

Social Information Systems: Review, Framework, and Research Agenda

Research-in-Progress

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Abstract

In this research-in-progress, we review the literature on an emerging new type of information systems: social information systems. Social information systems are information systems based on social technologies and open collaboration. The paper provides categories defining social information systems and a framework for existing and future research in this field of study.

Keywords: Online Communities and Digital Collaborations, Framework, Literature review, Wisdom of the crowd, Social technology, Social software, Social networks, Blogs, Wikis, Crowdsourcing.

Introduction

In this research-in-progress paper, we review the literature on an emerging new type of information systems: social information systems. What are "social information systems"? Essentially, *social information systems are information systems based on social technologies and open collaboration*. This review paper frames existing and suggested research into this new field of information systems research.

Social information systems are different from traditional business information systems, for which the term "information system" has often been used implicitly. They shift the core system function from work support to online social interaction (e.g., the system allows for comment, rating, "friending," and similar feedback mechanisms) or open collaboration (i.e., the number of contributors or participants in the system is not predefined). Social computing tools such as social media (Kaplan and Haenlein 2010) are the technology core of social information systems. For this paper, however, we follow Allen S. Lee's advice and adopt a systems perspective rather than a technology perspective (Lee 2010). Her argues that understanding technology as only a part of larger systems and processes in organizations is the *raison d'être* of our discipline. Hence, we review the literature from an organization process perspective rather than a technology perspective. In this research-in-progress paper, we identify generic features of how social information systems differ from traditional information systems and organize the literature on social information systems according to the supported process types.

Social information systems are increasingly used in both hedonistic and utilitarian ways: The use of social media has become a favorite free-time activity for Internet users. Table 1 gives an idea of the massive global reach of the social web, presenting the most visited websites in April 2011 according to the Alexa database (Alexa Internet Inc. 2011). Unlike with other forms of media, users can actively contribute and co-create in social media. Hence, we see various forms of autonomous user co-creation emerging on the Internet (Zwass 2010), effectively constituting a new and firm-independent method of production (Benkler 2002; Benkler 2006). Furthermore, firms are increasingly using open, social, and collaborative processes for their value-creation activities and for communication between users (consumers) and employees (Bughin and Chui 2010; Bughin et al. 2009; Bughin and Manyika 2007; Bughin et al. 2008).

Table 1: Global Reach of Websites			
Rank	Website	Daily Users	Social Functions
1	Google.com	49.92 m	Search, email, social functions (e.g., Buzz)
2	Facebook.com	41.98 m	Social media: social networking site
3	YouTube.com	27.12 m	Social media: social video sharing
4	Yahoo!	25.14 m	Portal, search, email, social functions
5	Wikipedia.org	14.02 m	Social media: wiki
6	Blogger.com	13.66 m	Social media: blogging
7	Live.com	12.67 m	Search, email
8	Twitter.com	10.39 m	Social media: microblogging

The contributions of this research are a conceptualization of social information systems and a framework for existing and future research in this emerging field of study. As a conceptual contribution (Hirschheim 2008), the paper aims to establish a coherent notion of social information systems. As a review (Schwarz et al. 2007), the paper provides an overview of existing findings and aids future research and theory development.

Our systematic review of social information systems provides an overview of this body of literature that (1) identifies the scope and consolidate the findings of research on social information systems, (2) defines the distinct features of social information systems in contrast to other types of information systems, and (3) suggests an agenda for future research into social information systems. In presenting our findings at this point we aim to improve the framework and generate discussion regarding this perspective on research on the Web-based “open and social phenomenon.”

The remainder of this paper provides a brief of overview of the findings at this stage of the research. The “Review Method” section outlines the steps we followed to review the literature. The “Social Information Systems” section presents the main results from our analysis. In the “Research Agenda” section, we compile some ideas on how social information systems may be analyzed in the future.

