



## From e-learning to social-learning: Mapping development of studies on social media-supported knowledge management



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### ARTICLE INFO

#### Article history:

Available online 11 February 2015

#### Keywords:

Social media

Knowledge management

CiteSpace

Citation-based analysis

### ABSTRACT

Social media is bringing great challenges and wonderful opportunities for organizational learning. With support of social media, organizations may facilitate the knowledge management process within firms (e.g., knowledge sharing), then to encourage employees to promote collaborative learning behaviors from e-learning to social learning. There is a significant trend in the recent studies is increasing number of publications on social media supported knowledge management (SMKM). However, previous SMKM studies have not been depicted well by combining work of both researchers in social media study and ones in KM (which supports organizational learning) study. By using CiteSpace, this paper mapped important references that lead trends of SMKM development, authors contributing greatly to this field and hot topics of all the related articles. The way that SMKM study developed was analyzed according to the visualization of references and topics. Furthermore, the two most important groups – topics from SM and those from KM study were studied respectively to compare their development in order to show the fusion, the separation and other relationship. Finally, hottest trends and topics in these years and recent future were discussed to provide help for future work.

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### 1. Introduction

Knowledge management (KM) refers to a set of organizational activities to achieving organizational objectives by making the best use of knowledge (Groff & Jones, 2012). KM is critical for organizational learning, as KM processes (i.e., knowledge capture, sharing, and apply) can support organizational processes involving individual learning and collective learning (King, 2009; King, Chung, & Haney, 2008). Recently, more and more researches start to focus on the relationship between social media and KM, which may improve organizational learning from e-learning to social-learning (Ma & Chan, 2014). The topics include whether the use of social media can facilitate KM, or the use of social media has a negative impact on KM in reverse. As established discipline by Nonaka since 1991, KM has been impacted by the study in the fields of business administration, information systems, management and library and information sciences (Nonaka, 1991; Nonaka & von Krogh, 2009). However, more recently, there are other fields that have started contributing to the KM study. Social media are included in these

fields (Bellinger, 2013). Social media is the social interaction among people in which they create, share or exchange information and ideas in virtual communities and networks (Ahlqvist, Bäck, Halonen, & Heinonen, 2008). Andreas Kaplan and Michael Haenlein define social media as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content.” (Kaplan & Michael, 2010). Meanwhile, social media performed better in many ways, including quality, reach, frequency, usability, immediacy, and permanence, than traditional or industrial media (Morgan, Jones, & Hodges, 2012). Based on this, more and more attention was paid on the relationship between social media and KM.

In 1973, Granovetter (1973) published their influential work, “The strength of weak ties”. In this work, they made an analysis of social network and it suggested that social network is a tool for strengthen the weak ties. The impact of the strength of weak ties on diffusion of information was explored. Nonaka found that “any organization that dynamically deals with a changing environment ought not only to process information efficiently but also create information and knowledge” (Nonaka, 1994) while social media is a good tool for an organization. However, no matter it is Granovetter or Nonaka, they are all in an era without Internet or

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social media. So in some extent they just make a relative research, not direct research, of the relationship between social media and KM. Alavi and Leidner (2001) made a review on knowledge management and knowledge management systems in 2001. And Alavi concluded that “advanced information technologies (e.g., the Internet, intranets, extranets, browsers, data warehouses, data mining techniques, and software agents) can be used to systematize, enhance, and expedite large-scale intra- and inter-firm knowledge management” (Alavi & Leidner, 2001). In his work, he also believed that “the role of IT in organizational knowledge management ought to receive considerable scholarly attention and become a focal point of inquiry”. After the birth and burst of social media such as Facebook and Myspace, in 2010, Kaplan AM made a complete definition of social media and a classification of social media. He also mentioned that social media can improve the process knowledge sharing in firms (Kaplan & Michael, 2010).

These researches focus either on social media or knowledge management, but all of these researches mentioned or predicted the relationship between social media and knowledge management. In a word, these researches strengthened the huge potential of the study on social media and knowledge management. However, it is not clear that the way of the study on social media and knowledge management emerged. Meanwhile, trends of the study on social media and knowledge management are in need of a good analysis. With a clear description on the development of the study on social media and knowledge management, there will be a better understanding on the theories on social media and knowledge management.

The rest of the paper is organized as follows. Section 2 presents the current status of the study on social media and knowledge management. In the next section, we will analyze the trends of the study on social media and knowledge management. Then we will make a classification of social media and knowledge management, based on the classification, the relationship between each kind of social media such as blogs, and each kind of knowledge management, such as knowledge sharing. After all of these, we will summarize the findings and make a conclusion of the paper.

## 2. Current status of the study on social media and knowledge management

### 2.1. Data

Web of Science (WoS) provides basic information of important academic literatures in many fields, including titles, authors, journals(or other source), abstracts as well as citation data. Also, based on WoS, we can do some basic analysis on selected dataset. We

mapped big data study's current status represented in literatures with WoS.

