



## Journal of Knowledge Management

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### Article information:

To cite this document:

Delio Ignacio Castaneda, Luisa Fernanda Manrique, Sergio Cuellar, (2018) "Is organizational learning being absorbed by knowledge management? A systematic review", Journal of Knowledge Management, <https://doi.org/10.1108/JKM-01-2017-0041>

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# Is organizational learning being absorbed by knowledge management?

## A systematic review

Delio Ignacio Castaneda, Luisa Fernanda Manrique and Sergio Cuellar

### Abstract

**Purpose** – This paper aims to focus on research regarding organizational learning (OL) and knowledge management (KM), and to specifically investigate whether OL has been conceptually absorbed by KM.

**Design/methodology/approach** – This study is based on 16,185 articles from the Scopus and ISI Web of Science databases, using VantagePoint 10.0 software. The method used in this study is a systematic literature review covering KM and OL publications from the 1970s, when the OL field started to grow, up to 2016.

**Findings** – Nuclear processes of OL, creation and acquisition of knowledge, have been conceptually absorbed by KM literature in the past years.

**Research limitations/implications** – Only two databases have been considered, Scopus and ISI Web of Science, because of their academic prestige. However, these databases include a large number of articles on KM and OL. Search terms used could exclude some relevant terms, although all major descriptive terms have been included.

**Practical implications** – This paper identifies thematic clusters in KM and OL, evolution of both fields, most cited authors and representative journals by topic.

**Originality/value** – This is the first paper to jointly analyse the evolution of KM and OL. This paper shows a conceptual absorption of OL into KM, which may enrich academic discussion and also provide some clarity to the conceptualization of these two fields.

**Keywords** Organizational learning, Knowledge management

**Paper type** Research paper

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### 1. Introduction

In the current era of information and knowledge, organizational learning (OL) and knowledge management (KM) are two fundamental fields that add value to organizations by facilitating the achievement of their goals (Castaneda, 2010). Companies that learn faster and use knowledge more effectively tend to be leaders (Smith, 2008). However, KM and OL are dynamic subjects that “have gone through dramatic changes in the last twenty years and will continue to change in the next ten years” (Easterby-Smith and Lyles, 2011, p. 1). These changes have rarely been investigated and they are the main focus of this study. Vera and Crossan (2003) stated that although OL and KM are closely related, these are rarely studied together. Furthermore, despite the theoretical extension of KM, its trajectory and identity remain largely unknown (Serenko, 2013), which applies equally to OL.

The objective of this study is to review OL and KM research, particularly to determine whether OL has been conceptually absorbed by KM. Several studies have focused on KM and OL separately (Bapuji and Crossan, 2004; Brahma and Mishra, 2015; Easterby-Smith *et al.*, 2000; Lee *et al.*, 2016; Serenko, 2013; Serenko and Dumay, 2015a, 2015b), but the current study is the first to simultaneously investigate the evolution of both fields. We have

Received 23 January 2017  
Revised 18 September 2017  
Accepted 3 November 2017

This article is a product of the Research Project ID PPTA 6497 “Research in Knowledge Management and Organizational Learning: Systematic Review”, financed by Pontificia Universidad Javeriana. The authors want to acknowledge the university’s support.

identified the main conceptual categories in each field, the representative authors in terms of frequency and impact and the relevant journals. The domains considered in this study are theoretical, empirical and analytical articles accessed via the Scopus and ISI Web of Science databases for 1970-2016. In Section 2, we present a brief review of the concepts considered and related research conducted using bibliometric and scientometric tools. In Section 3, we describe the methods used in the current study. In Section 4, we present our results and these are discussed in Section 5. In Section 6, we explain some implications and limitations, and give our conclusions.

## 2. Theoretical background

### 2.1 Knowledge management

KM was first conceptualized in the 1990s, where it was facilitated by the globalization of economies and markets, knowledge-intensive products and services and the rapid development of information technology (Alavi and Denford, 2001). The study of KM was developed by Drucker (1993) in terms of knowledge-intensive firms and the fundamental role of their knowledge workers (Drucker, 1966).

Most KM definitions are based on processes. Alavi and Leidner (2001) proposed one of the most widely cited frameworks comprising four processes: creation, storage retrieval, transference and knowledge application. The processes that are frequently incorporated in KM definitions are the creation, access, dissemination and application of knowledge (Nonaka and Takeuchi, 1995); the creation, maintenance, renewal, organization, transference and realization of knowledge (Wiig, 1997); the identification, capture, storage, sharing, application and selling of knowledge (Liebowitz, 1999); the generation, access, facilitation, integration, embedding, application, transfer and protection of knowledge (Lin, 2014); and the creation, acquisition, documentation, storage, electronic transference, face-to-face sharing and use and reuse of knowledge (Castaneda, 2015a).

Many previous KM definitions include the processes of knowledge creation and acquisition, which involve the generation of new knowledge inside an organization and the acquisition of knowledge from external sources (Huber, 1991). However, as we show later, the core feature of OL is also the creation and acquisition of knowledge. This overlap has rarely been analysed in previous studies, which also motivated the current study.

Different methods have been used to analyse KM. In particular, Pun and Balkissoon (2011) conducted a literature search for KM and OL based on the ProQuest databases for 1996-2009, which yielded 4,049 publications. They initially searched for “knowledge management” in citations and abstracts, and then narrowed the search to “knowledge management” and “organizational learning”, before further narrowing using the subcategory “studies and models”, which returned 833 articles for their review. They found that the six most frequent themes were studies, innovations, models, competitive advantage, organizational theory and information sharing, and they concluded that since 2008, OL and KM had moved towards the integration of concepts and practices. Topics such as knowledge acquisition, learning creation and learning models were part of their study, and they suggested that OL and KM were becoming sub-concepts within learning organizations.

However, Easterby-Smith and Lyles (2011) showed that learning organization was not a broad category that could include OL and KM, but instead learning organization focused on process and practice, whereas KM was more concerned with the content, practice and OL process and theory. Pasher and Ronen (2011) argued that second-generation KM had shifted from managing knowledge to creating new knowledge. However, knowledge creation is not a new field. Indeed, it arose in the 1960s under the label “organizational learning”, which was three decades before KM.

Serenko (2013) described the development of KM according to four generations:

1. Before the mid-1990s, KM had a technocentric view of knowledge processes, where it focused on explicit knowledge, knowledge codification and storage.
2. Between the mid-1990s and early 2000s, KM focused on human resource factors, social and cultural aspects in OL, applied knowledge and knowledge sharing driven by employees.
3. From the early 2000s to approximately 2013, KM was characterized by strategic perspectives; reconciliation between human and technocentric views; identification, development and support of self-managed social networks; and knowledge as a flow, and value creation focus.
4. From approximately 2014 to the present, KM has been characterized by the increasing complexity of the knowledge domain, knowledge as a relationship, value multiplication focus, knowledge by questioning and an increasing role for knowledge-based development.

Serenko found that the most frequent topics were intellectual core, research paradigms, KM journal analysis, past and future productivity impact, research relevance and collaboration analysis. The most common methods used for scientometric analyses were literature reviews, counting techniques, expert and personal opinions, and content, citation, co-citation, meta-, keyword and network analyses. Serenko considered OL as part of KM. However, there are historical and conceptual reasons to separate them. Inkinen (2016) reviewed the association between KM and performance by firms, and found that most studies considered human, technology, management processes and organization-oriented issues in descending order.

Brahma and Mishra (2015) examined academic studies published over 15 years but they did not describe their specific publication dates or the methods used. They grouped the extracted information into seven categories for analysis: KM foundations, knowledge as a key organizational resource, KM technologies, KM outcomes, role of organizational culture in knowledge-based performance, impact of KM on organizational performance and metrics for measuring the impact of KM. Serenko and Dumay (2015a) reviewed the most widely cited KM articles during 1997-2009 and found that the most commonly studied themes were knowledge as a process, managing/competitive advantage, organizational culture, information technology, communities of practice, knowledge innovation, KM strategy and scientometrics. Fteimi and Lehner (2016) studied the keywords in 755 studies published in the Proceedings of the European Conference of Knowledge Management during 2006-2013 and they ranked ten themes by frequency (in descending order): KM, knowledge sharing, knowledge, intellectual capital, knowledge transfer, innovation, communities of practice, case studies, small- and medium-sized enterprises and OL. They considered OL to be part of KM. Serenko and Dumay (2015b) suggested the need for more KM studies because normative rather than empirical concepts dominate the KM field.

## 2.2 Organizational learning

OL is considered to be a key area in management and organizational research (Bapuji and Crossan, 2004). The concept of OL was developed in the 1960s by Cyert and March (1963) who proposed the concept in the context of a decision-making model. They emphasized the relevance of learning by experience and the ways in which a firm may adapt to environmental changes. Cangelosi and Dill (1965) published the first study to include “organizational learning” in the title, and discussed individual and OL. However, the field only started to expand significantly after Argyris and Schön (1978) introduced single- and double-loop learning. Subsequently, Hedberg (1981) discussed the organizational obligation to acquire knowledge to survive, Shrivastava (1981) discussed the learning

systems and [Fiol and Lyles \(1985\)](#) discussed the learning levels within an organization. These foundational concepts were developed further in the 1990s, when [Argote and Epplé \(1990\)](#) described learning curves, [Weick \(1991\)](#) considered OL frequency and forms, [March \(1991\)](#) studied the exploration and exploitation of knowledge, [Huber \(1991\)](#) considered OL constructs (knowledge acquisition, information distribution, information interpretation and organizational memory) and [Brown and Duguid \(1991\)](#) discussed the relationship between OL and communities of practice and innovation. The OL literature has grown significantly from these foundations.