Review Method

This paper presents first findings from an extensive, structured literature review of research into "social information systems" (as defined above). The review is based on literature on how to review existing research in a systematic way (Okoli and Schabram 2010; Webster and Watson 2002). We conduct a systematic screening of highly regarded and relevant academic journals. For this review process, we have iteratively developed a set of keywords describing topics of research on social information system. Furthermore, we have defined a set of the most relevant journals for the context of research into social information systems (for the final sets of keywords and journals see table 2). The inclusion of general management journals, research and development journals, and marketing journals (in addition to core information systems journal such as found in the Association for Information Systems 6+2 basket) corresponds to both the scope of similar reviews (Dahlander and Gann 2010) as well as Willcocks et al.'s list of outlets relevant for information system researchers (Willcocks et al. 2008). In addition, we successively added sources by using forward and backward search (Okoli and Schabram 2010; Webster and Watson 2002). This allowed the inclusion of highly influential, highly cited (Dahlander and Gann 2010) papers that were not necessarily within the formal scope of keywords, journals, or publication time.

Table 2. Review Process	
Year of publication	2005 to 2010; the year 2005 is widely considered to be when the notion of “Web 2.0” gained recognition (O'Reilly 2005)
Keywords, final set	Co-Creation, Co-Production, Collaborative Filtering, Collective Invention, Crowdsourcing, Digital Networks, Enterprise 2.0, Idea Competitions, Innovation Communities, Innovation Contests, Lead User, Open Business Models, Open Collaboration, Open Innovation, Open Production, Open Source, Open Strategy, Peer Production, Social Collaboration, Social Commerce, Social Computing, Social Informatics, Social Media, Social Media Optimization, Social Media Marketing, Social Networks, Social Production, Social Software, Social Web, User Innovation, User Collaboration, Virtual Customer Integration, Web 2.0
Journals, final set	Academy of Management Journal, Academy of Management Review, California Management Review, European Journal of Information Systems, Harvard Business Review, Information Systems Journal, Information Systems Research, Journal of Information Technology, Journal of Consumer Research, Journal of Management Information Systems, Journal of Marketing, Journal of Marketing Research, Journal of Product Innovation Management, Journal of Strategic Information Systems, Journal of the Association for Information Systems, Management Science, Marketing Science, MIS Quarterly, Organization Science, Organization Studies, R&D Management, Research Policy, Strategic Management Journal, Technovation
Search engines	EBSCO, Google Scholar, JStor, ProQuest, ScienceDirect; manual search table of contents of the above set of journals.

In our analysis, we look at the overall research topic (i.e., the process studied), descriptions of features of “open and social” systems, types of research questions, theories used, methods applied, data analyzed, and, of course, the substantive findings of the research papers. In the following section, we summarize some initial findings from the review of these papers. Due to the length restrictions of the ICIS research-in-progress format, we focus on general features of social information systems and themes of the research paper; we will provide a comprehensive overview of the all findings in the full paper.

Social Information Systems

Considering “information systems” not to be a synonym of “information technology,” one must study not only the technology involved but also the organizational processes enabled or transformed by that technology (Lee 2010). Hence, this paper adopts a process rather than a technology perspective on the body of literature under study. Here, we present two findings of our review: (1) a set of generic *features* that differentiate social information systems from traditional information systems; and (2) an overview of the *topics* studied, organized by the types of organizational processes supported by social information systems.

(1) Generic Features of Social Information Systems

Sociality: Social information systems are based on social interactions. Governance structures often rely on social rather than legal mechanisms; governance follows bottom-up and grassroots logic. Control is implemented through transparency and social feedback, not through hierarchy. An individual's decision to participate will be influenced by prior social ties with other participants. (Agarwal et al. 2008; Feller et al. 2008; Hahn et al. 2008; Parameswaran and Whinston 2007a; Parameswaran and Whinston 2007b; von Krogh and Spaeth 2007).