We used “social media” and “knowledge management” as topical searches on WoS. Time span was set “all years”. Then we got 344 results (Dataset 1) from Web of Science Core Collection.

### 2.2. Depiction of current status of the study on social media and knowledge management

As Figs. 1 and 2 show, there are more and more published papers and citations about social media and knowledge sharing from year to year. From 1999 to 2003, not so many people cared about social media and knowledge sharing. However, with the development of social network such as Facebook, and Twitter and the outburst of Internet, there are more and more problems that worth to research. Obviously, the trend will go on. On the other hand, current study about social media and knowledge sharing is too new to form a complete system. Basic theories in other fields need to be used in the study. There are lots of things we can do about social media and knowledge sharing.

From Table 1, we can see that top authors contributing the study on social media and knowledge management are ABRAHAMS AS, BAYLEY M and so on. The top five organizations in study about social media and knowledge management are “UNIVERSITY OF TORONTO”, “FLORIDA STATE UNIVERSITY SYSTEM”, “UNIVERSITY OF BRITISH COLUMBIA”, “UNIVERSITY OF CALIFORNIA SYSTEM”. And “UNIVERSITY OF TORONTO” has advantage than others which has nine or less publications (Table 2). As Table 3 shows, LECTURE NOTES IN COMPUTER SCIENCE, JOURNAL OF KNOWLEDGE MANAGEMENT and JOURNAL OF ORGANIZATIONAL COMPUTING play great role in the development of the study on social media and knowledge management.

## 3. Analysis of the trends of study on social media and knowledge management

To map trends of the study on social media and knowledge management, citation analysis should be included in. With citation data of the used dataset, we got information in a much larger number of relevant publications. According to citation analysis, most cited references, influential authors and top-tier journals in the study of social media and knowledge management can be picked out.

In order to make the result more accurate, we use Citespace to show trends of the study of social media and knowledge management clearly. During the analysis, timespan was 1999–2014. And we took one year as a slice and top 50 cited terms in each slice were used for visualization. Meanwhile, we took some important

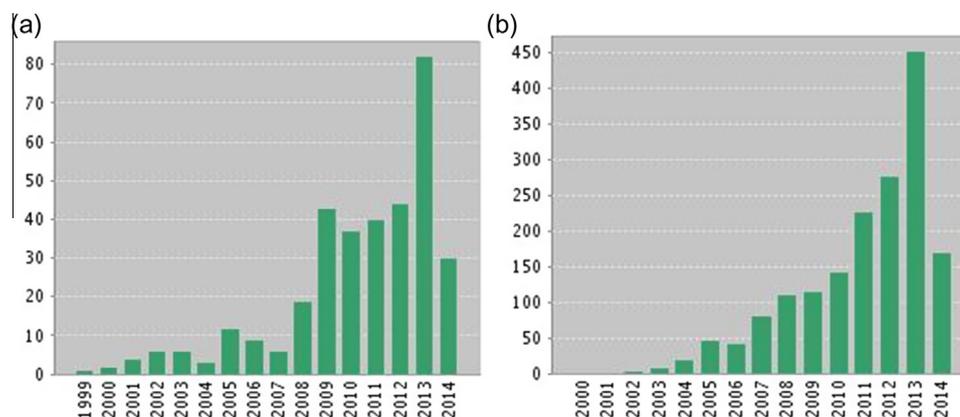


Fig. 1. (a) The number of papers each year from 1999 to 2014; (b) the number of citations each year from 2000 to 2014.