OL has been defined in many ways. [Fiol and Lyles \(1985\)](#) defined it as change that occurs as a function of experience, whereas [Huber \(1991\)](#) considered it to be knowledge acquisition. Other authors have defined OL as the integration of knowledge acquisition and organizational change based on action ([Castaneda, 2015b](#); [Castaneda and Rios, 2007](#); [Garvin et al., 2008](#)). To be organizational, an individual's knowledge must be embedded in a variety of institutional forms, including tools, routines, social networks, transactive memory systems ([Argote, 2011](#)), as well as organizational systems, structures and culture ([Cummings and Worley, 2009](#); [Villamizar and Castaneda, 2014](#)). According to a study by [Argote et al. \(2003\)](#), and broadened by [Argote \(2011\)](#), OL has three sub-processes comprising creating, retaining and transferring knowledge, which have been included as part of the definitions of KM by other authors ([Lin, 2014](#); [Liebowitz, 1999](#); [Nonaka and Takeuchi, 1995](#)). However, the common processes in OL definitions are knowledge creation and knowledge acquisition. [Flores et al. \(2012\)](#) reviewed management journals and proposed six OL sub-processes: information acquisition, distribution, interpretation, integration, organizational memory and knowledge institutionalization. [Popova-Nowak and Cseh \(2015\)](#) defined OL as a social process where individuals participate in collectively situated practices and discourses, which reproduce and simultaneously expand OL. Thus, OL includes multiple concepts, but it tends to include the creation and acquisition of knowledge as characteristic processes.

[Easterby-Smith et al. \(2000\)](#) analysed the past, present and future of OL, and found that the key past topics were learning levels, learning as cognitive and behavioural change, single- and double-loop learning, learning and unlearning and the distinction between OL and the learning organization. The three main debates at that time (2000) were (in descending order) the nature and location of OL, and whether learning occurs in individuals or organizational structures and systems; how to investigate OL; and what they called territorial debates. In terms of the last issue comprising territorial debates, they studied the tension between OL, a term studied previously for several decades, and the emerging concept of KM. The authors concluded that OL and KM shared similar underlying concepts and problems, although they used different languages. We also note that they differ in terms of their origins and history, where OL originated in the 1960s and KM in the 1990s. In regard to the future of OL, [Easterby-Smith et al.](#) suggested topics comprising practice as a new unit of analysis, learning and diversity and power and politics.

[Argote \(2011\)](#) described the past, present and future of OL in three stages. The past of OL, i.e. before 1988, was characterized by how defensive routines prevent learning, the conception of learning as changes in the organization's routines that affect future behaviour, and how the characteristics of performance change as a function of experience. In the present, i.e. between 1988 and 2010, researchers characterized the experience of the organization along various dimensions, where they considered the importance of the context where learning occurs, as well as further studies of knowledge retention and transfer rather than knowledge creation, e.g. motivational and emotional factors that affect knowledge transfer. In the future, i.e. after 2010, it was expected that further research would consider knowledge co-creation, how dynamic capabilities develop through OL, new quantitative and qualitative approaches for advancing the understanding of OL, learning

new forms of organizing, for example virtual organizations, and how technological developments affect OL.

Elkjaer (2004) identified three perspectives in the OL field, where the first focused on the acquisition of skills and knowledge, the second considered participation in communities of practice and the third addressed individual and joint inquiry or reflective thinking, including body, emotion and intuition. This third perspective captures OL as both individual and organizational development at the same time. However, Elkjaer (2004) did not assign dates to each of these perspectives.

Bapuji and Crossan (2004) reviewed the OL literature during 1990-2002. After searching using the Web of Science, they found only four articles from 1990 but 98 articles from 2002, thereby indicating a growing trend. Some of their findings were as follows: a growing consensus that learning occurred at individual, group and organizational levels; emergence of a learning perspective to explain organizational topics, such as performance and innovation; study of OL facilitators, such as culture and structure; and the debate between internal and external OL. They found that the most widely cited papers came predominantly from North American journals, and they proposed some directions for future research, e.g. how learning can yield performance; when and what type of experience hinders firm performance, and under what conditions; better methods and measures for capturing OL; resources as OL facilitators or blockers; and the temporal dimension in OL.

Easterby-Smith *et al.* (2004), editors of a special number of the *Management Learning* journal on OL, identified seven major contributions of OL since 1978: single- and double-loop learning and espoused theory and theory in practice (Argyris and Schön, 1978); the idea of unlearning developed by Hedberg (1981); the introduction of the learning organization (Senge, 1990); the introduction of a sociocultural perspective in OL (Brown and Duguid, 1991; Cook and Yanow, 1993); learning across boundaries (Inkpen and Crossan, 1995); and the potential link between knowledge, learning and competitiveness (de Geus, 1988).

Recently, Lee *et al.* (2016) interviewed Linda Argote, about the future of OL research, who based on her own experience emphasized micro-level analysis, such as facilitators of knowledge sharing, and how social networks affect OL and knowledge transfer. Argote and Hora (2017) stated a broader definition of OL that includes the processes of creating, retaining and transferring knowledge. In a review of KM and OL during 1996-2009, Pun and Balkissoon (2011) found that knowledge acquisition, creation and transfer underlie much of the research conducted in both fields. These three processes of knowledge acquisition, creation and transfer were also considered by Garvin *et al.* (2008) in relation to the learning organization.

In summary, the characteristic processes of OL are knowledge creation and knowledge acquisition, although other processes are also relevant to this field such as knowledge transfer. The current definitions of KM include the processes of knowledge generation and acquisition, which correspond to what was previously called OL historically.

### 3. Methodology

The method used in this study was a systematic literature review covering KM and OL publications from the 1970s, when the OL field started to grow, up to 2016 (inclusive). A review is: "a replicable, scientific and transparent process, in other words, a detailed technology, that aims to minimize bias through exhaustive literature searches of published and unpublished studies and by providing and audit trail of the reviewer's decisions, procedures and conclusions" (Tranfield *et al.*, 2003, p. 209). The current review differed from traditional narrative reviews by using more systematic, rigorous, explicit and reproducible methods for the selection of articles (Tranfield *et al.*, 2003; Delbufalo, 2012).

In agreement with Tranfield, Fink stated that a research literature review is a: “systematic, explicit, and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars and practitioners” (Fink, 2010, p. 3). A systematic review of only quantitative studies is called a meta-analysis and a systematic reviews of only qualitative studies have recently attracted attention in the social sciences where one type is meta-ethnography, whereas other methods are not widespread at present (Mays *et al.*, 2005).

The method used in this study followed that proposed by Tranfield *et al.* (2003) with three stages: planning the review, conducting the review and reporting and disseminating the results. This method also matches that proposed by Fink (2010) who provided more details of the tasks involved in a review than Tranfield *et al.* (2003). Seven tasks were defined by Fink: selecting research questions; selecting bibliographic or article databases, web sites, and other sources; choosing search terms; applying practical screening criteria; applying methodological screening criteria; performing the review; and synthesizing the results. The first three tasks are included in the planning stage and the last four tasks when conducting the review.

### 3.1 Planning the review

The research protocol addressed the following question: How have published OL and KM topics evolved between 1970 and 2016?

The databases were selected according to quality standards based on the inclusion of full reports of the original studies and those by experts in the field. The first database selected was the Web of Science Core Collection which includes the Social Sciences Citation Index, the Science Citation Index and the Arts & Humanities Citation Index, where the overall database included more than 10,000 journals relevant to the research topic. The second database was Scopus because of its coverage of related fields, such as psychology, social sciences, engineering and business.

The terms used in the search strings were defined according to the research question to obtain the most relevant results within the preliminary literature search.

The domains considered included theoretical, empirical and analytical journal articles, where a strict standard for the inclusion of studies was developed to obtain the best-quality evidence. Articles were reviewed according to the relevance of their subject, coverage and screening criteria where all languages were included. The selection criteria included research articles and reviews of KM and OL published in academic journals between 1970 and 2016.

### 3.2 Conducting the review

To identify the potentially relevant articles, the initial search used keywords comprising “organizational learning” and “knowledge management”, which were subsequently modified and used to construct search strings for the electronic databases. To reduce the risk of missing publications, the search was performed with two separate and prominent databases: ISI Web of Science and Scopus.

The OL search string for Web of Science was:

Topic = (organization\* near/3 learn\*) and (generation or acquisition or creation or capture) or (“organizational knowledge generation” OR “organizational knowledge acquisition” OR “organizational knowledge creation” OR “organizational learning capture”)),

and the search string for Scopus was:

TITLE-ABS-KEY ((organization\* W/3 learn\*) AND (generation OR acquisition OR creation OR capture) OR (("organizational knowledge generation" OR "organizational knowledge acquisition" OR "organizational knowledge creation" OR "organizational learning capture"))).

The KM search string used for the Web of Science was:

Topic = (("knowledge management" AND (transfer or use or application or documentation or storage or shar\* or memory))),

and the search string for Scopus was:

TITLE-ABS-KEY (((("knowledge management" AND (transfer OR use OR application OR documentation OR storage OR shar\* OR memory))))).

After the initial search, we conducted practical and methodological screening (Fink, 2010) to ensure the relevance of articles, where we required the inclusion of at least one of the keywords mentioned above in the topics, abstracts, keywords and/or title. We performed preliminary screening for about 200 individual articles and then discussed the results to reach agreement on each decision. We then reviewed all of the databases and checked for relevance by manually reading the abstracts if there was any doubt. Duplications, book reviews, conference proceedings and unpublished studies were excluded manually to ensure the inclusion of only peer-reviewed studies. This process is summarized in Table I based on Fink's study (2010).

