



Contents lists available at ScienceDirect

## Computers in Human Behavior

journal homepage: [www.elsevier.com/locate/comphumbeh](http://www.elsevier.com/locate/comphumbeh)

## Mapping development of social media research through different disciplines: Collaborative learning in management and computer science

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## ARTICLE INFO

Article history:  
Available online xxx

Keywords:  
Social media  
Literature methodology  
Management  
Computer science, Collaborative Learning (CL)

## ABSTRACT

Social media is bringing great challenges and wonderful opportunities for companies which attract both many managers and quite large number of researchers in recent years. However, current studies on social media has not been depicted well by combining work of both researchers in management study and ones in computer science study. Using CiteSpace II, this paper empirically mapped important references that lead trends of social media development, authors contributing greatly to this field and hot topics of all the social media articles. The way that social media study developed was analyzed according to the visualization of references and topics of social media, with support of empirical data from Web of Science. General characters of published articles from top journals and top conferences were given out to show status of social media study now. Furthermore, the two most important groups – topics from management study and those from computer science study were studied respectively to compare their development in order to show the fusion, the separation and other relationship of the two most important branches of social media. Then we debate Collaborative Learning (CL) as an emerging hot topic both in management and computer science under the environment of social media. 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

According to Nielsen (2012), the time people spend on social media in America increased rapidly from 88 billion minutes in 2011 to 121 billion minutes in 2012. And numerous reports or studies also reveal that social media is becoming the hottest aspect on internet (Jain, 2013; Labra Gayo, Ord Ez De Pablos, & Cueva Lovelle, 2010; Norman, 2010). In this case, social media is attracting more and more attentions in management study, computer science study and real business (Bowman, Westerman, & Claus, 2012; Guo, Vogel, Zhou, Zhang, & Chen, 2009; Zhou, Fang, Vogel,

Jin, & Zhang, 2012). Generally, social media refers to “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 & Haenlein, 2010), which include Wikis, Twitter, Facebook, Virtual Worlds, et al.

Based on the work done by both researchers of management study and ones of computer science study, understanding of social media and its nature is accumulated in different publications. Firstly, before the “social media” was proposed, a lot of work has been done about “media” and “social”. They mostly focused on journalism (Bagdikian, 1990; Tuchman, 1978), technology and other certain social problems such as social capital (Putnam, 2000) and antiwar movements (Gitlin, 1980). These studies went very deep but structure of them was loose. In this period, studies on social media were different from the management perspective and the computer science perspective.

With the advent of social media era, more and more recent attentions were paid on social media study. From 2008, some papers began to discuss social media directly (Ahlqvist & Tutkimuskeskus, 2008; Eugene, Castillo, Donato, Gionis, &

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Mishne, 2008). This is the early stage of the new trend of social media study. More and more computer science study adopted management theories to uncover nature of social media and to find direction of technical social media promotion (Correa, Hinsley, & de Zuniga, 2010; Mangold & Faulds, 2009). In 2010, the article of Kaplan and Haenlein (2010) made social media study more systematic. After that, development of social media increased rapidly and lots of findings were made. The distinction that social media has from other media in quality, reach, frequency, accessibility, usability, immediacy and performance were found and well defined (Eugene et al., 2008). The honeycomb framework defined seven blocks to identify the focus of certain social media (Kietzmann, Hermkens, McCarthy, & Silvestre, 2011). Impact of social media is going to be measured by researchers (Harris & Kandace, 2008). On one hand, a number of ways were proposed in management group to take advantages of business value of social media. These include Word-of-Mouth marketing (Kozinets, de Valck, Wojnicki, & Wilner, 2010; Smith, Coyle, Lightfoot, & Scott, 2007), marketing research with social media data (Kaplan, 2012), communication (Anger & Kittl, 2011; Zailskaitė-Jakstė & Kuvykaitė, 2012), collaborate sales promotion (Mackey & Liang, 2013) and relation development (Yanping & Qianmiao, 2009). On the other hand, techniques about social media are studied widely in computer science group to provide support for promotion of social media use (Wang, Yang, Hua, & Zhang, 2010; Zhao, Wu, & Ngo, 2010). Also, shortcomings of social media were discussed intensively in two branches. The criticisms cover topics about trustworthiness (Kittur, Suh, Chi, & ACM, 2008), reliability (Moorhead et al., 2013; Pelechris, Zadorozhny, & Oleshchuk, 2011), ownership of social media content (Agha, Van Rossem, Stallworthy, & Kusanthan, 2007; van Laer, de Ruyter, & Cox, 2013), privacy (Campisi, Maiorana, Neri, & IEEE, 2009; Child, Haridakis, & Petronio, 2012) and loneliness (Vergeer & Pelzer, 2009).

