability of the OL approaches and noted them down as codings. Exemplary codes include “Knowledge brokers facilitate the transfer of knowledge among organizational units, thereby contributing to organizational learning” (Pawlowski & Robey, 2004, p. 646), coded as the “Transferring Knowledge” building block concerning knowledge brokers. Another example was, “Job rotation is a practice that gives individuals direct experience with work pertaining to different knowledge domains and therefore contributes to knowledge redundancy projects and works” (Fægri, Dybå, & Dingsøyr, 2010, p. 1118), coded as the “Socialization” process concerning job rotations.

Finally, we consolidated our findings. We merged our codings and conjointly mapped the approaches to OL theories. Whereas this mapping was interpretive, it can be easily comprehended as we widely relied on direct quotes from the descriptions of approaches and matched these to OL theories. To improve mapping reliability, we held a workshop with two other researchers familiar with OL theories to discuss the coherence of the mappings. In cases where the group mutually agreed on a different mapping, we refined our analysis accordingly. For instance, the group concluded that job rotation provided only indirect support for double-loop learning.

Results

Table 2 provides an overview of the identified approaches, assigns them to the categories of people, processes, or technology and shows their linkages to OL theories. “X” marks direct support, whereas “(X)” refers to support that is indirect because it is not consistently imperative (e.g., postmortem evaluations can support learning from others if clients are involved).
| Approach | FBB | OKCT | SL/DLL |
|----------|-----|------|--------|
| **People** |     |      |        |
| Chief knowledge officer | ✓ | ✓ | (X) |
| Dyadic relationships |  |  |  |
| Events for informal interactions |  |  |  |
| Job rotations |  | ✓ |  |
| Knowledge broker | ✓ | ✓ |  |
| Knowledge manager | ✓ | (X) |  |
| Skills management | (X) |  |  |
| **Processes** |     |      |        |
| Action learning |  |  | ✓ |
| Communities of practice | ✓ | (X) | ✓ |
| Cross-functional teams |  | ✓ |  |
| Experience factory | ✓ | (X) |  |
| Leaving expert debriefing |  |  |  |
| Postmortem evaluations | ✓ | (X) |  |
| Project briefings | (X) |  | (X) |
| Research and development |  |  | (X) |
| Training |  |  |  |
| **Tech** |     |      |        |
| Knowledge repositories |  |  |  |
| Virtual worlds | ✓ | (X) | (X) |

Note. OL = organizational learning; FBB = five building blocks; OKCT = organizational knowledge creation theory; SL/DLL = single-loop and double-loop learning; Tech = technology.
People

Table 3 shows the people-based OL approaches offers a description and provides a list of the most important references according to our research.

Chief knowledge officer. A chief knowledge officer (CKO) needs to “[p]rovide critical input to the process of knowledge creation and use around the firm and facilitate efforts to improve such processes if necessary” (Jones, Herschel, & Moesel, 2003 p. 50). Consequently, this practice relates to a single-loop learning effect (Fend, 1999; Jones et al., 2003). CKOs need to facilitate “the development and deepening of existing, and creation of new firm-specific competencies and capabilities designed to provide the organization a leading competitive edge” (Rastogi, 2000, p. 42). CKOs can actively advocate changes in core values, organizational goals, and culture, as well as in individuals’ behavior (Jones et al., 2003). Moreover, CKOs lead “the development of knowledge strategy” (Jones et al., 2003, p. 50), thus enabling double-loop learning. Due to their executive level roles, CKOs are not directly engaged in learning processes, although they may decide which activities are reasonable. Accordingly, we did not identify direct relevance of the CKO to either the five building blocks or the organizational knowledge creation theory. However, we discuss the importance of the CKO in this context (see “Discussion”).

Table 3. People-Based Approaches.