VantagePoint version 10.0 was used to analyse the review outcomes. Screening and selection processes were developed, as well as concatenating the raw database search outcomes. The detection and definition of thematic clusters as well as subsequent analyses, such as coverage comprehensiveness and publication activity, were performed by combining VantagePoint with VOSviewer, Gephi and Tableau, particularly for visualization.

Although we reviewed the OL literature, we found no appropriate definitions of the periods or stages in the development of the OL field that might allow us to structure a different research approach, so we decided to follow the definition of the periods given by Serenko (2013).

Different bibliometric methods were used to observe the absorption of OL by KM. First, the two databases were divided, where we obtained one for KM and another for OL in four different periods, as described by Serenko (2013), i.e. before 1995, 1995-2005 and 2006-2014, plus a new period of 2014-2016, so we could visualize the trends in these fields. We defined the main keywords related to OL (e.g. organizational learning and learning process) and KM (KM, knowledge sharing and knowledge system), and we evaluated the co-evolution of KM words in the OL database and vice versa. We performed the same analysis with the clusters of keywords obtained using VOSviewer software based on the information in both databases (Van Eck and Waltman, 2010).

To identify the absorption of OL by KM, we used a tool adapted from that described by Lee et al. (2008) who defined the following different types of keywords.

**Table I** Inclusion and exclusion criteria for publication in knowledge management and organizational learning 1970-2016

<i>Inclusion criteria</i>	<i>Type</i>
Terms knowledge management organizational learning in titles, abstracts, topic or keywords	Content
Published from 1970 to 2016	Publication date
All languages	Publication language
All journals	Journal
Exclusion criteria	Type
Letters, editorials, duplications, book reviews, conference proceedings and unpublished studies	Research design



- core keywords: keywords that appeared in three or more periods of analysis;
- emergent keywords: keywords that appeared in the last period of analysis and with a growing trend;
- established keywords: keywords that appeared in all of the analysis periods and with a high frequency (above the median); and
- declining keywords: keywords with a decreasing frequency (below the median).

To complete this analysis, we also determined the number of studies of OL that appeared in the KM area during each period of the analysis and vice versa. The migration and/or participation of authors in the two fields were also indicators of absorption, as well the journal's relevance in both the OL and KM fields.

#### 4. Results

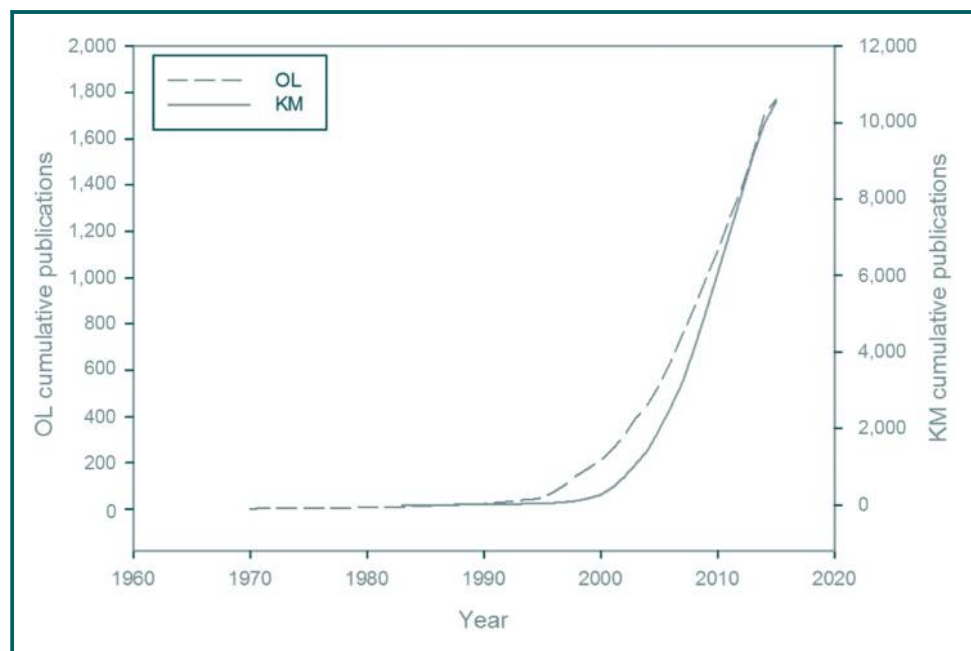
In total, 16,185 KM and OL publications were found using the Web of Science and Scopus databases, where 14,452 (approximately 87 per cent) were found using the KM search string and the remaining 2,104 (13 per cent) using the OL search string. It is important to note that some publications were listed in both databases so the numbers are not absolute.

Figure 1 shows that OL emerged in the 1970s and KM in the 1990s, and both topics exhibited significant growth throughout the 2000s.

##### 4.1 Countries

Figures 2 and 3 provide an overview of the countries where KM and OL were investigated. USA led the OL impact ranking with 5,323 forward citations, whereas The Netherlands, Switzerland, Canada, Japan and Germany (in descending order) also had high publication impacts. In Latin America, only Brazil had a significant impact ranking.

**Figure 1** Growth in published studies of knowledge management KM and organizational learning OL



**Figure 2** Publications related to organizational learning in each country in terms of productivity and impact



The USA, France, the UK, Taiwan, China, Germany and Australia were the most important countries in terms of KM research productivity and impact. The three main countries that emerged from this analysis were China, the UK and Taiwan. In Latin America, Mexico and Brazil were the countries with the highest productivity.

In Africa, there were virtually no OL publications but a more significant number of KM publications, where South Africa had the highest impact with 205 forward citations.

#### *4.2 Organizational learning absorption by knowledge management*

We analysed the chronological evolution of both issues based on keyword correlation. To ensure an appropriate comparison of OL and KM, we used the periods proposed by [Serenko \(2013\)](#) for both cases.

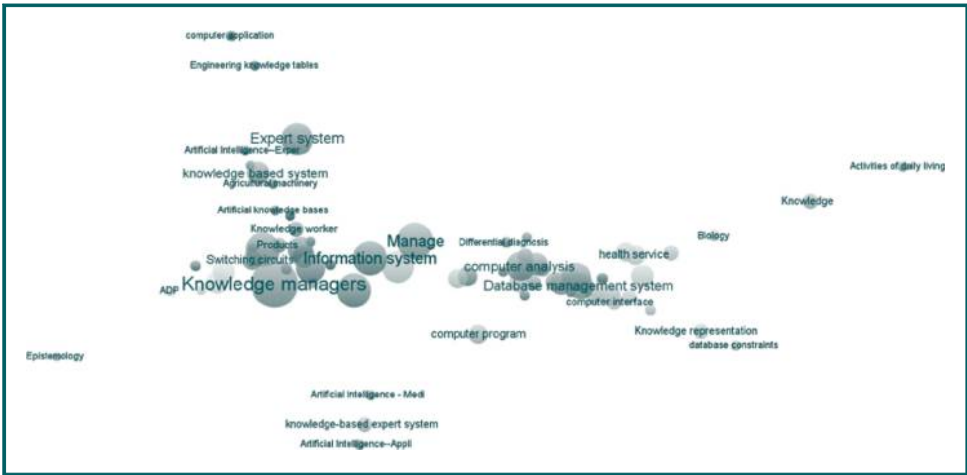
[Figures 4](#) and [5](#) show the semantic networks obtained in terms of importance and proximity among the different keywords for KM and OL before 1995, respectively. In agreement with [Serenko](#), there was a technocentric focus for the first KM generation ([Figure 4](#)). The main KM topics in the first period were knowledge-based systems, expert systems, computer software, artificial intelligence and decision support techniques. Only one article was identified about knowledge acquisition ([von Königslöw, 1994](#)), which highlighted the importance of KM process control using expert systems and object orientation.

A specific OL focus in the first period was learning systems, although the publications on this topic discussed computer-assisted tools ([Barker and Manji, 1992](#)) and training algorithm tools ([da Mota Tenorio, 1990](#)). Some authors such as [Abrett and Burstein \(1987\)](#) used the term “knowledge acquisition”, where they referred mainly to the experimental

**Figure 3** Publications related to knowledge management in each country in terms of productivity and impact



**Figure 4** Semantic network obtained for published studies of knowledge management before 1995



environments used for managing and maintaining large databases within organizations. Another group of articles discussed the psychological aspects of educational processes. The main OL topics in the first period were learning (psychological aspects and physiology), acquisition mechanisms, cognition and memory. In this stage, 26 per cent of

**Figure 5** Semantic network obtained for published studies of organizational learning before 1995

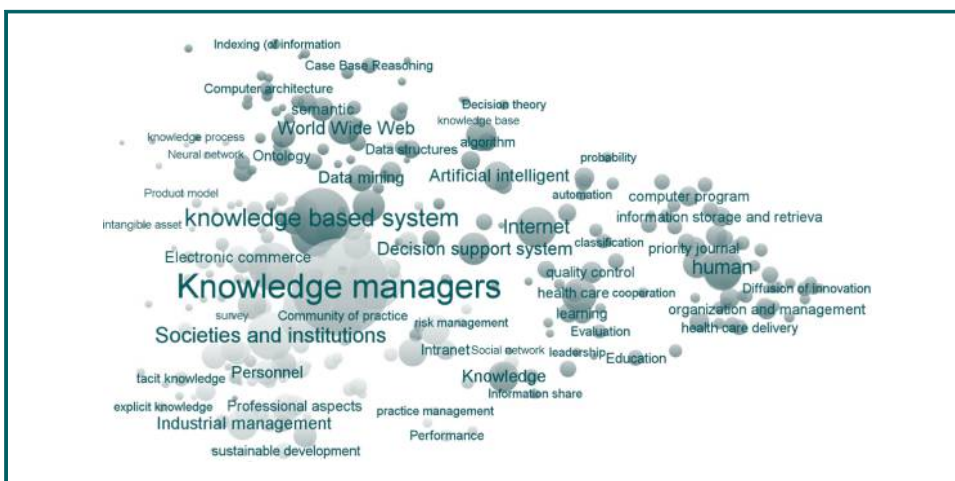


the OL studies contained the word knowledge in the abstract or keywords. The topic of artificial intelligence was common to OL and KM.

