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A Review of Information Systems Research on Online Social Networks

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Abstract:

Over the last decade, online social networks have evolved into a global mainstream medium with increasing social, organizational, and economic impact. This paper provides a structured overview of Information Systems research on this outstanding techno-social phenomenon of the 21st century via a structured literature review. Based on our search in information systems journals and conference proceedings that resulted in 510 papers, we carve out and assess the knowledge and the research fields that have been predominantly addressed and impacted by the information systems research community so far. Moreover, we identify research gaps that future research should address. We analyze how the academic discussion on online social networks developed in the information systems literature over time, which publication outlets are most receptive to research on online social networks, which research areas have already been covered by information systems research on online social networks, and what potential future research areas exist that have not been covered by information systems research yet. We hope that our results will stimulate and guide future research in this field.

Keywords: Online Social Network, Social Network Analysis, Communication Network, Information Systems Research, Literature Review.

A Review of Information Systems Research on Online Social Networks

I. INTRODUCTION

The Internet originated many information-sharing networks that have fundamentally influenced people's lives (Mislove, 2009). Over the last several years, a new class of information networks called online social networks (OSN) exploded in popularity. Since the launch of the first recognizable OSN at the end of the 1990s, OSN such as Facebook, LinkedIn, and Google+ have become popular Internet platforms that connect hundreds of millions people around the world (Heidemann, Klier, & Probst, 2012). Unlike traditional webpages, which are largely organized around content, OSN are arranged around users and their interests (Mislove, 2009): After joining an OSN, users establish links to other users in the network, usually called "friends". This user-based link structure enables people to "stay connected with friends and family, to discover what's going on in the world, and to share and express what matters to them" (Facebook, 2013). To date, the use of OSN has reached an enormous scale and rivals the traditional World Wide Web (WWW) in terms of usage: the number of people around the world using OSN is expected to grow from 1.4 billion in 2012 to 1.9 billion in 2014 (eMarketer, 2012a). The most popular OSN in the world, Facebook, counts for more than one billion monthly active users as of October 2013 (Facebook, 2013). Moreover, American Internet users spend, on average, about 6.8 hours a week using Facebook (eMarketer, 2013), which equates to 27 percent of their total time online (Experian, 2013). These figures illustrate how deeply OSN have penetrated people's lives and transformed the ways they communicate. Although originally designed for private use, an increasing number of companies have begun to present their brands and products via OSN to leverage their popularity (Bughin & Manyika, 2007; Wen, Tan & Chang, 2009). Worldwide advertising spending on OSN is consequently expected to grow from US$5 billion in 2011 to US$12 billion in 2014 (eMarketer, 2012b). Thus, OSN have evolved into a global mainstream medium with increasing social and economic impact and can be regarded as one of the outstanding techno-social phenomena of the 21st century (Heidemann et al., 2012).

Against this backdrop, it does not seem surprising that a large number of researchers have started to explore OSN. Indeed, the number of papers focusing on OSN has constantly risen over the last several years (Richter, Riemer, & vom Brocke, 2011), and papers on OSN have been published in almost all major outlets of the global information systems (IS) community. With this paper, we overview these papers on OSN from an IS perspective via a structured literature review. We focus particularly on a research perspective (cf. Poeppelbuss, Niehaves, Simons, & Becker, 2011). What can such a literature review contribute? We believe that the growing number of publications on OSN needs to be analyzed to carve out and assess the knowledge and the research fields that the IS community has addressed so far (Scandura & Williams, 2000). Moreover, we identify research gaps that can be addressed in future research (Webster & Watson, 2002).

This paper is organized as follows: In Section 2, we provide the terminological foundations and present four broad research questions: (1) how has the academic discussion on OSN developed in the IS literature over time?, (2) which IS publication outlets are most receptive to research on OSN?, (3) which research areas have already been covered by IS research on OSN?, (4) what are potential future research areas that have not been covered by IS research yet? In Section 3, we outline the procedure that we used for our structured literature search. In Section 4, we present out findings with respect to the first three research questions and, in Section 5, we point out directions for future research. Finally, in Section 6, we summarize the paper and discuss its limitations.