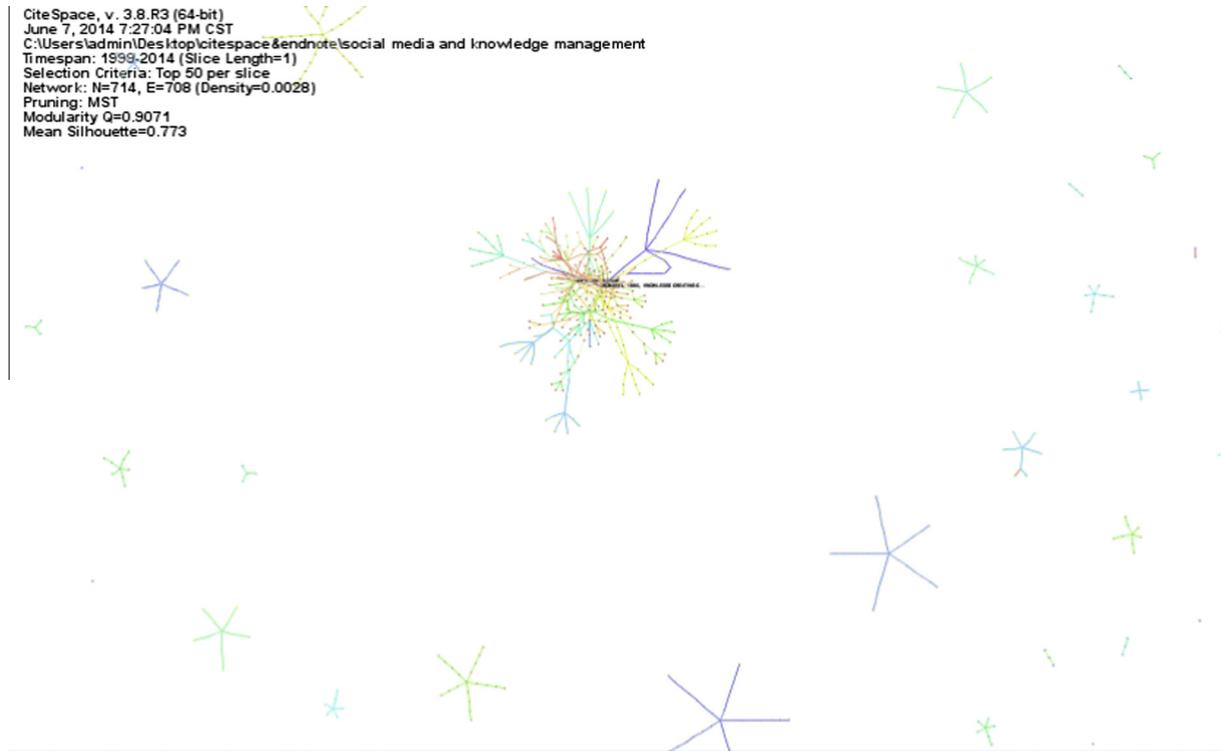


Fig. 2. Main references cluster in study of social media and knowledge management.

indicators provided by Citespace. “Centrality” is “a metric of a node in a network that measures how likely an arbitrary shortest path in the network will go through the node”; “Burst” is “single or multi-word phrases extracted from the title, abstract, or other fields of a bibliographic record and the frequency of the term bursts, i.e. sharply increases, over a period of time” and “Half-life” is “the number of years that a publication receives half of its citations since its publication” (Chen, 2004; Chen, 2006).

### 3.1. Most cited references

Fig. 2 shows the main clusters in full shot of references. From the figure, we can see that almost all of the most cited references are clustered together. We can conclude that the study of social media and knowledge management already has a core system. But it doesn’t mean that the study of social media and knowledge management is already at a perfect stage. As Table 4 shows, we can find that 7 of 8 top references are before 2005 and they are important papers in the study of knowledge management. On the contrast, the other references in Table 4 are in the study of social media and knowledge management. According to the “Burst” in Table 4, Kaplan AM’s publication, which named “Users of the world, unite! The challenges and opportunities of Social Media”, is attracting more and more attention. This can be explained that more and more researchers are paying attention on the study of social media and knowledge management. In a word, the study of social media and knowledge management already has a core system, but the core system is formed in the study of knowledge management before 2005. We should take more effort to consummate the systems in terms of social media and knowledge management.

“Knowledge management and knowledge management systems: conceptual foundations and research issues” is a review done by Maryam Alavi on MIS Quarterly in 2001. In this review, Alavi M “present a detailed process view of organizational knowledge management with a focus on the potential role of information

technology in this process.” Although this review is published in thirteen years ago, it attracted more and more attentions in recent future according to the “Burst”.

“Social capital, intellectual capital, and the organizational advantage” was published by Janine Nahapiet and Sumantra Ghoshal in 1998 on “The Academy of Management Review”. In this paper, they develop the argument that organizations are conducive to the development of high levels of social capital.

Table 1  
Top authors in Dataset I.

Authors	Records	% of 344
ABRAHAMS AS	3	0.872
BAYLEY M	3	0.872
BEDNAR MM	3	0.872
BORNSTEIN NM	3	0.872
BRAININ M	3	0.872
BRYER A	3	0.872
BUCHAN AM	3	0.872
CARRAGEE EJ	3	0.872
CARROLL LJ	3	0.872
CASSIDY JD	3	0.872

Table 2  
Top organizations in Dataset I.

Organizations-enhanced	Records	% of 344
UNIVERSITY OF TORONTO	11	3.198
FLORIDA STATE UNIVERSITY SYSTEM	9	2.616
UNIVERSITY OF BRITISH COLUMBIA	9	2.616
UNIVERSITY OF CALIFORNIA SYSTEM	9	2.616
UNIVERSITY SYSTEM OF MARYLAND	8	2.326
HARVARD UNIVERSITY	8	2.326
UNIVERSITY OF FLORIDA	6	1.744
CORNELL UNIVERSITY	6	1.744
KAROLINSKA INSTITUTE	6	1.744
UNIVERSITY OF CALIFORNIA IRVINE	6	1.744
UNIVERSITY OF CALIFORNIA LOS ANGELES	6	1.744