Openness: Social information systems usually do not have a predefined number of participants. Instead, the system is open to a broad range of participants/contributors. Usually, the decision to participate is voluntary. (Hahn et al. 2008; Parameswaran and Whinston 2007a; Parameswaran and Whinston 2007b; von Krogh and Spaeth 2007)

Contributions: Contributors to and participants in social information systems are communities of individuals, often independent end-users. Employees participating in social information systems may do so well outside of their formal organizational positions. (Parameswaran and Whinston 2007a; Parameswaran and Whinston 2007b; von Krogh and von Hippel 2006)

Content: The information that flows through social information systems is user-generated. The content is accessible to all participants. The content is dynamic, shared, and grows over time. (Kaplan and Haenlein 2010; Parameswaran and Whinston 2007a; Parameswaran and Whinston 2007b)

Technology: The technology relies on social technologies such as wikis, social networking sites, collaboration platforms, blogs, and similar social (media) tools. These tools are usually easy to use, flexible in their structure and size, and often available as open source tools. (Kane and Fichman 2009; Kaplan and Haenlein 2010; McAfee 2009; Prasarnphanich and Wagner 2009)

Location: Social information systems are online, Web-based, systems. They are usually hosted on a Web server and accessible through a browser. Hence, there is no local installation on the users' systems. (Kaplan and Haenlein 2010; Parameswaran and Whinston 2007a; Parameswaran and Whinston 2007b)

This set of features corresponds well to social computing dimensions in general (Ali-Hassan and Nevo 2009). Table 3 contrasts the features of social information systems with traditional (business) information systems.

Table 3. Unique Feature of Social Information Systems		
	Social Information Systems	Traditional Information Systems
Sociality	Community; focus on information exchange	No community; focus on information processing
Openness	Large number of users; voluntary contributions	Limited number of users; mandatory use
Contributors	Externals, employees outside of formal hierarchy	Employees
Contents	User-generated	Generated by professionals or generated automatically
Technology	Lightweight tools, flexible structures, open source software	Often complex, fixed structure; commercial software
Location	Online; networked	Offline; local

(2) Topics of Research on Social Information Systems

We have organized the literature on social information systems according to the types of supported organizational processes using a taxonomy building approach. In general, taxonomy-building activity is part of the enquiry branch of Systematics that originates in the work of biologist G.G. Simpson (Simpson 1961). Taxonomic groups categorize similar “taxa” for the identification of fields of objects. Similar taxonomy and classification methods can also be used for objects of the organizational sciences (McKelvey 1978; McKelvey 1982). Gregor applies this classification method for abstract “objects” (concepts) in her review of theories in information systems research (Gregor 2006). A classification framework should be complete but simple and hence should be useful for people to understand better the objects under study (Doty and Glick 1994; Gregor 2006; McKelvey 1982).

To organize the research on social information systems, we have grouped the research papers into five categories according to the focus of the process under study. The processes studied in research on social information system can be categorized as (1) user co-creation processes, (2) research and development-focused processes, (3) production-focused processes, (4) marketing-focused processes, and (5) firm-internal knowledge sharing processes (see Figure 1).