II. FOUNDATIONS AND RESEARCH QUESTIONS

Terminological foundations

For as long as human beings have lived together, they have established social networks. The Greek philosopher Aristotle described man as "zoon politicon" by nature—a social and political being with the fundamental need to build communities (Heidemann et al., 2012). In the era preceding OSN, starting in the 1940s, OSN forerunners and their respective methods and techniques included sociometry, graph theory, network analysis, and communication networks, which significantly influenced the development from monadic and aggregate data to relationships and relational analysis (e.g., Coleman, 1972; Krippendorff, 1970) and to networks and network analysis (e.g., Wigand, 1977, 1988). Many methods and techniques to analyze communication networks have been engineered by sociometricians and social psychologists (Wigand, 1977). Communication networks can, for example be, represented by sociograms (Moreno, 1934) or graph theory (Harary, Norman, & Cartwright, 1965). Matrix methods (e.g., Chabot, 1950; Festiger, 1949; Katz, 1947) are another way to respresent relationships in networks while taking into account quantitative characteristics. Using matrix methods seems reasonable as long as the number of

members in the network *N* remains relatively small (Wigand, 1977). Two further areas that have contributed to the emergence of network analysis include small-group research mostly conducted in laboratory settings (e.g., Bavelas, 1948) and the investigation of social networks typically conducted in urban or national settings (e.g., Coleman, Katz, & Menzel, 1957). In addition, a further way to represent the communication behavior of social systems is network analysis. Network analysis considers "the entire pattern of relationships among individuals before a decision is made what constitutes a communication group (or clique or cluster)" (Wigand, 1977, p. 186). Network analysis techniques were applied to many forms of social systems such as organizations, villages, class rooms, entire industries, interorganizational analysis, and others (Wigand, 1977). Overall, without these early methodological developments, today's methods and techniques for the analysis of OSN would rarely be possible.

OSN in particular became popular with the emergence of the WWW and the development of information and communication technologies such as social software in the late 1990s (Heidemann et al., 2012). While the first OSN were already launched at this same time (e.g., SixDegrees, MiGente, AsianAvenue), their rise to actual popularity began with the launch of MySpace in 2003, followed by Facebook in 2004 (Heidemann et al., 2012). In general, we can consider OSN as a particular type of virtual community (Dwyer, Hiltz, & Passerini, 2007) and social software (Richter, Riemer ,& vom Brocke, 2011). Compared to traditional offline social networks that have been studied since the 1940s (e.g., Wigand, 1988) and that usually contain a small number (a membership of 1,000 was considered large) of rather similar members, OSN and their network structure are much more heterogenious and complex (Krasnova, Koroleva, & Veltri, 2010b). Because OSN are a relatively new phenomenon, the literature still lacks a well-established definition for them. Instead, numerous similar terms such as social networking service (e.g., Adamic and Adar, 2005), social network site (e.g., boyd and Ellison, 2007; Ellison and boyd, 2013), social media networks (e.g., Kane, Alavi, Labianca, & Borgatti, 2014), or OSN (e.g., Heidemann et al., 2012; Schneider, Feldmann, Krishnamurthy, & Willinger, 2009) exist, which are often used synonymously. In our analysis, we use the term OSN and define it as:

> *a networked communication platform in which participants 1) have uniquely identifiable profiles that consist of user-supplied content, content provided by other users, and/or system-level data; 2) can publicly articulate connections that can be viewed and transferred by others; and 3) can consume, produce, and/or interact with streams of user-generated content provided by their connections on the site* (Ellison & boyd, 2013, p. 158).

That said, we particularly consider user-oriented sites (Pallis, Zeinalipour-Yazti, & Dikaiakos, 2011), "where, to a certain extent, networking is the main preoccupation" (Beer, 2008, p. 518). In contrast, content-oriented sites such as Twitter, YouTube, and Flickr have inherited some features of OSN but are actually microblogging sites or content communities, which differ from OSN with respect to their characteristics (Heidemann et al., 2012; Pallis et al., 2011; Probst, Grosswiele, & Pfleger, 2013; Richter et al., 2011; Smith, Fischer, & Yongjian, 2012). For example, prior research has showed that Twitter "does not conform to the usual characteristics of social networks, which exhibit much higher reciprocity" (Wu, Hofman, Mason, & Watts, 2011, p. 707). In addition, content-oriented sites differ from user-oriented sites with respect to, for instance, users' primary motivation to use them (e.g., Laine, Ercal, & Luo, 2011). Because treating content- and user-oriented sites interchangeably might consequently raise several theoretical problems (Howison, Wiggins, & Crowston, 2011; Probst et al., 2013), we concentrate on OSN as the currently predominant phenomenon.