**Table 3**  
Top sources in Dataset I.

Source titles	Records	% of 344
1-LECTURE NOTES IN COMPUTER SCIENCE	11	3.198
2-JOURNAL OF KNOWLEDGE MANAGEMENT	8	2.326
3-JOURNAL OF ORGANIZATIONAL COMPUTING AND ELECTRONIC COMMERCE	8	2.326
4-DECISION SUPPORT SYSTEMS	6	1.744
5-JOURNAL OF MEDICAL INTERNET RESEARCH	6	1.744
6-JOURNAL OF CLEANER PRODUCTION	4	1.163
7-JOURNAL OF THE AMERICAN SOCIETY FOR 8-INFORMATION SCIENCE AND TECHNOLOGY	4	1.163
9-PROCEEDINGS OF THE 9TH EUROPEAN CONFERENCE ON KNOWLEDGE MANAGEMENT	4	1.163
10-COMMUNICATIONS IN COMPUTER AND INFORMATION SCIENCE	3	0.872
10-COMPUTERS IN HUMAN BEHAVIOR	3	0.872

“The Strength of Weak Ties” is an influential research done by Mark S. Granovetter who worked in Johns Hopkins University. Based on the analysis of social network, he paid lots of attention on the cohesive power of weak ties. And “emphasis on weak ties lends itself to discussion of relations between groups and to analysis of segments of social structure not easily defined in terms of primary groups.” This work has a far-reaching influence in social media study.

“Toward a Knowledge-Based Theory of the Firm” is a paper published on “Strategic Management Journal” in 1996 which was done by Robert M. Grant. M. Grant has developed the coordination mechanisms through which firms integrate the specialist knowledge of their members in this work. Obviously, this work plays a great role in the study on social media and knowledge management.

“A dynamic theory of organizational knowledge creation” was composed by Ikujiro Nonaka who worked in Institute of Business Research, Hitotsubashi University, Kunitachi, Tokyo, Japan. This work provides a conceptual framework for research on the differences and similarities of learning by individuals, groups and organizations. It stimulates many people to research on the organization learning. In other words, it also has a quite far-reaching influence in the study on social media and knowledge management.

“Absorptive capacity: A new perspective on learning and innovation” is a work about absorptive capacity, which is the ability to recognize a firm’s ability to create, share and apply information to commercial ends. Wesley M. Cohen and Daniel A. Levinthal also “characterize the factors that influence absorptive capacity at the organizational level, how an organization’s absorptive capacity differs from that of its individual members”.

“Users of the world, unite! The challenges and opportunities of Social Media” is almost the hottest paper in recent study on social media and knowledge management, according to the “Burst”. It is

published by Andreas M. Kaplan and Michael Haenlein on Business Horizons in 2010. They defined social media and classified social media as six different types. Definitely, this paper is going to attract more and more attention in the future study on social media and knowledge management.

### 3.2. Influential authors

As Figs. 3 and 4 show, outstanding authors dominate the core of the study on social media and knowledge sharing. Most important authors are listed in Table 5. Ikujiro Nonaka (Nonaka I) is a Japanese organizational theorist and Professor Emeritus at the Graduate School of International Corporate Strategy of the Hitotsubashi University, best known for his study of knowledge management.

Maryam Alavi (Alavi M) is the John and Lucy Cook Professor of information strategy. As an expert in IT and knowledge management, and technology-mediated learning, Maryam has authored 70 published papers and has served on editorial boards of several prestigious academic journals.

Robert M. Grant (Grant RM) is a full professor of strategic management and holder of the ENI chair of Strategic Management in the energy sector. He used to be a faculty in Georgetown University, London Business School, City University, California Polytechnic, UCLA, University of British Columbia, and University of St. Andrews (Scotland). His research area is organizational capability and knowledge management, strategic planning and corporate strategy in the oil and gas sector.

Kathleen m. Eisenhardt (Eisenhardt KM) is Professor of Strategy and Organization at Stanford University. She is widely known for her work on strategy, strategic decision making, and innovation in rapidly changing and highly competitive markets. Professor Eisenhardt’s current research centers on collaboration and competition in the converging computing, telecommunications, and semiconductor industries, from the perspectives of complexity, evolutionary and game theories.

Wenger E, whose full name is Étienne Charles Wenger, is an educational theorist and practitioner, best known for his formulation (with Jean Lave) of the theory of situated cognition and his more recent work in the field of communities of practice.