In the second KM generation (1996-2005), [Serenko \(2013\)](#) focused on human resource factors, social and cultural aspects of OL, applied knowledge and knowledge sharing driven by employees. [Figures 6 and 7](#) show the semantic networks obtained for this period in terms of importance and proximity among the different keywords for KM and OL, respectively.

KM ([Figure 6](#)) still exhibited a strong trend towards KM systems supported by technological tools. The main topics were data mining, ontologies, knowledge-based systems, information technology, information retrieval, information systems and technologies for transference. The keyword “knowledge managers” had relatively high relevance in a large number of publications within learning and OL systems, which suggests some absorption of OL within KM. The word “knowledge” (e.g. knowledge-based systems, knowledge acquisition and knowledge creation) appeared in 60 per cent of the total OL studies, which also indicated absorption. The most important OL-related terms that appeared in a large number of publications were strongly associated with technological tools (systems, data mining, knowledge-based systems and World Wide Web). In this period, there was no significant

**Figure 6** Semantic network obtained for published studies of knowledge management during 1996-2005



**Figure 7** Semantic network obtained for published studies of organizational learning during 1996-2005

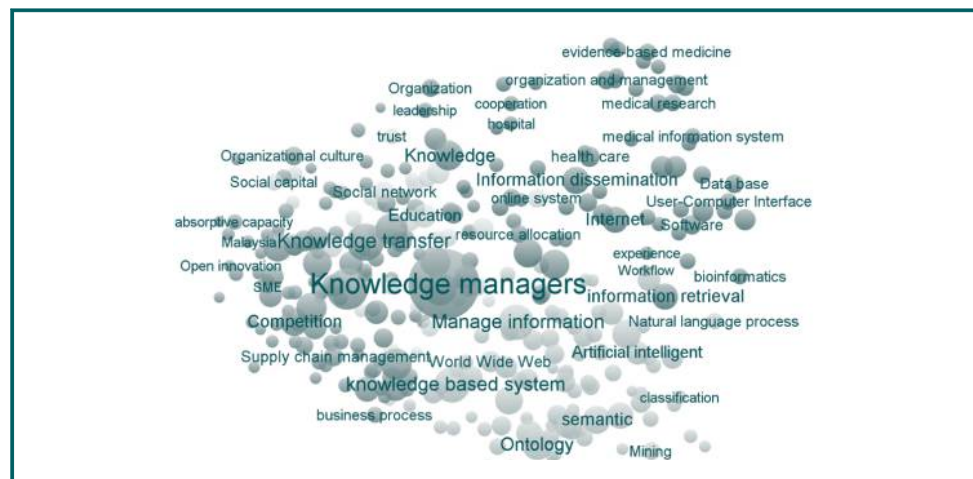


research into human resources and KM, thereby indicating a focus on the evolution of technological development in terms of new tools.

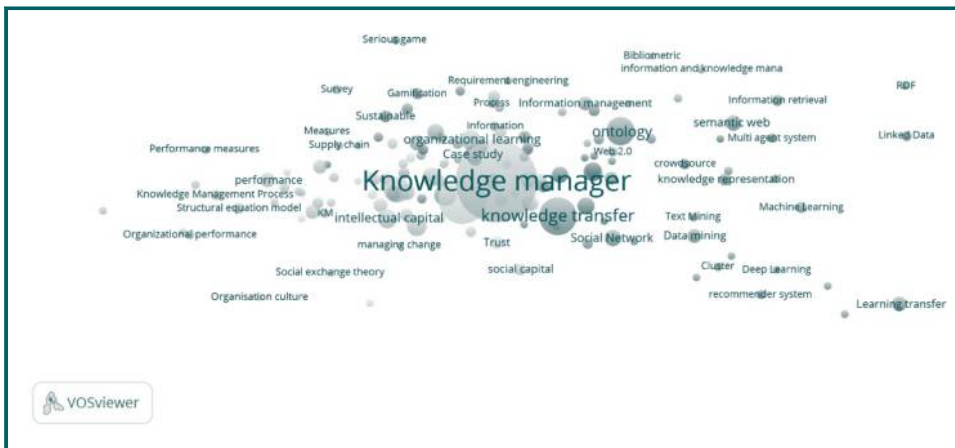
Several similarities were evident between OL and KM during this period, although OL was more focused on business competitiveness and how OL can affect organizational strategies based on key factors, such as innovation, strategic alliances and technology transfer. There was also an emphasis on the importance of a high capacity for absorbing external knowledge. Another group of studies focused on the relationships among OL, innovation and culture, as well as pedagogical tools for measurement and evaluation.

Serenko (2013) found that the third KM generation (2006-2014) was characterized by strategic perspective; reconciliation between human and technocentric views; identification, development and support of self-managed social networks; knowledge as a flow; and value creation focus. Figures 8 and 9 show the semantic networks obtained for this period in terms of the importance and proximity among the different keywords for KM and OL, respectively. Some new issues were evident regarding KM, i.e. business management, competitiveness, types of capital, organizational culture and absorptive capacity, which are related to the strategic role of knowledge in organizations.

**Figure 8** Semantic network obtained for published studies of knowledge management during 2006-2014



**Figure 9** Semantic network obtained for published studies of knowledge management during 2015-2016



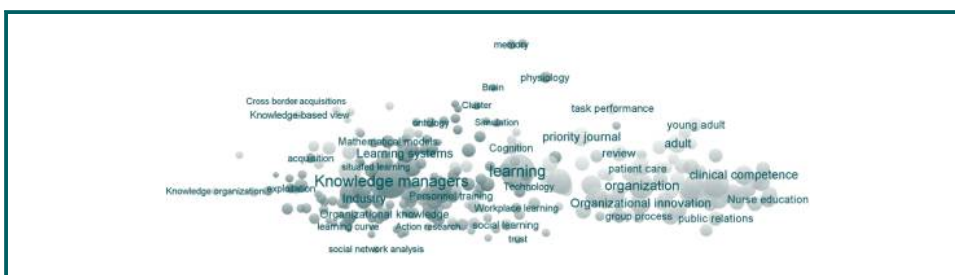
The main KM topics studied in this period were knowledge sharing and human resource management. Knowledge acquisition was linked to the community of practice, knowledge workers and knowledge creation. Knowledge transfer was associated with the capacity for absorption, intellectual capital and innovation. The tools and technology included human-computer interaction platforms, virtual reality, Web 2.0 and E-learning, as well as data mining tools, such as ontologies, the Semantic Web and knowledge engines.

During this period, OL studies were more clearly absorbed by KM. In total, 62 per cent of the OL studies included the word “knowledge” (e.g. KM, knowledge acquisition and knowledge creation) and it was among the ten most frequent words within these studies. KM was linked with technology transfer, learning organization and innovation. Knowledge transfer had a strong loop with absorptive capacity and strategic planning. Knowledge creation was investigated alongside organizational knowledge, community of practice and human capital. Knowledge sharing was connected with KM systems.

Other important topics in this stage were organization and management combined with organizational innovation and total quality management. Personnel management was studied with problem-based learning and cooperative behaviour (Figure 10).

The last stage was from 2015-2016, although this was not included in the periods proposed by Serenko (2013). The aim was to include the most recent literature from a different period to identify the current trend in the evolution of both fields. It was also important to show the evident absorption of OL by the KM literature during this period.

**Figure 10** Semantic network obtained for published studies of organizational learning during 2006-2014



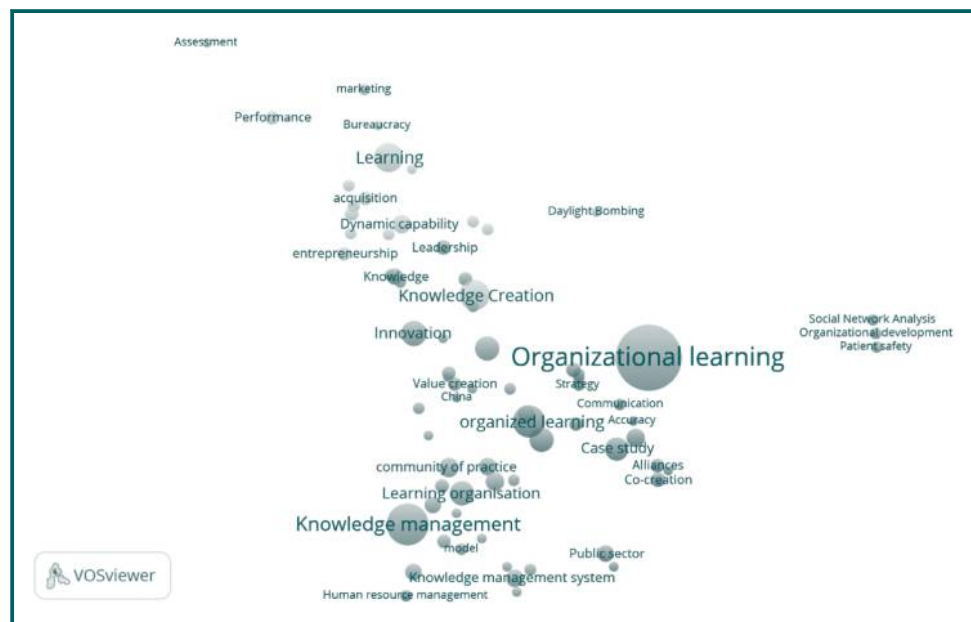
During 2015-2016, the second most important term in terms of frequency was “knowledge management” in OL studies. Terms related to KM (e.g. knowledge sharing, knowledge creation and knowledge acquisition) were present in most studies from this period, where 63 per cent contained the word “knowledge”. To observe this trend and identify the main topics associated with KM in OL studies, we focused on the most relevant cluster within this area. We found that KM had been investigated on the basis of tacit knowledge and community of practice. Knowledge transfer developed alongside workplace learning, quality management and human resource management. KM systems were investigated with big data tools. Other topics considered in this period included knowledge creation linked with dynamic capabilities and innovation, and the development of OL via alliances and co-creation.