In today's world, human actors and software process engines cooperate closely to enact business process at a previously unheard-of scale and complexity level (Damiani, Lytras, & Cudre-Mauroux, 2010). And the social activities that occur in the Web 2.0 open and expand communication and interaction scenarios (Garcia-Penalvo, Colomo-Palacios, & Lytras, 2012). Notably, in both fields of Management and Computer Science, Collaborative Learning (CL) under the environment of social media emerges which indicates CL is more and more popular in recent years especially due to the widely use of social media. Some scholars speak highly of effects of social media on CL, such as, regarding social media as a good way of jointly constructing knowledges (Moskaliuk et al., 2011) and a good tool for students to foster collaborative learning during lectures (George, Dreibelbis, & Aumiller, 2013). A paper about media in CL firstly propose that computer-supported collaboration learning (CSCL) can lead to high performance in complex task (Chou & Min, 2009). Though the work use media instead of social media, the method authors use reflects a concept of social media. With the clear definition of social media given by outstanding scholars like Kaplan, researchers begin to study the effects of social media on CL deeply which involves management and computer science.

Although social media studies obtained great basic frameworks for various studies and impacts of social media studies are being examined, rare research have reviewed the development of social media study quantitatively and visually. Furthermore, studies on social media in different disciplines are not well combined. Especially for the disciplines of management and computer science, which focus on different aspects of social media and hardly get full understanding of situations in other disciplines. They need to figure out the development of whole social media study as well as their own stages. In this case, conclusion of social media development

is urgently needed for understanding process and the present status of social media study. Thus, this study has two major research questions: (1) *What are the development trends of social media studies?* (2) *Which trends are different between two major disciplines, i.e., management and computer science?* This paper empirically analyzed the progress of social media evolution to help track the emergence of social media study and predict future trends of it. Important references, authors, institutions, journals and topics were discussed to map the status of this field. Finally, the two important branches of social media study—the management group and the computer science group are analyzed. Their fusion and separation were described as well. This analysis can help understand the relationship of the two branches and find way to enhance the whole social media study. This paper was organized as follow: In Section 2, we introduced research methods and data collection process. From Sections 3 to 4, we analyzed the general trends of social media, and compared two branches, i.e., management and computer science. The findings were discussed in Section 5.

## 2. Methodology and data

Citespace II is an information visualization tool developed by Professor Chaomei Chen from Drexel University for getting quantitative data and visualizing information in special field (Chen, 2006). It is regarded as the most characteristic and influential application software in the field of visualization analysis which can visualize and analyze the trends and patterns in a field or domain within a designated period of time (Liu, Jiang, & Jin, 2014). There is no doubt that scholars in different fields have attempted studies with the help of Citespace including the ones in IS. For instance, Yang concluded research focus and research frontier in information management filed and depict an overview of this field which provide convenience for future researches (Yang, 2013). Li and Shen utilizes Citespace and Sigma index to conduct analysis on key technologies of technical evolution in the 3G mobile communication system (Li & Shen, 2013). Wu and Chen detected important subjects and regions together with the recent research stream in Cloud Computing with the help of Citespace (Wu, Chen, & IEEE, 2012). All the researches indicate that Citespace is an useful tool for discovering trends and emerging topics in the development of a field or domain. Hence, in this paper, we choose Citespace II as the main tool to obtain a visual result of trends and topics in the field of social media study. Web of Science (WoS) is selected as our data source which can also provide some basic functions such as showing publication and citation numbers in different periods. In this study, these tools were used to analyze development of social media both from a comprehensive perspective and from perspectives of a discipline (management or computer science). Records of papers in WoS were used as datasets for this study. We searched for “social media” in titles of papers on WoS, timespan was set “all years”, “Science Citation Index Expanded (SCI-E): 1900–present”, “Social Science Citation Index (SSCI): 1996–present” and “Conference Proceedings Citation Index Science (CPCI-S): 1990–present” were selected for Citation Database. Finally 1632 records were collected. These records were adopted for analyzing the development of whole social media research. Then, records for computer science group were selected by confining research area as “computer science” and ones for management group can be find by choosing research area as “business and economics”. 211 records for management group and 316 for computer science group were found. By analyzing information of papers in these records, situation of these publications can be observed. And with help of CiteSpace II, citation data contained in these records can give out information about a much more wide range of publications.

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