### 3.3. Top-tier journals

Fig. 5 displays the main journals cluster in the study on social media and knowledge sharing. As Table 6 shows, the top-tier journals in the study of social media and knowledge sharing are ORGAN SCI, ACAD MANAGE REV, MIS QUART, ACAD MANAGE J and so on. According to the “Burst” showed in Table 7, RES POLICY, DECIS SUPPORT SYST, J KNOWL MANAG, BUS HORIZONS and INFORM SYST RES are attracting more attentions compared to other journals. It means that pure management journals are paying

**Table 4**  
Top 8 references in study of social media and knowledge sharing.

Freq	Author	Year	Title	Source	Half life
26	NONAKA I	1995	The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation	KNOWLEDGE CREATING C	4
21	ALAVI M	2001	Knowledge management and knowledge management systems: conceptual foundations and research issues	MIS QUART	4
19	NAHAPIET J	1998	Social capital, intellectual capital, and the organizational advantage	ACAD MANAGE REV	6
19	GRANOVETTER	1973	The Strength of Weak Ties	AM J SOCIOL	31
19	GRANT RM	1996	Toward a Knowledge-Based Theory of the Firm	STRATEGIC MANAGE J	13
17	NONAKA I	1994	A dynamic theory of organizational knowledge creation	ORGAN SCI	15
16	COHEN WM	1990	Absorptive capacity: A new perspective on learning and innovation	ADMIN SCI QUART	11
16	KAPLAN AM	2010	Users of the world, unite! The challenges and opportunities of Social Media	BUS HORIZONS	3

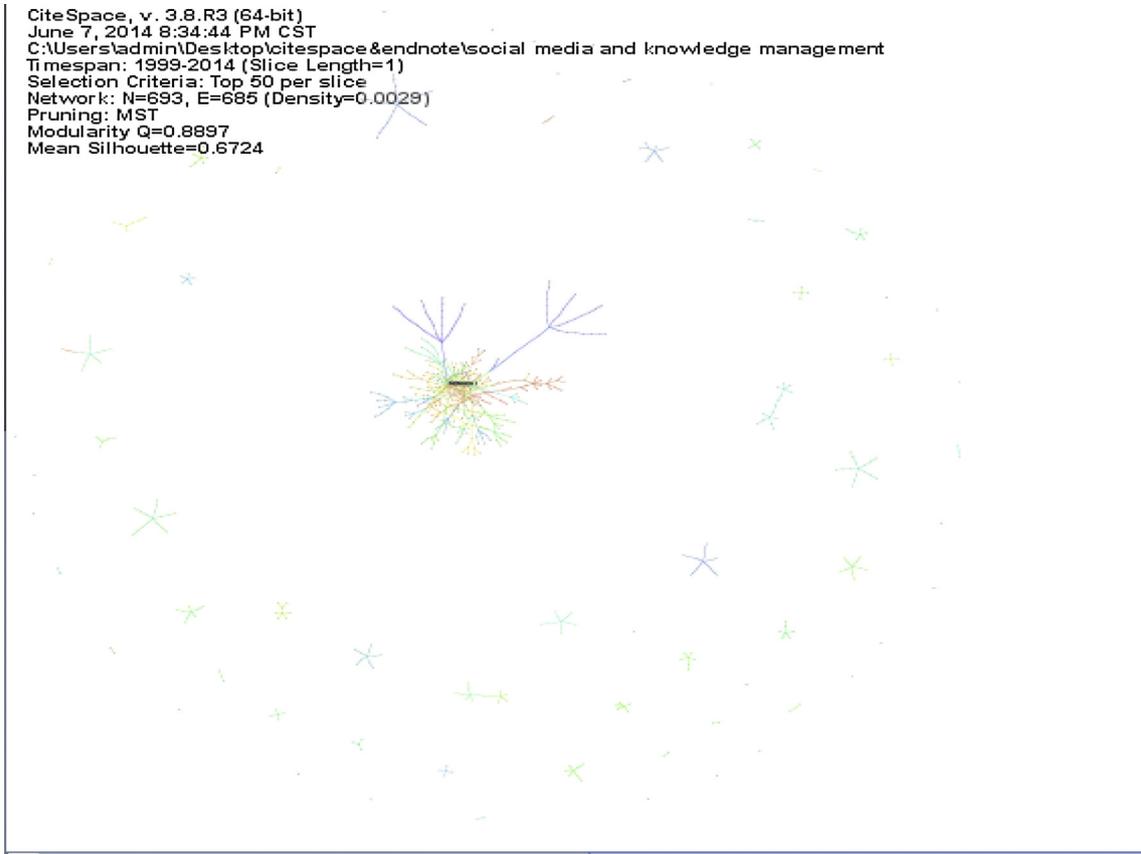


Fig. 3. Full shot of most cited authors.



Fig. 4. Main authors cluster in the study on social media and knowledge management.

**Table 5**  
Top 6 authors in study of social media and knowledge sharing in frequency.

Freq	Burst	Centrality	Author	Half-life
41		0	Nonaka I	4
27	3.91	0	[Anonymous]	0
24		0	Alavi M	6
23		0	Grant RM	13
19		0	Eisenhardt KM	22
19		0	Wenger E	10

more attention to the application of new technology. According to the “Half-life” in Table 3, AM J SOCIOLOG (American journal of sociology) is the most far-reaching journal in the study of social media and knowledge sharing without any doubt.