| Approach             | Description                                                                                                                                   | References                                                                 |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| CKO                  | A CKO creates a KM infrastructure, builds a knowledge culture, and manages results. As the leader of KM teams, the CKO should offer a clear sense of direction and strategy. | Fend (1999); Jones, Herschel, and Moesel (2003); Rastogi (2000); Serban (2002) |
| Dyadic relationships | Liaisons in which a coach or mentor (i.e., more experienced, senior employee) acts as a social supporter or counselor for a protégé (i.e., less experienced, junior employee) concerning the protégé’s personal (career) development. | Bell (2000); Darwin (2000); Flaherty (2010); Gibb (1999); Mavrinac (2005); Ragins (1997); Singh, Bains, and Vinnicombe (2002); Stone (2007) |
| Events for informal interactions | Events to encourage conversation, open communication, and informal knowledge sharing, such as mountain trips or barbecues, where ideas can be discussed across all organizational levels. | Akbar and Mandurah (2014); Hoegl and Schulze (2005); Leonard and Sensiper (1998); Massa and Testa (2009); Mayfield (2010) |
| Job rotations        | Organizational processes in which members of an organization change their projects, positions, and areas of responsibility for varying periods to gather experience in different knowledge domains and positions. | Bennett (2003); Campion, Cheraskin, and Stevens (1994); Fagri, Dybå, and Dingsøyr (2010); Kolb (1984); Louis (1980); Nonaka and Takeuchi (1995); Ortega (2001); Ostroff and Kozlowski (1992); Prusak (1997); Taylor and Greve (2006) |
| Knowledge broker     | This role creates connections between knowledge buyers and knowledge sellers. As intermediaries between otherwise disconnected pools of ideas, they may cross organizational (e.g., departmental) or cultural (e.g., domain) boundaries. | Cheng (2009); Cillo (2005); Dobbins et al. (2009); Long, Cunningham, and Braithwaite (2013); Pawlowski and Robey (2004); Teodorescu (2006); Xu, Ramanathan, and Ramnath (2014) |
| Knowledge manager    | Takes the role of identifying information needs, in addition to understanding appropriate ways of taking information and converting it into stored knowledge, while also ensuring that the knowledge is reliable and up-to-date. Compared with knowledge brokers, knowledge managers act more proactively and manage KM-related infrastructures. | Davenport and Peitsch (2005); Jones, Herschel, and Moesel (2003); Karim and Hussein (2008); Pantry and Griffiths (2003); Pawlowski and Robey (2004); Teodorescu (2006); Wilson (2002) |
| Skills management    | An organization-wide approach that aims to retrace the skills mastered by each individual in terms of expert catalogs or expert profiles (e.g., included in intranets). In these databases, all individuals describe their areas of expertise, so that other individuals can identify and contact appropriate experts for specific problems. Profiles can be generated and maintained manually by individuals or by automatically extracting information. | Alrafaj, Kruschwitz, Hunter, and Fox (2012); Crowder, Hughes, and Hall (2002); Davenport and Prusak (1998); Dingsøyr and Conradi (2003); Garud and Kumaraswamy (2005); Lindvall and Rus (2003); Rus and Lindvall (2002); Wang, Jiao, Abrahams, Fan, and Zhang (2013) |

Note. CKO = chief knowledge officer; KM = knowledge management.
Dyadic relationships. This approach includes both coaching and mentoring. Coaching refers to “the process by which individuals gain the skills, abilities, and knowledge they need to develop themselves professionally and become more effective in their jobs” (Stone, 2007, p. 11). Coaching helps people to improve their current and future job performance (Flaherty, 2010; Stone, 2007). A coach is an accountability partner who helps individuals fulfill their personal goals (Flaherty, 2010). Mentoring is “a long-lived learning method with roots in classical Greece. It is a dyadic relationship between a more experienced, senior employee and a less experienced, junior employee” (Mavrinac, 2005, p. 396). The mentor (i.e., senior employee, internal or external to the organization) adopts the roles of social supporter, role model, counselor, and/or protector (Ragins, 1997; Ragins & Cotton, 1999; Singh et al., 2002). In addition, the mentor assists the protégé (i.e., the junior employee) in topics such as orientation and career development (Darwin, 2000).

Dyadic relationships facilitate transferring knowledge as they focus on learning “something that he or she would have learned less well, more slowly, or not at all if left alone” (Bell, 2000, p. 54). Dyadic relationships undertaken as a social exchange (Flaherty, 2010; Gibb, 1999) also facilitate socialization within organizations. Finally, a coach/mentor guides orientation and personal development (i.e., a given problem) of the protégé based on organizational values and norms (Darwin, 2000). This guidance may lead to improvement of the protégé’s individual working processes, therefore enabling single-loop learning and the persistent improvement of organizational performance. Although dyadic relationships typically involve two employees in somewhat informal settings, events for informal interactions can also be used to foster OL at the company level.

Events for informal interactions. Events for informal interactions facilitate the transfer of knowledge among individuals by enabling informal discussions (Akbar & Mandurah, 2014; Leonard & Sensiper, 1998). Furthermore, interactions between individuals foster socialization (Akbar & Mandurah, 2014; Leonard & Sensiper, 1998).

Job rotations. Job rotations facilitate transferring knowledge as they aim to establish knowledge redundancy (Feigri et al., 2010; Nonaka & Takeuchi, 1995). Employees benefit from their colleagues’ experiences while knowledge spreads more easily throughout the organization (Prusak, 1997). Job rotations are described as social processes in which employees engage in sense-making (i.e., socialization) when assigned to new jobs (Louis, 1980; Ostroff & Kozlowski, 1992). They enhance individual knowledge, which in turn increases problem-solving abilities (Kolb, 1984; Nonaka & Takeuchi, 1995; Taylor & Greve, 2006) in the sense of single-loop learning. When employees use insights gained during different job assignments to modify their individual values and norms, double-loop learning might also occur. However, these changes occur at the individual rather than an organizational level. Although job rotations enable OL within specific organizational groups, knowledge brokers can help to exchange knowledge between different areas of an organization as part of a vast knowledge network.