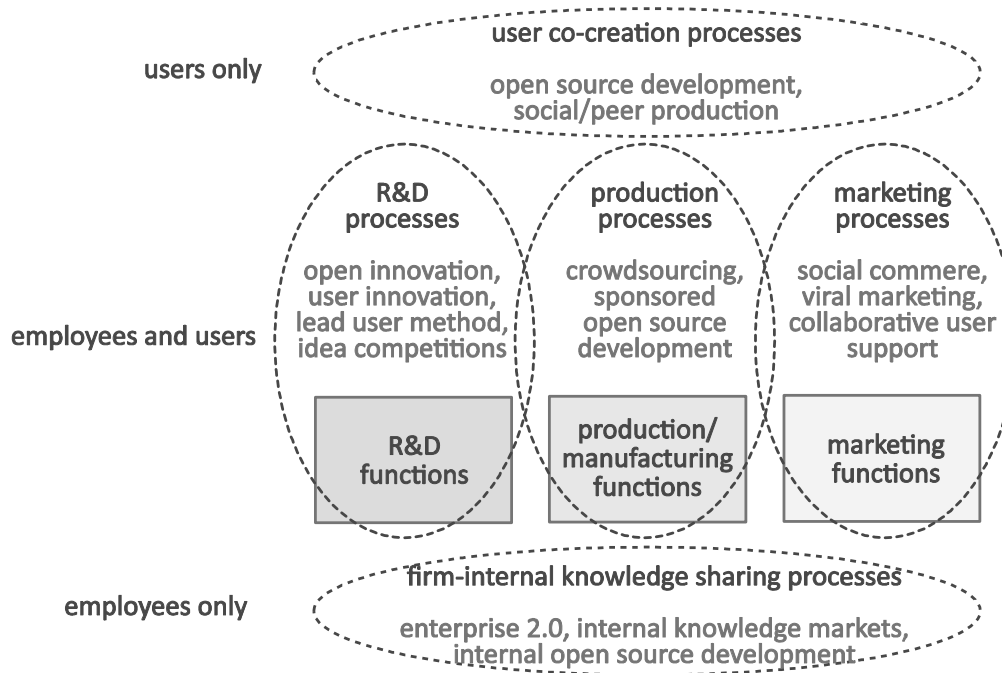


Figure 1: Topics of Research on Social Information Systems

User Co-Creation Processes. The first topic we find in the literature analyzed is the use of social information systems for independent user co-creation of knowledge, content, or products. This form of co-creation happens autonomously, without a sponsoring firm (Zwass 2010). The same processes have also been called social collaboration, social production, or commons-based peer production (Benkler 2002; Benkler 2006). Wikipedia and open source software such as Linux and Apache are showcase examples of results from co-creation. Examples of technologies used here include collaborative open source platforms (e.g., SourceForge.com) and social media (e.g., wikis). Open source projects in particular have been studied extensively, with research focusing on the motivation of participants, the governance structures, and the related competitive dynamics (von Krogh and von Hippel 2006). Research has found that the motivation of open source contributors is often based on status and signaling (i.e., showcasing their abilities) considerations (Roberts et al. 2006). Authority and leadership in open source projects is democratically legitimized and may shift over time (O'Mahony and Ferraro 2007); authority may transfer to new projects (Hahn et al. 2008). Grewal et al. find that the embeddedness of an open source projects in networks of other open source projects influences the project's success (Grewal et al. 2006). The open source principles can also be transferred in part to other forms of user co-creation (Müller-Seitz and Reger 2009). However, participation in other open projects, such as Wikipedia, is driven by more altruistic motives (Prasarnphanich and Wagner 2009). Kane and Fichman suggest that the academic community evaluates the use of social information systems to share knowledge (Kane and Fichman 2009).

Research and Development Processes. Studies that look at how social information systems can support the research and development (R&D) function of firms have focused on open innovation, user innovation, the identification and integration of lead users, as well as innovation and idea competitions (for a recent review: Dahlander and Gann 2010). Research has also been interested in idea competition as a way to generate new ideas for product development (Ebner et al. 2009). Again, motivations and incentives for participation have been studied (Leimeister et al. 2009; Terwiesch and Yi 2008). Another topic in this category is research on lead users, who are

especially valuable for generating high-quality R&D ideas (von Hippel 1986). Research suggests a structured way to integrate them into R&D (Lüthje and Herstatt 2004). Lead user identification can be achieved through screening or pyramiding techniques (von Hippel et al. 2009).

Production Processes. Research on production processes that are supported by social information systems have typically focused on firm-sponsored open source software development. However, research on crowdsourcing and toolkits also falls into this category. This literature looks at co-creation that is sponsored by a firm (Prahalad and Ramaswamy 2004; Zwass 2010). Examples include Apple's Darwin (firm-sponsored open source development) or firms' micro tasks performed by Internet users on Amazon Mechanical Turk (a crowdsourcing platform). The technologies used are often proprietary platforms that are nevertheless open for external contributors. Firm-sponsored open source development can be used for the outsourcing of development tasks to communities of open contributors (Ågerfalk and Fitzgerald 2008; Dahlander and Magnusson 2005; Dahlander and Wallin 2006). The video game industry uses open contribution for the development of new features and levels of games (von Krogh and Spaeth 2007; West and Gallagher 2006). Leimeister et al. look at how platforms should be designed to stimulate participation (Leimeister et al. 2009).