**4. Relationship between social media and knowledge management**

**4.1. Social media**

Social media is a group of Internet-based applications that are built on the ideological and technological foundations of Web 2.0, and that allows the creation and exchange of User Generated Content[3]. Kaplan AM makes a comprehensive classification of social media in his influential paper, “Users of the world, unite! The challenges and opportunities of Social Media”. There are six different types of social media:

1. collaborative projects: e.g., Wikipedia
2. blogs: e.g., Sina Boke (at PRC)
3. content communities: e.g., Youtube
4. social networking sites: e.g., Facebook
5. virtual game world: e.g., World of Warcraft
6. virtual social world: e.g., Second Life

**Table 6**  
Top 10 journals in study on social media and knowledge management in frequency.

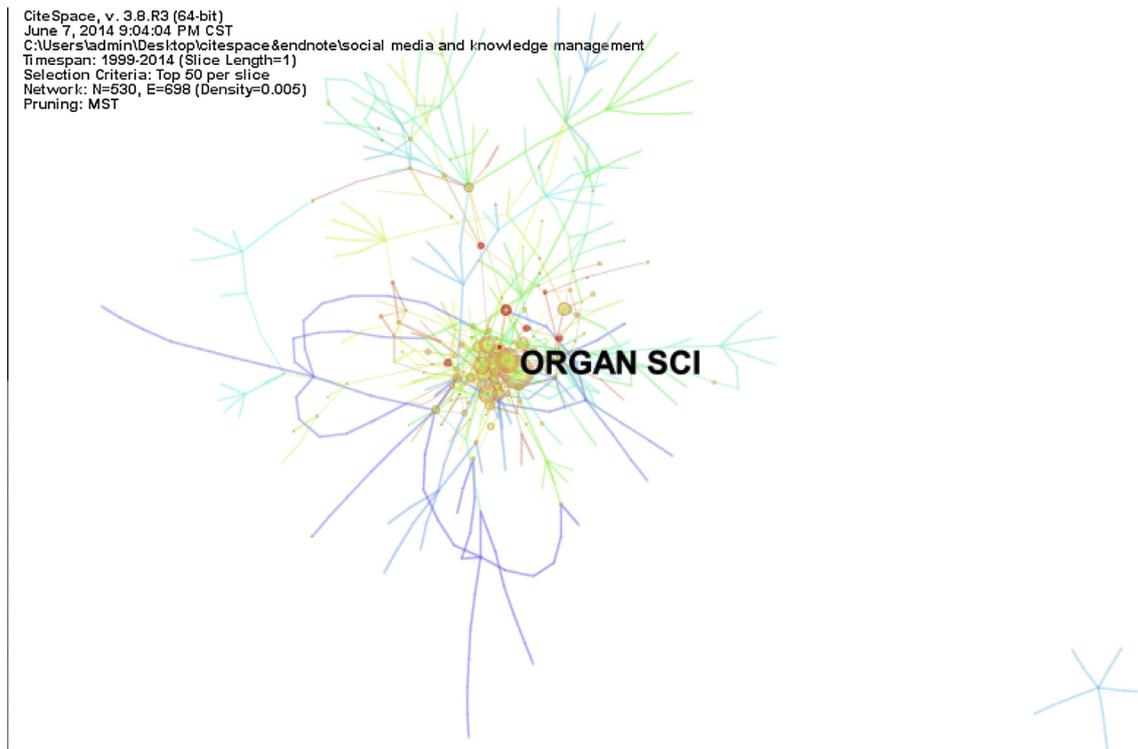
Freq	Burst	Centrality	Year	Source	Half-life
80		0	1991	ORGAN SCI	12
65		0	1989	ACAD MANAGE REV	12
56		0	1989	MIS QUART	14
54		0	1993	ACAD MANAGE J	10
50		0	1999	HARVARD BUS REV	2
49		0	1983	MANAGE SCI	20
46		0	1996	STRATEGIC MANAGE J	9
46		0	1990	ADMIN SCI QUART	11
36		0	1973	AM J SOCIOLOG	31
35		0	2001	SCIENCE	9

**Table 7**  
Top 5 journals in study of social media and knowledge sharing in burst.

Freq	Burst	Centrality	Year	Source	Half-life
24	3.99	0	2002	RES POLICY	6
19	3.66	0	2008	DECIS SUPPORT SYST	4
17	3.14	0	2009	J KNOWL MANAG	3
24	3.12	0	1991	BUS HORIZONS	21
33	2.98	0	1996	INFORM SYST RES	4

**Table 8**  
Papers published on every definite topic such as collaborative projects and knowledge capture.

	Knowledge capture	Knowledge sharing	Knowledge apply
Collaborative projects	74	445	233
Blogs	17	137	36
Content communities	66	374	274
Social networking sites	9	100	40
Virtual game world	3	12	23
Virtual social world	5	27	18
Mobile social media	2	14	7



**Fig. 5.** Main journals cluster in the study on social media and knowledge management.

**Table 9**  
Citation per paper and h-index on every definite topics such as collaborative projects and knowledge capture.