Knowledge broker. Knowledge brokers cultivate a sense of trust (Cheng, 2009) and “facilitate the transfer of knowledge among organizational units” (Pawlowski & Robey, 2004, p. 646). Because knowledge brokers determine “what people in other offices do and who knows what” (Teodorescu, 2006, p. 82), they create mental maps about knowledge resources (Teodorescu, 2006) comparable with databases about employee experiences (learning from past experience). Knowledge brokers also contribute to learning from others as they “make a link between organizations which have some special knowledge or skills” (Cheng, 2009, p. 196). Knowledge brokers also help “communities to understand each other’s language” (Pawlowski & Robey, 2004, pp. 649-650) and “manipulate knowledge before transferring it from one context to another” (Cillo, 2005, pp. 405-406). Similarly, literature identifies externalization as a competence of knowledge brokers (Dobbins et al., 2009; Long, Cunningham, & Braithwaite, 2013; Xu, Ramanathan, & Ramnath, 2014).

Some scholars refer to knowledge brokers in the context of single-loop learning as follows: “Knowledge brokers can also help organizations to establish a clear communication feedback mechanism to reflect efficiency and effectiveness of knowledge sharing” (Cheng, 2009, p. 196). Although knowledge brokers are primarily concerned with concrete linkages between employees or organizational units for the knowledge interchange to address specific problems, knowledge managers address OL on a broader level.

Knowledge manager. Knowledge managers support knowledge transfer as they “help manage the knowledge acquired so that it is archived correctly within directories that are logical and easy for people to find what they need” (Jones et al., 2003, p. 58). They contribute to learning from past experience as they have the “ability to collect, organize, store and utilize information and knowledge” (Karim & Hussein, 2008, p. 124) and help “an organization to gain insight and understanding from its own experience” (Pantry & Griffiths, 2003, p. 105). Learning from others can be enabled by knowledge managers when they are sent “to visit suppliers, customers, or strategic alliance firms where they can proactively acquire new knowledge from these sources” (Jones et al., 2003, p. 58). Knowledge managers also contribute to systematic problem solving as they use quantitative data analysis (Teodorescu, 2006) as part of their aim to provide an organization’s members with the knowledge they need (Pantry & Griffiths, 2003). In addition, knowledge managers need to interpret information related to the broader context, including past experiences and how they will affect the future (Teodorescu, 2006). Accordingly, knowledge managers are
associated with combination (Pawlowski & Robey, 2004). Externalization is similarly attributed to knowledge managers as well as for knowledge brokers due to their mutual closeness. Socialization is also connected to knowledge managers (Karim and Hussein, 2008). Similar to knowledge brokers (N. Cheng, 2009; Xu et al., 2014), knowledge managers are specifically associated with single-loop learning (Karim and Hussein, 2008; Wilson, 2002). As knowledge managers need to ensure that knowledge is up-to-date, expert catalogs in the context of skills management are an important asset.

**Skills management.** Skills management helps organizations to transfer knowledge because two or more individuals are empowered to “re-use previously acquired knowledge . . . from resources within their organization” (Crowder, Hughes, & Hall, 2002, p. 185). If extended to external stakeholders, skills management accounts for learning from others (Lindvall & Rus, 2003). Skills management supports socialization as it connects individuals with the required experts and “attempts to speed up the connection-making process” within social networks (Crowder et al., 2002, p. 189).

**Processes**

Table 4 shows the process approaches to OL offers a description and provides a list of the most important references according to our research.

**Action learning.** Action learning helps employees to experiment as “it can be particularly useful . . . when addressing a complex problem that the individual finds difficult to solve using traditional methods” (Kesby, 2008, p. 26). Open discussions enable learning from each other and “enhance participants’ ability to reflect on and learn from their individual and collective experiences” (Kesby, 2008, p. 28; learning from past experience). Invoking clients from different enterprises in the learning set offers the possibility of exchanging different interpretations and enables learning from others (Revs, 2011, pp. 22-23). Due to several set meetings, “a lot of people start to learn with and from each other, and a learning community comes into being” (Revs, 1982, p. 69), thus enabling the transfer of knowledge. Frequent meetings and the on-hand approach support the socialization process. Among others, action learning is supposed to “make useful progress upon treatment of some problem or opportunity in the real world” (Revs, 2011, p. 12). Solving these problems involves single-loop learning. For addressing complex problems, action learning can be applied within communal CoP sessions.