In the KM literature, the main trends identified were KM combined with KM strategy and organizational performance, innovation associated with the absorptive capacity and dynamic capabilities and OL associated with knowledge acquisition and knowledge application. The importance of knowledge technological tools in this period was demonstrated by studies related to knowledge transfer based on data mining tools, clustering techniques and business intelligence. Machine learning and big data for data retrieval were other important topics in this stage. Data mining techniques such as ontologies, the Semantic Web and natural language processing were other important trends in the KM literature during 2015-2016. Knowledge sharing was strongly linked with community of practice, collaboration, collaborative learning and open innovation (Figures 11-12).

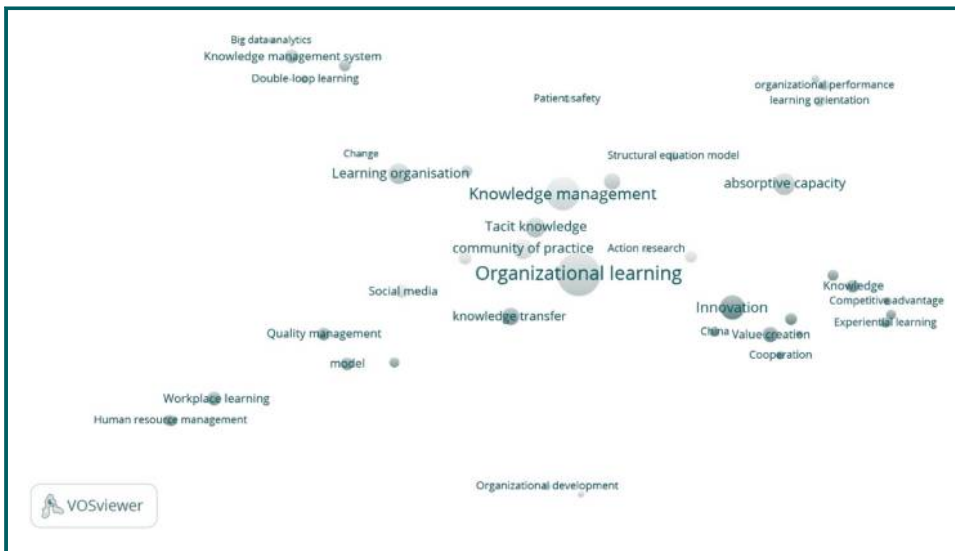
### 4.3 Thematic clusters

We performed clustering analysis with VOSviewer software using thematic groups defined on the basis of keyword classifications. The global topics identified were then investigated in terms of KM and OL.

**Figure 11** Semantic network obtained for published studies of organizational learning during 2015-2016



**Figure 12** Main clusters related to knowledge management in the semantic network obtained for published studies of organizational learning during 2015-2016



Five key research areas were identified for KM:

1. KM process (12,100 papers);
2. KM-based systems and technological tools (6,330 papers): management information systems and decision support systems and tools, such as data mining tools;
3. Electronic KM transfer (3,585 papers): electronic transmission and diffusion of knowledge;
4. KM methodologies (3,744 papers): case studies, surveys and reviews; and
5. Human resources (1,082 papers): psychosocial variables.

Five clusters were also identified for OL:

1. OL processes (1,648 papers);
2. Human resources (549 papers);
3. Creativity and innovation (472 papers);
4. OL systems and technological tools (326 papers); and
5. OL methodology (254 papers).

Tables II and III show the most relevant authors in terms of the number of publications, as well as the leading countries and publication sources. Figures 13 and 14 show the number of papers in each cluster by year for both KM and OL, respectively.

#### 4.4 Authors

Figure 15 shows the productivity and citation impacts for the main authors of the 32,616 studies published on these topics.

One group of authors had very high productivity but a low citation impact, i.e. Gottschalk (Norwegian School of Management), Jungjui (University of BeiHang) and Lee (University of Hong Kong Polytech). Another group had low productivity but a high citation impact, i.e.



**Table II** Leading authors, seminal authors, countries and publication sources for knowledge management 1980-2016

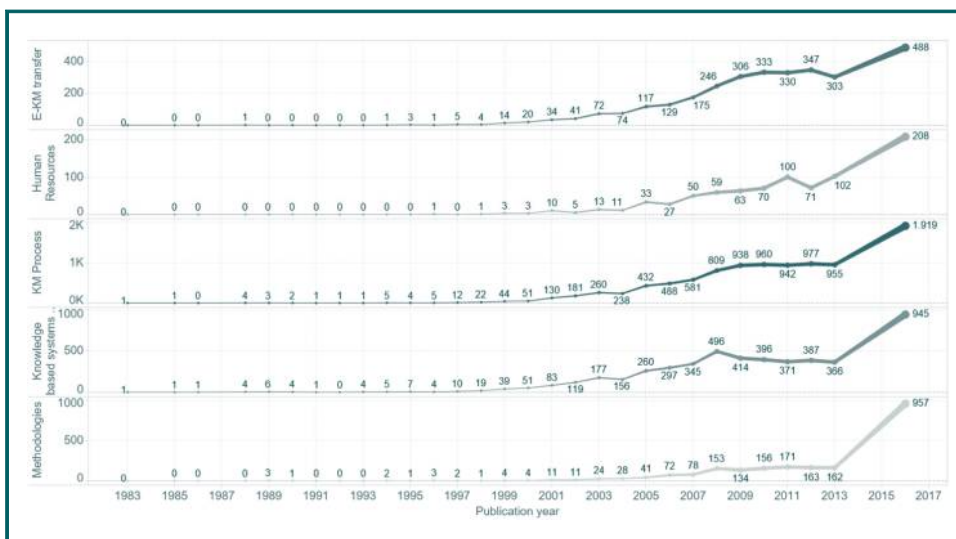
Clusters	Authors	Seminal authors	Countries	Source
KM process (12100)	Wang H. (36)	Nonaka, I (2,528)	USA (2,073)	<i>Journal of Knowledge Management</i> (414)
	Li X. (34)	Takeuchi, H (1,657)	China (1,160)	<i>Expert Systems with Applications</i> (183)
	Li Y. (32)	Prusak, L (1,509)	UK (1,133)	<i>International Conference on Information and Knowledge Management, Proceedings</i> (171)
	Wang X. (31)	Davenport, T H (1,334)	Germany (748)	<i>Proceedings of the European Conference on Knowledge Management, ECKM</i> (163)
Knowledge-based systems and technological tools (6330)	Zhang Y. (28)	Alavi, M (937)	Taiwan (618)	<i>Lecture Notes in Computer Science</i> (including subseries lecture notes in artificial intelligence and lecture notes in bioinformatics) (154)
	Wang H. (26)	Nonaka, I (1,014)	USA (1,219)	<i>Expert Systems with Applications</i> (156)
	Wang S. (20)	Prusak, L (666)	China (701)	<i>Lecture Notes in Computer Science</i> (including subseries lecture notes in artificial intelligence and lecture notes in bioinformatics) (105)
	Chen Y.-J. (18)	Takeuchi, H (629)	UK (556)	<i>Journal of Knowledge Management</i> (83)
	Li X. (17)	Davenport, T H (607)	Taiwan (393)	<i>Vine</i> (74)
Methodologies (3744)	Lyu Y (17)	Alavi, M (474)	Germany (376)	<i>International Conference on Information and Knowledge Management, Proceedings</i> (66)
	Wang H. (11)	Nonaka, I (734)	USA (482)	<i>Journal of Knowledge Management</i> (137)
	Bolisani E. (9)	Takeuchi, H (459)	China (326)	<i>Vine</i> (112)
	Wang S. (8)	Prusak, L (435)	UK (307)	<i>Proceedings of the European Conference on Knowledge Management, ECKM</i> (98)
E-KN transfer (3585)	Scarso E. (8)	Davenport, T H (399)	Germany (211)	<i>Expert Systems with Applications</i> (38)
	Lyu Y (8)	Alavi, M (314)	Australia (189)	<i>Lecture Notes in Computer Science</i> (including subseries lecture notes in artificial intelligence and lecture notes in bioinformatics) (32)
	Li Y. (15)	Nonaka, I (885)	USA (618)	<i>Journal of Knowledge Management</i> (134)
	Wang S. (13)	Prusak, L (620)	China (379)	<i>Computers in Human Behavior</i> (63)
Human resources (1082)	Zhang Y. (12)	Takeuchi, H (553)	UK (334)	<i>Vine</i> (57)
	Zhang J. (11)	Davenport, T H (552)	Taiwan (235)	<i>Proceedings of the European Conference on Knowledge Management, ECKM</i> (55)
	Oliveria M (10)	Alavi, M (371)	Germany (197)	<i>Expert Systems with Applications</i> (54)
	Bontis N. (5)	Nonaka, I (298)	USA (167)	<i>Journal of Knowledge Management</i> (63)
	Akhavan P. (4)	Prusak, L (235)	UK (84)	<i>Proceedings of the European Conference on Knowledge Management, ECKM</i> (34)
Human resources (1082)	Lai H.-M. (4)	Takeuchi, H (201)	Taiwan (80)	<i>Vine</i> (28)
	Rothberg H. (4)	Davenport, T H (196)	China (75)	<i>Computers in Human Behavior</i> (21)
	Kuo, T.-H. (4)	Alavi, M (125)	Canada (54)	<i>9th European Conference on Knowledge Management, ECKM 2008</i> (18)