	Knowledge capture		Knowledge sharing		Knowledge apply	
	Citation	h-index	Citation	h-index	Citation	h-index
Collaborative projects	7.41	10	4.93	22	7.49	17
Blogs	15.59	3	7.77	15	2.31	5
Content communities	6.24	11	6.62	21	11.03	24
Social networking sites	4.44	2	5.16	12	4.57	5
Virtual game world	7.67	2	3.75	3	1.35	3
Virtual social world	2.80	1	1.48	4	1.61	3
Mobile social media	3.50	1	1.64	3	0.14	1

However, after 2010 when the pervasive use of smartphone, a new type social media, called mobile social media, is catching more and more attention. Mobile social media as a group of mobile marketing applications that allow the creation and exchange of user-generated content. So, in this paper, we classify social media as seven types: collaborative projects, blogs, content communities,

social networking sites, virtual game world, virtual social world and mobile social media.

4.2. Knowledge management

Very early on in the KM movement, Davenport (1994) offered the still widely quoted definition: “Knowledge management is the process of capturing, distributing, and effectively using knowledge.” Based on Davenport’s definition, we define knowledge management’s three sub-processes: knowledge capturing, knowledge sharing and knowledge application. So the next topic is the comparison of the relationship between seven different social media and three knowledge management’s sub-process.

4.3. Relationship between social media and knowledge management

From Table 8, we can see that no matter what kind of social media it is, the number of published papers on knowledge sharing is the largest. So we can conclude that scholars pay more attention

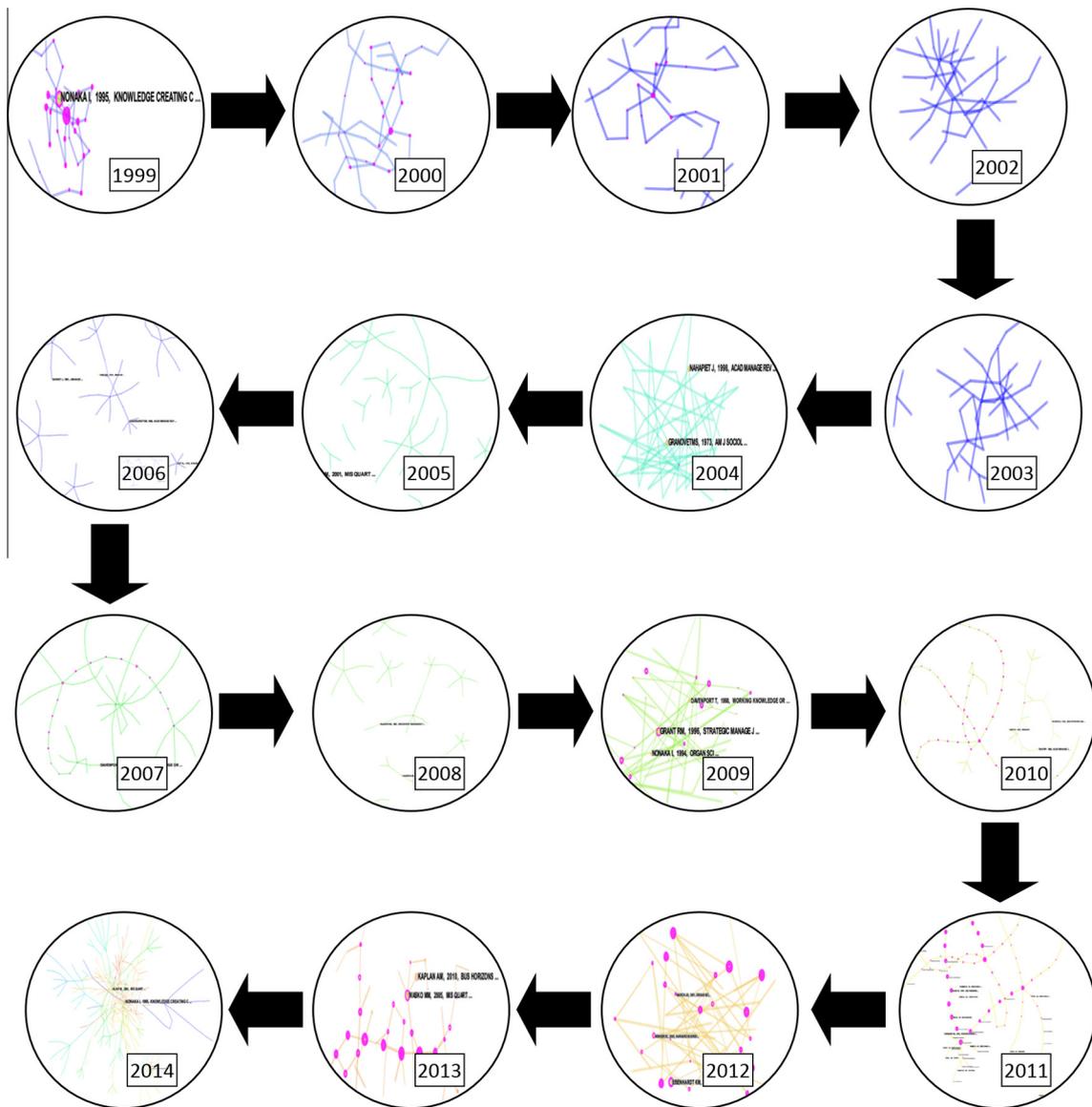


Fig. 6. Evolution of the study on social media and knowledge management.