Research questions

In this paper, we analyze and synthesize OSN research published by the IS community over the last several years. Furthermore, we identify research gaps that scholars should address in the future. In so doing, we focus on the outcomes of OSN research and aim to represent the status quo in this field of research. Additonally, our literature review may help researchers to publish further papers on OSN (Cooper, 1988; vom Brocke et al., 2009) because "authors are likely to have an interest in past publication activities, including the recent developments in the field…or the publication outlets that are most receptive" (Poeppelbuss et al., 2011, p. 508). In addition, we believe that researchers are not only interested in the development of published papers over time and the respective outlets, but also in the research areas that have already been covered and, especially, the research areas that have not yet been covered. Moreover, editors and reviewers may find this paper useful when assessing them against the background of the most current research in this field (Poeppelbuss et al., 2011). Our literature review addresses the following research questions:

RQ1: How has the academic discussion on OSN developed in the IS literature over time?

RQ2: Which IS publication outlets are most receptive to research on OSN?

RQ3: Which research areas have already been covered by IS research on OSN?

RQ4: What are potential future research areas that have not been covered by IS research yet?

In the following, we address these research questions via a structured literature review. By answering these research questions, we hope to cover the issues that are most relevant for researchers in the field, while acknowledging at the same time that the topic has a broad relevance for academia and industry alike.

III. LITERATURE SEARCH

A thorough and rigorous analysis of a research field requires a systematic and structured literature review (Bandara, Miskon, & Fielt, 2011; Webster & Watson, 2002). Moreover, it requires a comprehensive and replicable literature search strategy that includes selecting relevant publication outlets (i.e., journals and conferences), relevant keywords, and a relevant period of time (vom Brocke et al., 2009). We follow Bandara et al. (2011) who propose two main steps: (1) selecting the relevant sources to be searched (cf. also Webster and Watson, 2002), and (2) defining the search strategy in terms of time frame, search terms, and search fields (cf. also Cooper, 1988; Levy & Ellis, 2006).

Source Selection

A literature search should include the field's leading journals, which are known for their high quality and are therefore likely to contain the major contributions (Webster & Watson, 2002). To identify leading and high-quality journals, researchers commonly refer to journal rankings (Levy & Ellis, 2006; vom Brocke et al., 2009). The Association for Information Systems (AIS) provides the Senior Scholar's Basket of Journals[1], which comprises eight top IS journals, and the Management Information Systems (MIS) journal ranking[2], which is edited by Carol Saunders and synthesizes a number of other rankings. In our literature search, we included both the eight journals in the Senior Scholar's Basket of Journals and the 30 top-ranked journals in the MIS Journal Ranking. Because of their well-known high quality, we considered all remaining journals contained in the AIS eLibrary[3] (e.g., *Scandinavian Journal of Information Systems*), too. In the MIS journal ranking, we represent the various *IEEE Transactions* with the collection category "IEEE Transactions various" (IEEETrans). We also list some transactions such as the *IEEE Transactions on Computers* (IEEETC), however, separately. In the following analyses, we avoid counting papers twice by considering only the collection category IEEETrans comprising all *IEEE Transactions* (including IEEETC etc.).

Webster and Watson (2002) also suggest examining conference proceedings with a high reputation for quality, which is all the more important when it comes to analyzing a relatively young field of research such as OSN. Conferences provide valuable contributions in the exchange of new ideas and support the development of new research agendas (Levy & Ellis, 2006; Probst et al., 2013). As a consequence, we included the major international IS conferences in our literature search, too. More precisely, we considered the proceedings of the AIS Conferences[4] (International Conference on Information Systems and Americas Conference on Information Systems) as well as the proceedings of the AIS Affiliated Conferences[5] (e.g., European Conference on Information Systems and Pacific Asia Conference on Information Systems). Table 1 overviews the selected sources for our literature search[6]. This structured journal and conference selection allows for a transparent, replicable, and broad overview of IS research on OSN including major outlets of the IS community and insightful quantitative analyses with respect to the number of publications and their development over time.