**Notes:** Values in brackets are the number of papers in the relevant category

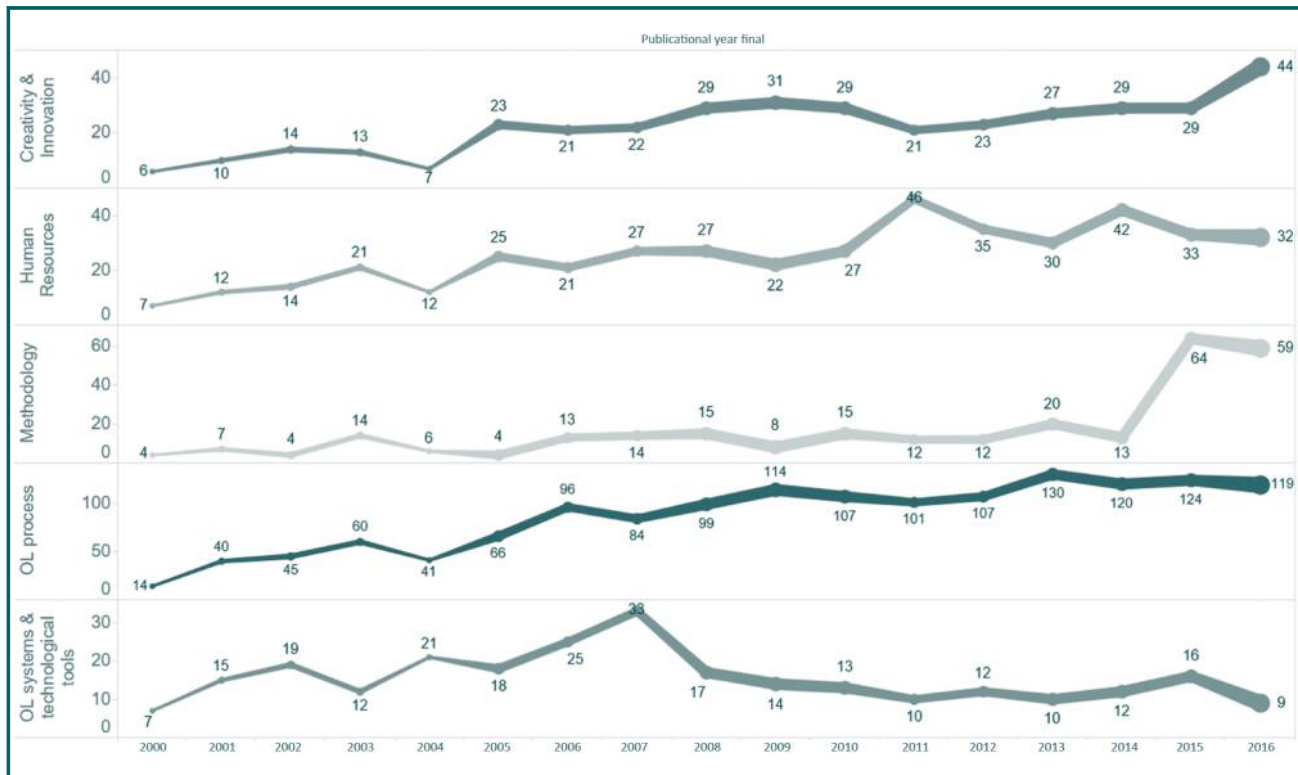
**Table III** Leading authors, seminal authors, countries and publication sources for organizational learning 1970-2016

Cluster	Authors	Seminal authors	Countries	Source
OL process (1648)	Song, Ji Hoon (7)	Nonaka, I (490)	USA (489)	<i>Learning Organization</i> (40)
	von Krogh, Georg (7)	Argyris, C (324)	UK (208)	<i>Journal of Knowledge Management</i> (35)
Human resources (549)	Somerville, Mary M (7)	Takeuchi, H (295)	Canada (102)	<i>Strategic Management Journal</i> (27)
	Cegarra-Navarro, Juan-Gabriel (6)	March, J G (270)	Spain (96)	<i>Management Learning</i> (26)
	Škerlavaj, M. (6)	Huber, G P (185)	Australia (88)	<i>Organization Science</i> (25)
	Zahra, Shaker A (4)	Nonaka, I (108)	USA (179)	<i>Learning Organization</i> (10)
	Song, Ji Hoon (3)	Argyris, C (90)	UK (78)	<i>Medical Teacher</i> (10)
	Henderson Amanda (3)	Takeuchi, H (72)	Australia (34)	<i>Journal of Knowledge Management</i> (9)
Creativity and innovation (472)	von Krogh, Georg (3)	March, J G (63)	Canada (32)	<i>Journal of Workplace Learning</i> (8)
	Theriou, Georgios N (3)	Wenger, E (54)	Spain (26)	<i>Journal of Information Science</i> (5)
	Zahra, Shaker A (4)	Nonaka, I (146)	USA (143)	<i>International Journal of Technology Management</i> (12)
	Vivas-López, S. (4)	Takeuchi, H (87)	UK (58)	<i>Journal of Knowledge Management</i> (11)
	Goffin, Keith (4)	March, J G (87)	Spain (28)	<i>Journal of Product Innovation Management</i> (11)
	Argote, Linda (4)	Argyris, C (85)	Australia (24)	<i>International Journal of Innovation and Learning</i> (10)
OL systems and technological tools (326)	Koners, Ursula (4)	Levinthal, D A (79)	Canada (24)	<i>Organization Science</i> (10)
	King, WR (2)	Nonaka, I (112)	USA (109)	<i>International Journal of Technology Management</i> (12)
	Ayas, K. (2)	Argyris, C (70)	UK (43)	<i>Management Science</i> (8)
	Goffin, Keith (2)	Takeuchi, H (65)	Canada (19)	<i>Technovation</i> (7)
	Argote, Linda (2)	March, J G (54)	Taiwan (15)	<i>Journal of Product Innovation Management</i> (6)
	Methodology (254)	Koners, Ursula (2)	Brown, J S (44)	Germany (14)
Dimovski, V. (3);		Nonaka, I (197)	USA (10)	<i>International Journal of Production Economics</i> (5)
Liao, S.-H. (3);		Argyris, C (128)	UK (6)	<i>Management Learning</i> (5)
Škerlavaj, M. (3);		Takeuchi, H (114)	Canada (5)	<i>Medical Teacher</i> (5)
Hsu, I.-C. (3);		March, J G (100)	Taiwan (4)	<i>Decision Sciences</i> (5)
Tucci, C L (2);		Senge, P M (82)	Australia (4)	<i>Expert Systems with Applications</i> (4)

Note: Values in brackets are the number of papers in the relevant category

**Figure 13** Evolution of thematic clusters in published studies of knowledge management during 1980-2016

**Figure 14** Evolution of thematic clusters in published studies of organizational learning during 1980-2014



Leidner and Alavi (University of Emory, INSEAD and Texas Christian University), and their review from 2001 (Alavi and Leidner, 2001) is one of the most important studies in the field.

The first 20 authors in terms of productivity had more than five publications and 18 had published on both topics. Some authors such as Cegarra-Navarro (University of Cartagena), Garcia-Morales (University of Granada), Easterby-Smith (University of Lancaster), Sabherwal (University of Missouri) and von Krogh (ETHZ) made important contributions to both topics throughout the review period. Some authors such as Chiva Ricardo (University of Jaume) published about OL in the past but had recently reported studies of KM.