**CoP.** CoP especially increase the level of knowledge transfer (Dewhurst & Cegarra-Navarro, 2004) as they provide “an informal learning environment in which novices and experienced members of the community may interact with each other, share their experiences of being in a particular profession, and learn from each other” (Hara & Schwen, 2006, p. 108). Following this assertion, CoP also help to learn from past experience. Employees can use the experienced body of a CoP as a forum to trigger joint systematic problem solving (Pavlin, 2006; Wenger & Snyder, 2000). CoP can be alternatively formed by participants from outside the organizational borders (Dewhurst & Cegarra-Navarro, 2004) helping to learn from others. Dissemination of tacit knowledge remains the focus of CoP. The concept of socialization is supported as “[CoP] can be seen as useful vehicles for creating shared narratives to transfer tacit knowledge” (Dewhurst & Cegarra-Navarro, 2004, p. 323). CoP support internalizing explicit to tacit knowledge as they “are particularly effective at turning information into knowledge” (Pavlin, 2006, p. 137). While participating in community sessions, more artifacts and resources are produced and more knowledge unfolds (Krishnaveni & Sujatha, 2012; externalization). Organizations need to support CoP by providing technical infrastructure such as wikis, chat rooms, and video conferences (Brazelton & Gorry, 2003; J. S. Brown & Duguid, 1991). The use of these tools leads to new knowledge assets, which may also be used for the combination of explicit knowledge (Ardichvili, Page, & Wentling, 2003). CoP enable single-loop learning through possible cost reductions, quality improvements, and technological developments as a result of community discussions (Pavlin, 2006). CoP often benefit from the diverse backgrounds of their members, which is a characteristic also found in cross-functional teams.

**Cross-functional teams.** Cross-functional teams can be used for transferring knowledge as in contrast to single functional units, they “enable an organization to pool together a wide range of expertise from various units to accomplish complex tasks” (Davidow & Malone, 1992; Huang & Newell, 2003, p. 168). By assembling individuals from different organizational units, the individuals are able to observe others’ working habits and therefore absorb their tacit knowledge (socialization). Cross-functional teams support single-loop learning (McKee, 1992) as well as double-loop learning because “teams are formed to generate new ideas or solutions that did not previously exist in the organization” (Huang & Newell, 2003, p. 168). They are often used when emphasis is placed on creativity and innovation (Huang & Newell, 2003) to disseminate OL (Denison, Hart, & Kahn, 1996). To support their employees with tailored expertise, establishing an experience factory should be considered.

**Experience factory.** An experience factory supports learning from past experience. Project teams report their experiences and relevant documents throughout the course of projects. The experience is distributed during planning and execution of ongoing projects as well as future ones (Basili & Seaman, 2002; Schneider et al., 2002). This allows organizations to efficiently transfer their knowledge. Although
it is not its primary task, experience factories might also use external knowledge from competitors through benchmarking (learning from others). Typical knowledge assets managed by the experience factory include knowledge in terms of models, graphs, and histograms (Basili, Caldiera, & Rombach, 1994), which facilitate the use of scientific