on the study of knowledge sharing than knowledge capturing or knowledge application, no matter what kind of social media.

If we choose the citation per paper as the indicator of the topic's importance, from Table 9, we can find that combined with most social media except content communities and social networking sites, knowledge capture plays a more important role than knowledge sharing or knowledge apply. In content communities, the number of citation per paper on knowledge apply is higher than knowledge capture and knowledge sharing. In social networking sites, the number of citation per paper on knowledge sharing is higher than knowledge capture and knowledge apply.

However, if we take the h-index as the indicator of the area's importance, we can conclude that knowledge sharing in most social media plays the most important role. But in content communities, h-index on knowledge apply is the highest. We can say that knowledge apply is more important than other two sub-processes of knowledge management in content communities.

## 5. Discussion

According to the above analysis, we have some interesting findings and potential implications. First, although the study on social media and knowledge management already has a core system, the system is mainly formed to support knowledge management study. This is a good sign of future rapid development. Based on the core system, we can develop a new system on the study of knowledge management in social media. On the other hand, all the centrality indicators of references, authors and journals are 0 in the analysis. This means that the study on social media and knowledge management is still at the young stage.

Second, the most cited references in the study on social media and knowledge management is "The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation", "Knowledge management resources", "Social capital, intellectual capital, and the organizational advantage" and so on. Most of these references are the most influential on the knowledge management study. According to the analysis, Kaplan's "Users of the world, unite! The challenges and opportunities of Social Media" is attracting more and more attentions. This reference is the first reference on the study of knowledge management in social media, not just on the knowledge management. These references symbolize the trend of the study on social media and knowledge management.

Third, the most outstanding authors are Ikujiro Nonaka, Maryam Alavi, Robert M. Grant, Kathleen M. Eisenhardt, Étienne Charles Wenger and so on. They settle in center of authors' main cluster of the study on social media and knowledge management. Ikujiro Nonaka, Robert M. Grant, Kathleen M. Eisenhardt and Étienne Charles Wenger are the experts on the knowledge management study and they all played an important role in the development of knowledge management theory. Maryam Alavi is the expert on information technology and knowledge management and makes a prediction that information technology including social media will impact on knowledge management greatly.

Fourth, the top-tier journals in the study on social media and knowledge management are ORGAN SCI, ACAD MANAGE REV, MIS QUART and so on. Among all of these journals, according to the "Burst", RES POLICY, DECIS SUPPORT SYST, J KNOWL MANAG, BUS HORIZONS and INFORM SYST RES are paying more and more attention on the study of social media and knowledge management. They are all pure management journals, compared to ORGAN SCI and so on. It means that the study on social media and knowledge management is converting from technology topics to management topics.

There are also some contributions for forecasting trends of social media supported-knowledge management (SMKM) research. There are seven types of social media: collaborative projects, blogs, content communities, social networking sites, virtual game world, virtual social world and mobile social media. Knowledge management also can be classified as three sub-processes: knowledge capture, knowledge sharing and knowledge apply. Most types of social media have a more strong relationship with knowledge sharing than knowledge capture or knowledge apply. Fig. 6 shows the status of the study on social media and knowledge management in each year. Topics of social media and knowledge management occurred in 1999 and the topics are mainly about knowledge management. Then from 2000 to 2008, topics about social media and knowledge management developed slowly. After that, the study on social media and knowledge management bursted in 2009. It kept increasing rapidly from 2011 to 2014 and the trend will go on.

## 6. Conclusion

This paper described the fast-changing and long-developed studies on social media and knowledge management with Web of Science and Citespace. The current status of the study on social media and knowledge management was depicted by drawing trends of publications and citations. And top authors, institutions, and journals were quantitatively listed. The study on social media and knowledge management is relatively fast-changing. Then trends of the study on social media and knowledge management were analyzed. Most cited references, influential authors and top-tier journals in the study on social media and knowledge management were carefully studied. Finally, the relationship between different types of social media and three sub-process of knowledge management was carefully studied.

## Acknowledgment

The work described in this paper was supported by the National Natural Science Foundation of China (No: 71201155), and the Science Foundation of Ministry of Education of China (Grant No. 13YJA630073). Additional Funding was received from the Selected Seed Foundation of Tianjin University (No. 60306088).

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