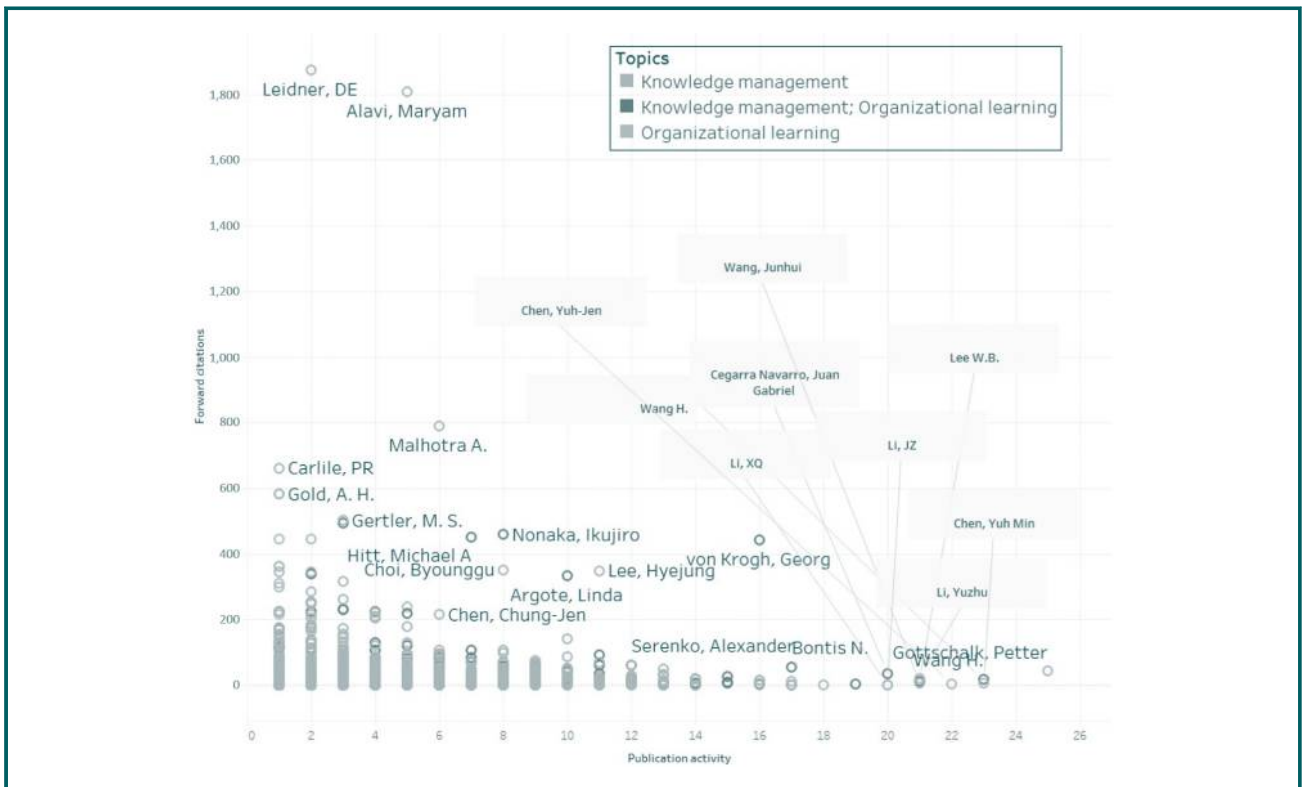
Thus, the majority of leading OL authors had also published in KM, but each had a different publication trend. There was no significant evidence that any author left one area to enter the other, and the main trend involved publishing periodically on each topic alternately.

The leading authors in the area of KM had different behaviours. Among the 20 most productive authors (two or more publications in the review period), only five had published on both topics, with a maximum of five OL publications, where one of the most productive authors in terms of both topics was Lee (University of Hong Kong Polytech). Thus, there was a higher likelihood for OL authors to publish in the area of KM than vice versa (Figure 15).

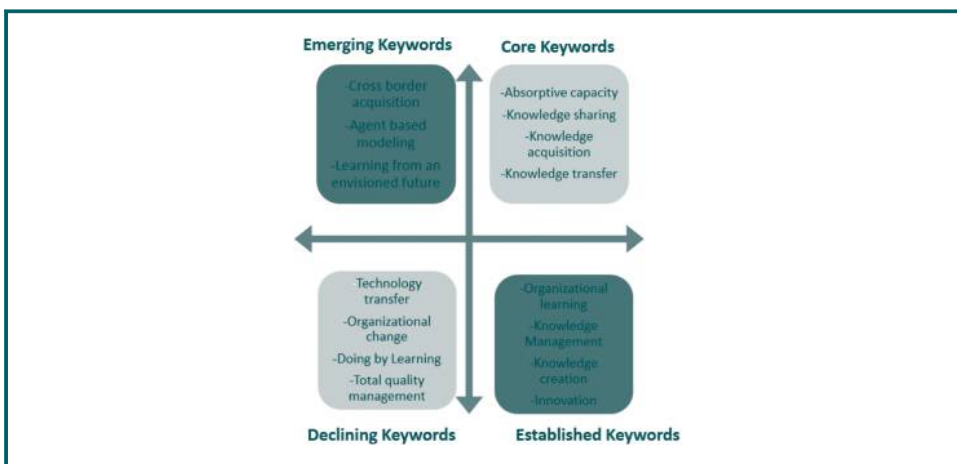
#### 4.5 Keywords

To find evidence for the absorption of OL by KM, we used the tool developed by Lee *et al.* (2008), where we defined a keyword map divided into four quadrants, as shown in Figure 16. The following analysis was performed for both KM and OL.

**Figure 15** Main authors by citation impact and productivity in terms of studies of knowledge management and organizational learning (1973-2016)



**Figure 16** Analysis of keywords related to organizational learning during 1980-2016



Core keywords were used as indicators of relevance for each topic because keywords had high relevance to the evolution of each field, where they appeared during three of the four periods considered in the analysis with high frequency. In the analysis of OL, the most representative keywords were absorptive capability, knowledge sharing and knowledge

acquisition. The latter two topics indicated the absorption of OL into KM. The established keywords also indicated absorption. Most of the terms used in the fields appeared in the four periods of the analysis at a relatively constant frequency. In the analysis of OL, the most important keywords were KM and knowledge creation. To identify weak signals, we used the emerging keywords as terms that started to appear recently in studies (2015-2016) with a significant frequency compared with other emergent keywords. In the analysis of OL, these terms were cross-border acquisition and agent-based modelling. To identify the topics for which the relevance to OL was lost, we used the declining keywords that decreased in appearance, e.g. technology transfer, organizational change, doing by learning and total quality management. The analysis of the keywords for OL demonstrated the absorption of this topic in KM, where among the core and established keywords, this trend was evident in the OL literature. Other important streams in the OL literature were the absorptive capacity and innovation.

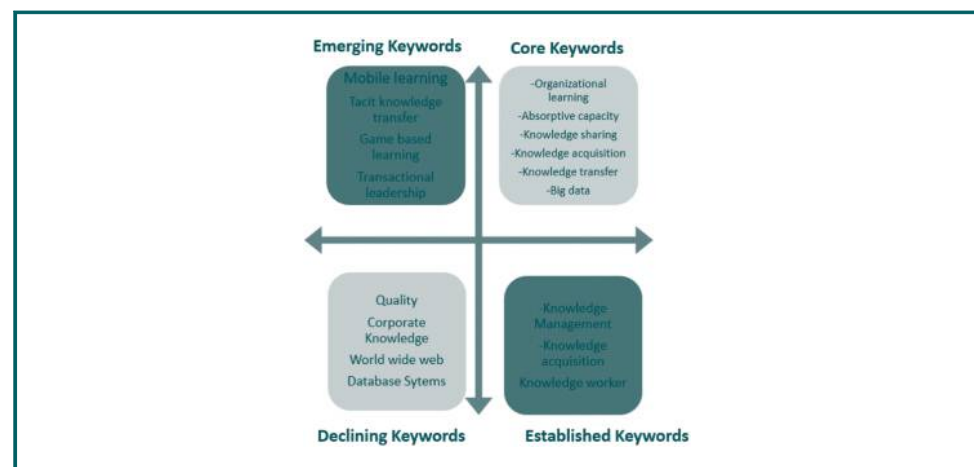
In the KM area, the importance of the OL topic was evident according to the keywords analysis. One of the most important core keywords was OL and the other important topics were absorptive capacity, knowledge sharing and big data. The keywords established in the KM literature were KM, knowledge acquisition and knowledge worker. Some of the emerging keywords (new relevant topics) were related to learning (e.g. mobile learning and game-based learning). Two topics that declined in frequency in the KM literature were quality and World Wide Web (Figure 17).

#### 4.6 Source analysis

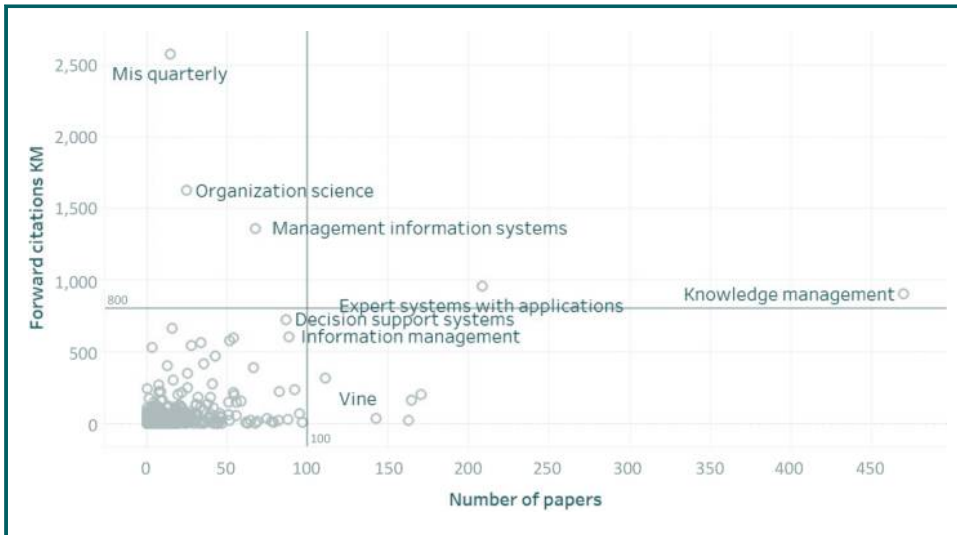
The similarities between OL and KM were investigated by analysing the publication sources and identifying topics with conceptual similarities. Figures 18 and 19 show the leading journals in terms of impact factor and productivity in the KM and OL fields, respectively, where the node size represents the strength of the relationship between impact and productivity. Figures 20 and 21 show the impact factors and publication productivity for OL and KM journals, respectively.