| Approach                  | Description                                                                 | References                                                                 |
|---------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Action learning           | A method based on learning by doing that involves voluntary and nonhierarchical meetings to solve problems and learn from each other in a proactive manner. The primary goal is to put knowledge instantaneously into action. Action learning differs from traditional training due to its focus on learning how to ask questions instead of finding answers to questions posed by others. | Kesby (2008); Revans (1980, 1982, 2011)                                      |
| Communities of practice   | Groups of individuals who meet voluntarily—due to common interests or areas of expertise—to exchange experiences, identify or develop best practices, and establish new interindividual relations. The groups are built on mutual agreement, loosely connected, and self-managed. | Ardichvili, Page, and Wentling (2003); Brazelton and Gorry (1991); Brown and Duguid (1991); Davenport and Prusak (1998); Dewhurst and Cegarra-Navarro (2004); du Plessis (2008); Krishnaveni and Sujatha (2012); Lave and Wenger (1991); Mestad, Myrdal, Dingsøyr, and Dybå (2007); Pavlin (2006); Peltonen and Lämsä (2004); Wenger (2004); Wenger and Snyder (2000) |
| Cross-functional teams    | Teams that are assembled by pooling experts from different organizational units to combine different functional skills. Team members have contrasting social identities and obligations concerning divergent organizational subunits. Typically, the teams are temporary and overlay existing functional organization to make decisions on lower hierarchical levels. | Alderfer (1987); Alderfer and Smith (1982); Ancona (1990); Brown (1983); Davidow and Malone (1992); Denison, Hart, and Kahn (1996); Dorairaj, Noble, and Malik (2012); Ford and Randolph (1992); Galbraith (1994); Gersick and Hackman (1990); Huang and Newell (2003); McKee (1992); Ohmae (1990) |
| Experience factory        | Organizational unit that accounts for a central repository to support ongoing projects throughout planning and execution with tailored experience. It extends a knowledge repository through project team reports concerning experiences and documents. | Basili, Caldiera, and Rombach (1994); Basili and Seaman (2002); Dingsøyr and Conradi (2002); Schneider et al. (2002) |
| Leaving expert debriefing | Structured approach (i.e., interviews or workshops) to capture knowledge of a leaving expert, which is especially helpful in the case of aging or highly specialized workforces. | Dow and Pallaschke (2010); du Plessis (2005); Hofer-Alfeis (2008); Hofer-Alfeis (2009); Streb, Voelpel, and Leibold (2008) |
| Postmortem evaluations    | Events after project completion in which project members meet to reflect their positive and negative experiences and compose their lessons learned as postmortem reports/stories. Data collection typically involves group discussions, semistructured interviews, or focused discussions. | Baaz, Holmberg, Nilsson, Olsson, and Sandberg (2010); Birk, Dingsøyr, and Stålhane (2010); Desouza, Awazu, and Baloh (2006); Dingsøyr (2005); Hoegl and Schulze (2005); Schindler and Eppler (2003); Zedtwitz (2002) |
| Project briefings         | Structured or unstructured workshops to transfer project-related (technical) knowledge, such as evolving issues, requirements, and the attainment of project members in newly started projects. | Finch, Yu, Shen, Kelly, and Hunter (2005); Hoegl and Schulze (2005); Yu, Shen, Kelly, and Hunter (2006) |
| Research and development  | Independent organizational unit to enable the creation of new knowledge, either as single endeavors to demonstrate the effects of new knowledge on ongoing projects or controlled experiments. Related activities can develop new technologies, define new quality standards, and improve current processes. | Foray (2004); Hoegl and Schulze (2005); Pasher and Ronen (2011); Remondino and Bresciani (2011); West and Iansiti (2003) |
| Training                 | Formalized teaching of members of the organization regarding particular skills or types of behavior (both soft and hard skills). Formalized sessions can be used to standardize content and practices across organizational units. | Chau, Maurer, and Melnik (2003); Dorairaj et al. (2012) |
methods to systematically solve problems. By synthesizing experience from different projects, explicit knowledge is combined (Basili et al., 1994). Having supplied this knowledge to projects, employees can use these insights to internalize that knowledge. Single-loop learning can also be enabled because adjustments of current practices can be made based on the collected experience. As experience factories rely on insights from projects, it is important to consider how knowledge can be retained if experts leave the organization.

Leaving expert debriefing. This debriefing helps organizations to learn from past experiences as the leaving expert’s experiences are systematically examined to support understanding by successors (Streb, Voelpel, & Leibold, 2008). Moreover, as one of its core purposes, this approach supports transferring knowledge (Dow & Pallaschke, 2010). From the perspective of organizational knowledge creation theory, a leaving expert debriefing enables socialization and externalization. The former occurs when the leaving expert meets with the successor (Hofer-Alfeis, 2008; Streb et al., 2008). The latter occurs when knowledge is documented (Dow & Pallaschke, 2010) in workshops or interviews. As with capturing the knowledge of experts when they leave the organization, knowledge needs to be captured when projects end. Here, postmortem evaluations represent a useful approach.

Postmortem evaluations. Postmortem evaluations support learning from past experiences as they capture experience from completed projects (Birk et al., 2002). The workshop “makes project team members share and understand one another’s perspectives” (Birk et al., 2002, p. 44) and—accompanied by written reports—facilitates the transfer of knowledge within organizational boundaries. Moreover, postmortem evaluations can support learning from others if, for example, client representatives are included in the sessions. “In listening to others [individuals] employ socialization and in reflecting and sharing your own experience you externalize your tacit knowledge” (Dingsøyr, 2005, p. 296). The latter “is especially encouraged, when the outcomes and the essential insights of the workshop are written up in a brief document” (Hoegl & Schulze, 2005, p. 267). Furthermore, the approach “identifies improvement opportunities and provides a means to initiate sustained change” (Birk et al., 2002, p. 43). This process in turn leads to single-loop learning. Nevertheless, postmortem evaluations “(should) focus on double-loop learning [as participants of the workshop are] in the best position to review cause-and-effect relationships and should . . . propose improvements for the management and execution of future projects” (Zedtwitz, 2002, p. 257). A change in norms and values is achieved “by making project-specific knowledge and experience available to a corporate-wide pool of organizational and technical knowledge” (Zedtwitz, 2002, pp. 258-259). The insights gained through postmortem evaluations can be beneficial and easily reutilized when establishing new projects through project briefings.