Marketing Processes. Research on marketing-side (distribution, sales, after-sales) social information systems has focused on social commerce and online viral marketing; studies are found in both marketing and information systems journals. Social commerce is a form of electronic commerce that involves social information systems to assist in the online buying and selling of products (Stephen and Toubia 2010). In fact, many industry experts expect 2011 to be the year social commerce takes off (Rowan and Cheshire 2011). So far, research has supported that online user feedback provides an effective way to study and stimulate product related word-of-mouth (Godes and Mayzlin 2004; Godes and Mayzlin 2009). Specifically, microblogging (e.g., Twitter) can be used to track firm-related word-of-mouth in quasi real time (Berinato 2010; Jansen et al. 2009). Online user reviews – such as those enabled by the social commerce features on Amazon – affect future sales, especially if reviewers reveal their true identities (Forman et al. 2008; Li and Hitt 2008). Accordingly, marketing departments should employ social commerce strategies generating early positive reviews and hence positive word-of-mouth (Li and Hitt 2008). Understanding the social structure in online networks is crucial for the success of viral marketing campaigns (Bampo et al. 2008). Kane et al. suggest forming dedicated social media teams that integrate marketing, public relations, and technology skills for online customers relations (Kane et al. 2009). Moon and Sproull show that continuous feedback and evaluation of user contributions is an effective way to stimulate future high-quality contributions to social information systems (Moon and Sproull 2008). Dutta, though, identifies several risks involved in social media activities and social information systems process (Dutta 2010). Few studies have looked at the use of social information systems applications for collaborative user support and after-sales services. For example, Cisco uses a wiki to engage users to share knowhow regarding its products (dokwiki.cisco.com).

Firm-internal Knowledge Sharing Processes. This category summarizes research on the use of open processes and social information system within firms, without outside user involvement. Supporting social technologies are often labeled as enterprise social software or Enterprise 2.0 (McAfee 2006) tools. Electronic knowledge management systems offer several benefits to organizations that employ

them (Gray and Durcikova 2005; Kankanhalli et al. 2005). Social information systems based on wikis seem to be suitable as replacements for traditional knowledge management systems. The overall number of firms embracing social technologies for internal use is continually increasing (Bughin et al. 2009; Bughin and Manyika 2007; Bughin et al. 2008). Vitharana et al. discuss the benefits of using open source development processes for firm-internal software development (Vitharana et al. 2010). Research on internal knowledge markets falls into this category as well (Benbya and van Alstyne forthcoming 2011).

Research Agenda

In summary, studies of the social information systems field have investigated a range of research questions. However, a considerable number of research questions in this dynamic field remain unanswered. The use of social information systems is growing rapidly, a trend that may lead to new forms of organizations (Bughin and Chui 2010). Existing research papers have repeatedly called for future studies in three main areas. One concerns the theoretical foundations of social information systems. Open and social processes are not well explained with standard economic and management theory. Hence, research should provide new theoretical foundations for the open and social phenomenon (Chesbrough and Appleyard 2007; Dahlander and Gann 2010; von Krogh and Spaeth 2007). The second concerns the design of social information systems. Several scholars suggest focusing on research that supports designing, building, and leveraging new forms of social information systems (Agarwal et al. 2008; Leimeister et al. 2009). Finally, social information systems provide large amounts of rich data to study basic social processes. In other words, data from online social systems may be used to answer a range of sociological and psychological questions from the offline worlds as well (see also the Information Systems Research special issue on interplay between digital and social networks, Agarwal et al. 2008). We believe our discipline should take a leading position in research on social information systems and social computing. Overall, we hope to contribute to this research stream by reviewing existing research and elaborating a perspective on social information systems as a unique type of information systems.

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