The three most important KM journals in terms of both productivity and impact factor (Figure 18, top-right panel) were the *Journal of Knowledge Management*, *Journal of Management of Information Systems* and *Decision Support Systems*. KM journals with

**Figure 17** Keywords analysis based on knowledge management studies during 1970-2016



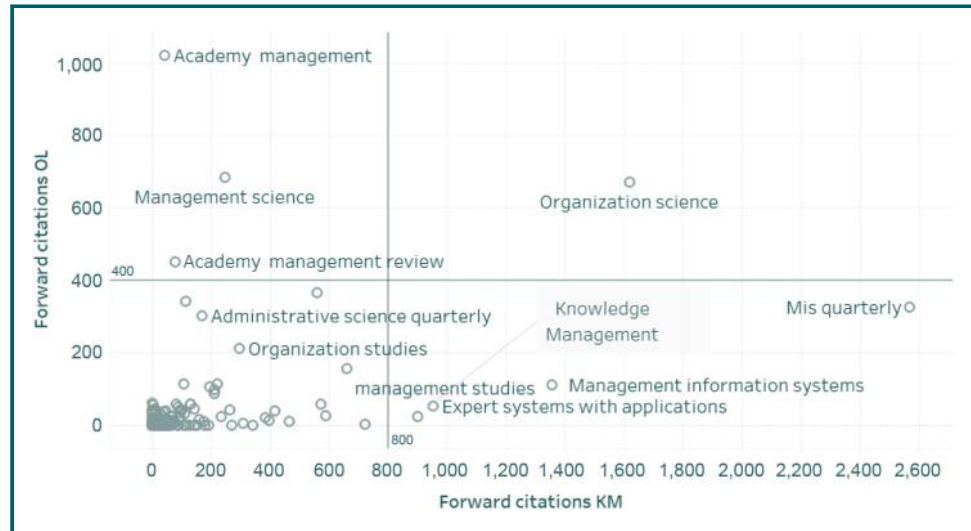
**Figure 18** Publication source productivity and impact analysis for knowledge management studies during 1980-2016



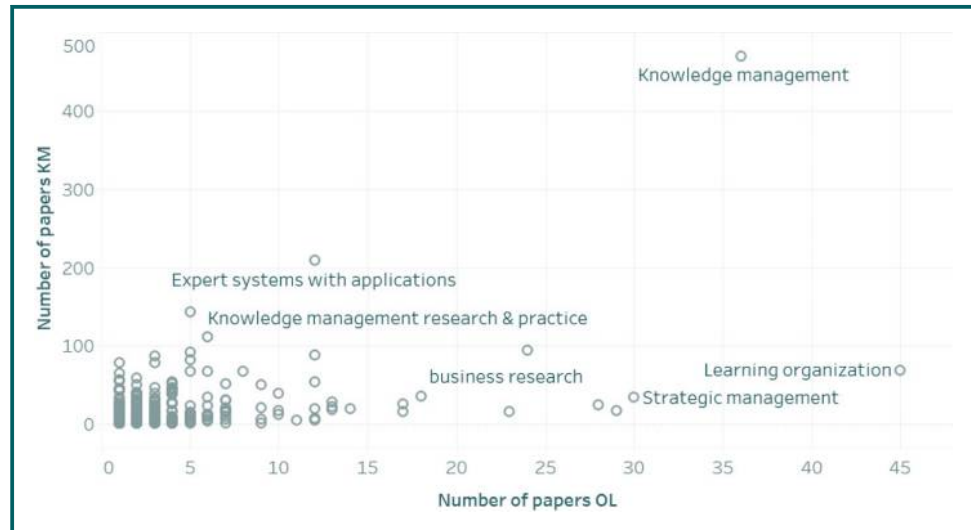
**Figure 19** Publication source productivity and impact analysis for organizational learning studies during 1980-2016



**Figure 20** Publication sources and impact analysis for organizational learning and knowledge management studies during 1980-2016



**Figure 21** Publication sources and productivity analysis for organizational learning and knowledge management studies during 1980-2016



high impact factors but low productivity (Figure 18, top-left panel) were *MIS Quarterly*, *Organization Science*, *Management Science* and *Information and Management*.

The OL publication sources were more defined, with five high impact and productivity journals (Figure 19, top-right panel), the most prominent of which was *Management Science* with *Learning Organization*. Among the journals with high impact but low productivity (Figure 19, top-left panel), *Academy of Management Journal*, *Academy of Management Review* and *Journal of Environmental Management* were the most important.

Figure 20 shows the correlation between journals with publications on both topics during the review period, which highlights the pattern of OL absorption by KM. Among the 910 journals that published studies of OL, 510 (57 per cent) also published studies of KM, where the most prominent journals in terms of impact on both topics were *Management Science* and *Organization Science* (Figure 20, top-right panel).

Figure 21 shows the combined productivity where the most productive journals in terms of both topics were the *Journal of Knowledge Management*, *International Journal of Technology Management* and *Expert Systems with Application* (Figure 21, top-right panel).

## 5. Discussion

The objective of this study was to review the evolution of research into OL and KM, particularly to determine whether OL had been conceptually absorbed by KM.

Some authors such as Easterby-Smith and Lyles (2011) stated that KM and OL have undergone dramatic changes and that they will continue to change, and the current study helped to understand these changes. Pun and Balkissoon (2011) argued that since 2008, OL and KM have tended to integrate their concepts and practices, where they are starting to be sub-concepts of “learning organization”. We found that the inclusion of topics associated with OL in KM publications started before 2011. In particular, during 1996-2005, there was a growing trend in the publication of studies of learning and OL systems in KM papers. A common connector between KM and OL was organizational strategy because learning and knowledge are important for achieving the organizational strategy. During 2006-2014, KM and OL were strengthened because of their common strategic perspective. We found a common interest in linking learning and knowledge with organizational strategy, results and competitiveness. Both fields also had an interest in understanding the role of organizational culture.

Our results do not support the claim of Pun and Balkissoon that KM and OL are beginning to be sub-concepts of “learning organization”, but these do support the suggestion of Easterby-Smith and Lyles that learning organization is a category focus in process and practice, which is complementary to KM and OL. The concept of learning, particularly knowledge acquisition and creation, is increasing in KM publications. Knowledge creation and acquisition are also part of most KM definitions and processes. In addition, the concept of knowledge transfer, which is characteristic of KM definitions, was seen in some definitions of OL (Argote and Hora, 2017).

We also obtained evidence to demonstrate the absorption of OL into KM. During 2014-2016, the second most important term in frequency in the OL literature was KM. Keywords analysis also showed that knowledge transfer was a core topic in OL. Among the keywords identified, KM was one of the visible topics in OL. Based on the core keywords and keywords identified for KM, knowledge acquisition was one of the main topics.

Two increasingly common denominators were identified in KM and OL publications: incorporation of technological tools and understanding the role of human variables. The historical dichotomy between technological versus human approaches is now over, and technology has become the new best friend of human beings for integrating learning and knowledge contents with the flows that contribute to organizational objectives. Future studies should aim to understand the dynamic relationships of knowledge-based technologies, human variables and organizational performance.

We also studied the characteristic topics for each KM generation as defined by Serenko (2013). Serenko included OL within KM, whereas we treated the topics independently. A major contribution of our review is the characterization of clusters by OL topics according to the three evolutionary phases.

Thematic cluster analysis for KM and OL detected four common categories: processes, methods, technological tools and human resources, although they had different contents. KM



had an extra category comprising electronic knowledge transfer and OL included category creativity and innovation. Human resource was the fastest growing category in both fields during the past 10 years. The individual is the knowledge holder who builds collective knowledge with other individuals, thereby creating organizational value via a learning process. However, the generation of individual and collective knowledge is not automatic in human beings, but instead it is highly dependent on motivation, attitudes, self-efficacy and leadership. How these variables interact is currently an interest for researchers and practitioners in KM and OL.

We only included journals from the Scopus and Web of Science databases, but this provided a wide range of journals from both fields. The *Journal of Knowledge Management* was most representative for three of the five KM categories comprising KM processes, electronic knowledge transfer and human resources, second for methods and fourth for knowledge-based systems and technological tools. *Expert Systems with Applications* had the largest number of articles in the knowledge-based systems and technological tools categories, and *Vine* had the largest number in the methods category. The *Journal of Knowledge Management* also had the highest number of papers in the OL category. This suggests that the nuclear OL processes, i.e. the generation and acquisition of knowledge, are now part of KM because the most influential KM journal also had the highest number of articles in the OL processes category. Some high productivity and citation impact authors' published studies in both the KM and OL fields, e.g. Krogh and Argote.

Finally, we consider that this review has contributed to our understanding of the evolution of KM and OL. We demonstrated the conceptual absorption of OL into KM, which may enrich academic discussion and also provide some clarity regarding the conceptualization of these two fields.

## 6. Limitations and conclusions

The current study had some limitations. The first was that only two databases were used, i.e. Scopus and ISI Web of Science, but these were selected because of their academic prestige and breadth, as well as their extensive coverage of KM and OL studies. Second, the search terms used excluded some terms recommended by certain authors. However, the major terms were included and the effect of excluding certain terms was not expected to be significant. Third, the number of thematic categories was not formally optimized and the descriptive names used were open to other interpretations.

We conclude that OL has been gradually absorbed within KM. In particular, the characteristic OL processes of knowledge creation and acquisition are now essential parts of KM definitions, processes and studies.

We suggest that future studies should investigate the role of knowledge sharing as a connector between KM and OL. Individuals and organizations learn by sharing knowledge. According to the KM literature, knowledge sharing is the core process responsible for knowledge creation and application.

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