Project briefings. Project briefings are conducted for the transfer of project-specific knowledge. Similar to postmortem evaluations, learning from others can be supported by including members of external organizations. By means of frequent interactions between different stakeholders, the approach promotes socialization. It involves “the sharing of the explic-icated experiences, or the documents and their integration with functional specifications of the starting development project” (Hoegl & Schulze, 2005, p. 268). This process leads in turn to the combination of explicit knowledge. The process of externalization is supported only if transferred knowledge is codified in a document (Finch, Yu, Shen, Kelly, & Hunter, 2005). In addition to project briefings to inform decision making, organizations can use research and development to discover ideas to improve organizational processes.

Research and development. This approach uses “research results, scientific knowledge or new ideas” (Remondino & Bresciani, 2011, p. 7) and therefore supports systematic problem solving. Experimentation also occurs as new ideas or scientific knowledge is tested in organizational settings (Remondino & Bresciani, 2011; West & Iansiti, 2003). The “provided material, such as patents, studies, or surveys, can be analyzed, synthesized, and integrated” (Hoegl & Schulze, 2005, p. 270) by the research and development unit (combination). The “predominantly explicit” knowledge provided by research and development teams can be “utilized for experimentation” (Hoegl & Schulze, 2005, p. 270), thus enabling the internalization of knowledge. Research and development can support externalization if newly developed knowledge is, for instance, transferred into research reports. Each research and development initiative “should also be regarded as a tool to challenge past assumptions and re-examine approaches to problem solving” (West & Iansiti, 2003, p. 812; single-loop learning). Insights gained from experiments that prove useful should be built into employee training.

Training. By using internal experts or hiring external trainers and consultants (Dorairaj, Noble, & Malik, 2012), training facilitates learning from past experiences and learning from others. As they support dissemination of, for instance, process and technical knowledge (Chau, Maurer, & Melnik, 2003; Cheng & Hampson, 2008), training helps in transferring knowledge of both tacit knowledge (socialization) and explicit knowledge (internalization) to individuals. Externalization only occurs if knowledge gained during training is codified afterwards, which is not mandatory in training.

Technology

Table 5 shows the technological OL approaches offers a description and provides a list of the most important references according to our research.
Table 5. Technology Approaches.

| Approach          | Description                                                                 | References                                                 |
|-------------------|------------------------------------------------------------------------------|-------------------------------------------------------------|
| Knowledge repositories | Digital knowledge storages for the long-term storage of experiences, documents, reusable code, etc., which should be easily accessible with reusable content. Whereas some types of knowledge repositories serve only as storage systems, wikis, for example, additionally support employee collaboration and conversation. Organizations may use a knowledge portal which typically integrates different repositories and supports KM processes. | Desouza (2003); García, Amescua, Sánchez, and Bermón (2011); Garud and Kumaraswamy (2005); Mueller, Renzl, and Kaar (2008); Paik and Choi (2005); Stocker, Richter, Hoeffer, and Tochermann (2012); Tagliaventi and Mattarelli (2006); Wagner (2006); Wu, Gordon, and Fan (2010) |
| Virtual worlds    | Characterized as “any computer-generated physical space, represented graphically in three dimensions that can be experienced by many people at once” (Castronova, 2005, p. 22), virtual worlds are electronic environments in which individuals interact in a realistic manner in the form of avatars. | Füller and Matzler (2007); Mueller et al. (2008); Tagliaventi and Mattarelli (2006); Wasko and Faraj (2000); Mueller, Hutter, Fueller, and Matzler (2011) |

Note. KM = knowledge management.

Knowledge repositories. The process of transferring knowledge through knowledge repositories is perceived as “the single most knowledge capturing and transferring tool” (Paik & Choi, 2005, p. 82). Employees participate in knowledge-sharing activities, and the presence of knowledge repositories stimulates the externalization of employees’ tacit knowledge (Gallupe, 2001; Wu et al., 2010). While browsing through existing explicit knowledge, “[u]sers can internalize structural knowledge from documents [and] assimilate structural knowledge by reading and learning from documents” (Wu et al., 2010, p. 294). In contrast to Wu et al. (2010, p. 294), we claim that knowledge repositories serve as a tool which helps employees to find, sort, or categorize different explicit knowledge assets and therefore combine them to create new, explicit knowledge. Single-loop learning is supported because knowledge repositories store internally generated knowledge such as best practices to help improve current practices. In addition to the ability to capture and transfer knowledge, information technology can enable OL when establishing virtual worlds.

Virtual worlds. Virtual worlds support experimentation as they enable users to experience or modify products or features before they exist physically (Füller & Matzler, 2007). As knowledge is shared in virtual worlds (Mueller, Hutter, Fueller, & Matzler, 2011, p. 479), this approach supports transferring knowledge. By interacting and using shared databases (Mueller et al., 2011), employees can learn from past experience. Similarly, support can be fostered for learning from others if virtual worlds are established on an inter-organizational level. As has been shown for virtual worlds, “existing tacit and explicit knowledge can be accessed and shared… but also new knowledge is generated and applied” (Mueller et al., 2011, p. 495). Moreover, these virtual environments consider the social aspects of knowledge processes (Mueller et al., 2011). Accordingly, virtual worlds address internalization and socialization. By providing and combining databases (Mueller et al., 2011), it is also possible to externalize and combine knowledge.

Discussion

Contributions

Our main contribution is the synthesis of OL approaches and the mapping of these approaches to OL theory. Concerning the former, we established an overview of OL approaches that stems from diverse research domains concerning knowledge and learning. This overview improves transparency with regard to the approaches that have been proposed to date. In addition, the aggregation of these approaches helps to identify common ground among different approaches. Concerning the latter, we advanced the understanding of OL processes and contributed to the conceptualization of OL (Garvin et al., 2008; Reich, 2007; Taylor et al., 2010; Vera & Crossan, 2004; Wu & Chen, 2014). The prevailing lack of practical guidance for implementing OL can be overcome by the mapping such that organizations choose approaches that ensure that OL theories are fully covered. Depending on already established approaches, the mapping helps to identify approaches that complement OL efforts to fully cover OL theories. Our results show that using only one approach is not promising because none of the approaches directly supports all OL theories in their entirety. It is thus important to adapt several approaches to cover the variety of OL theories. Although most identified approaches facilitate the transfer of knowledge and socialization, our analysis shows that several options exist for auspicious combinations of OL approaches. For instance, knowledge managers and skills management can be applied together to enhance the knowledge transfer of postmortem evaluations. Due to the number...
of approaches and their linkages to OL theories, we discuss
below the contributions to the research streams of the three
OL theories rather than review each of the linkages.

**Five building blocks.** None of the approaches provides support
for all five of the building blocks. Experimentation finds the
least support across the three theories, whereas the other four
blocks are broadly covered by action learning, CoP, experi-
ence factories, and knowledge managers. It should thus be
assured that virtual worlds, action learning, and/or research
and development units are considered in organizations striv-
ing to become learning organizations. Considering that the
establishment of virtual worlds incorporates substantial
investment, we presume that organizations will more likely
invest in research and development units (Davenport & Pru-
sak, 1998).

**Organizational knowledge creation theory.** This is the only the-
ory that finds complete, direct support by OL approaches
(i.e., CoP, and indirectly, virtual worlds). With four excep-
tions, all approaches at least indirectly support socialization.
The least support concerning this theory is provided for
internalization. As internalization of explicit knowledge pri-
arily occurs at the individual level, it is affected by few
organizational measures. Therefore, alternative approaches
are needed to help individuals identify relevant knowledge
(e.g., knowledge repositories, experience factory) and con-
vert that knowledge (e.g., training).

**Single-loop and double-loop learning.** Most of the identified
approaches appear suitable to solve short-term problems
(single-loop learning), whereas double-loop learning is only
marginally supported. In particular, postmortem evaluation,
cross-functional teams, and a CKO are approaches that
can change organizational values due to continuous
knowledge gathering and sharing (the former two
approaches) or as the central role in top management (the
latter). The scant support for double-loop learning can be
attributed to the problem of change management in general.
OL itself requires organizations and their individuals to
adapt their processes. If further changes are imposed by the
learning processes, resistance might become too strong
(Hirschheim & Newman, 1988) to be addressed without ini-
tiating a specific change project.

**Limitations and Future Research**

The potential implications concerning the combined use of
these approaches to move toward the ideal of a learning orga-
nization (Garvin et al., 2008) are hypothetical and need to be
evaluated. Appropriate empirical studies might address both
the development of measures to capture theory-based evalu-
atations in the organizational context as well as benchmarks
concerning the impact of different approaches on organiza-
tional performance.

Organizations must combine several of the identified
approaches to design a learning organization. Researchers
can support organizations by identifying contingencies
(Donaldson, 2001), that is, the most appropriate approaches
for diverse organizational structures and cultures. As it is
unlikely that each approach will have the same impact on
learning effectiveness or efficiency in every organization, we
suggest that OL research should integrate the contingency
perspective when evaluating the effectiveness of various
approaches. Accordingly, organizational size and structure
might be critical elements. Although “organizational size is
neither an impediment to nor a facilitator of organizational
learning with regard to the firm’s results” (Real et al., 2014,
p. 202), not every approach might be suitable for each orga-
nization. For instance, small organizations might not benefit
from implementing the experience factory. Benefits from
effort-intensive approaches are relatively likely to accrue to
large organizations, where not all employees know each
other, but all depend upon support from a central organiza-
tional unit.

**Practical Implications**

Organizations should use our insights to reflect upon their
approaches to OL with respect to their coverage of OL theo-
ries. Although the final design of OL approaches depends on
the context and is subject to future research (see “Limitations
and Future Research”), our study reveals CoP as a central
element for enabling OL. CoP probably represent the most
powerful approach to support OL due to their broad coverage
of the three OL theories. This finding is consistent with the
central role that has long been ascribed to this approach in
organizational strategies (Wenger, 1998, 2004). CoP are also
central for enabling OL because they offer linkages to many
other approaches. For instance, CoP members can build
cross-functional teams as they typically come from different
areas and have diverse backgrounds. As another example,
the dyad of a mentor and protégé can be interpreted as a
knowledge-producing community of practice at the micro-
level (Singh et al., 2002). Finally, CoP can be seen as provid-
ng support for experience factories due to their specialized
knowledge. As the identified approaches are well distributed
across the people, process, and technology categories, we
suggest combining these approaches, using at least one from
each category. This suggestion is consistent with research
proposing that the effect from the three categories in combi-
nation is most likely to be effective (Bhatt, 2001; Mehta
et al., 2007).

Second, knowledge and learning culture in organizations
is decisive for the effectiveness of implementing OL
approaches. It is thus essential to raise awareness for enhanc-
ing OL. For this purpose, several approaches can be cojointly
implemented. For instance, job rotations typically require
high engagement of behalf of the rotating employees.
Individuals thus need to be aware of the advantages that arise
from using OL approaches. Moreover, this category is important as approaches such as events for informal interactions and dyadic relationships have significant impact on organizational culture, which is essential for OL effectiveness (Sutton, 2001). Through improved work performance, organizational competitiveness is also increased (Flaherty, 2010; Stone, 2007). This awareness is the foundation for individual motivation to engage in the organization’s learning process. Here, the role of a CKO can be decisive. Due to its importance, we will further discuss below the role of the CKO in improving the depth of OL. CKOs are directly associated with single- and double-loop learning. Accordingly, they contribute to the survivability of organizations (Argyris, 1977). Although CKOs do not address other aspects of OL theory, they can select and lead the implementation of activities which provide reasonable support. The CKO advocates the discovery and use of knowledge (Jones et al., 2003). Furthermore, the CKO can support knowledge transfer, for instance, by regularly bringing employees together through informal events. The CKO facilitates “the development and deepening of existing, and creation of new firm-specific competencies and capabilities designed to provide the organization a leading competitive edge” (Rastogi, 2000, p. 42), which implies the use of experiments within the organization. The CKO also manages “relationships with external providers of information and knowledge and negotiate[s] contracts with them,” thereby “acting as liaisons between the internal and external knowledge providers” (Serban, 2002, p. 107). The CKO thus establishes a foundation for learning from others. By creating a knowledge infrastructure which enables knowledge workers to store and retrieve past experiences in standardized form, the CKO helps employees learn from past experiences. The CKO might also “[d]esign and implement a firm’s knowledge codification process . . . to specify key categories of information or knowledge that the organization would address” (Jones et al., 2003, p. 50), which indicates systematic problem solving. While CKOs can promote specific practices and thereby indirectly enable the realization of the knowledge creation spiral, they do not perform these processes themselves. As Jones et al. (2003, p. 53) states, a CKO “is the designer, implementer, and overseer of an organizations knowledge infrastructure.” The same responsibilities are assigned for oversight of the knowledge infrastructure and therefore influence the phases of the knowledge creation spiral (Rastogi, 2000; Serban, 2002).

Finally, organizations should not restrict their efforts to selecting approaches from our review. Rather, our overview is fundamental for carefully designing the implementation of selected approaches. Organizations can use our mapping to identify multiapproach strategies which potentially incorporate all three theories. A combination of different approaches is likely to be beneficial as different approaches use different ways of learning, and their combinations may lead to synergetic effects. The literature provides concrete guidelines on how to successfully apply OL approaches. For instance, with respect to CoP workshops, one specific example is the problem-based learning, interactive multimedia, experiential learning, and role-playing (PIER) approach (Hardless, Nilsson, & Urban Nuldén, 2005). Moreover, the World Café can be used to foster collaborative dialogs, particularly among large groups (Brown & Isaacs, 2005).

**Conclusion**

One of our main contributions is the aggregated and categorized overview of approaches to design learning organizations. Although a main reason for the failures to reach the ideal of a learning organization thus far can be found in the rather abstract descriptions of OL theories, our mapping of practical approaches to OL theories guides organizations in designing learning processes. Organizations can use our mapping to design a comprehensive set of approaches while aligning them to organizational cultures and processes.

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**Author Biographies**

**Dirk Basten** holds a doctoral degree in Information Systems. His research focuses on information system project success, software development effort estimation, knowledge management in project and program contexts, and Gamification.

**Thilo Haamann** holds a master’s degree in Information Systems and is engaged with Deloitte Consulting GmbH, Germany. His interests include knowledge management and organizational learning as well as agile product development and the execution of transformation programs.