Table 1: Selected Journals and Conferences	
Journals	*ACMTDS, ACMTrans, ACS, AI, AIMag, AMJ, BISE, CACM, CAIS, DSI, DSS, EJIS, HBR, I&M, IEEESw, IEEETC, IEEETrans, IEEETSE, IEEETSMC, IJEC, ISF, ISJ, ISR, JAIS, JComp, JCSS, JIT, JITTA, JMIS, JMS, JSIS, MISQ, MS, OS, PAJAIS, RELCASI, SJIS, SMR, THCI*
Conferences	AMCIS, CONF-IRM, ECIS, ICIS, ICMB, MCIS, PACIS, WHICEB

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[1] http://start.aisnet.org/?SeniorScholarBasket
[2] http://start.aisnet.org/?JournalRankings
[3] http://aisel.aisnet.org/journals/
[4] http://aisel.aisnet.org/conferences/
[5] http://aisel.aisnet.org/affiliated/
[6] The appendix overviews the journals' and conferences' full names.

Search Strategy and Results

OSN's development into a global phenomenon started about ten years ago in 2003 (Heidemann et al., 2012), and the first scientific publication explicitly dedicated to OSN dates to the same year (Richter et al., 2011). For that reason, we considered a time frame from 2003 to 2013 for our literature search. To identify relevant publications in the sources selected above (see Table 1), we conducted a keyword search using databases such as AISeL and EBSCOhost. In the literature, several terms are used synonymously for what we call an OSN. Therefore, we applied the phrases "online social network", "social network service", "social network site", and "social networking" to search the sources' titles, abstracts, and keywords (where available). Table 2 overviews our search strategy.

Table 2: Overview of the Search Strategy	
Time period	2003–2013
Search terms	"Online social network", "social network service", "social network site", "social networking"
Search fields	Title, abstract, keywords

Our literature search resulted in 673 papers. To determine all relevant papers, we manually analyzed each paper's title, abstract, and keywords to determine its relevance to our research questions. We excluded all papers that did not match our research focus. In this context, we considered only papers either dealing with OSN as defined above or with OSN in general, without any further definition, as relevant. As a consequence, we excluded all papers focusing, for example, solely on offline social networks. At least two researchers independently analyzed each paper. We measured the reliability of agreement between the researchers with Krippendorff's alpha (Krippendorff, 2004) which is a well-suited measure of reliability in content analysis (cf. Hayes & Krippendorff, 2007). Our Krippendorff's alpha was 0.915, which reflects a high reliability of agreement among the team of researchers. Indeed, Krippendorff (2004) suggests that this value should be 0.800 or higher, with tentative conclusions being acceptable for values between 0.800 and 0.667. In case of disagreement between the researchers, we decided based on a team discussion and team consensus. This procedure led to a final set of 510 papers that served as the basis for our subsequent analyses.

IV. FINDINGS

RQ1: How did the academic discussion on OSN develop in the IS literature over time?

To gain insights into how the academic discussion on OSN has developed in the IS literature over time, we first analyzed the number of papers published on OSN in the selected IS journals and conferences from 2003 onwards (see Figure 1). Our results indicate that the level of publication activity has risen continuously since 2003. From 2003 to 2007, only eight papers on OSN were published. Afterwards, the number of papers published rose from 29 in 2008 to 128 in 2013. This corresponds to an average annual increase of 35 percent between 2008 and 2013. The rapidly growing number of publications indicates that the research field has become more mature in recent years. Due to the ever increasing number of papers, a drop in publication activity does not seem to be imminent. Rather, we can assume that OSN research will continue to gain in importance in the future.

As it is typical for relatively young research fields, the first papers on OSN were mainly found in conference proceedings. By 2008, when the rapid growth in OSN publication activity began, 79 percent of all papers were conference papers. In the same year, the International Conference on Information Systems (ICIS) hosted a session on OSN as part of its "social aspects of IS" track. In addition, the mini-tracks "social network analysis in IS research" and "social aspects of social networking" were initiated at the Americas Conference on Information Systems (AMCIS). Since then, tracks and mini-tracks have been covering OSN topics as inherent parts of IS conferences. In recent years, research on OSN has become firmly established in IS research. As a consequence, OSN topics are also regularly addressed in major IS journals. The increase from six journal publications in 2008 to 14 in 2009 can partly be attributed to *Decision Support Systems*' special issue on "online communities and social network". Further special issues such as "mining social media" in the *International Journal of Electronic Commerce* in 2011 and "social media and business transformation" in *Information Systems Research* in 2013 illustrate that OSN-related research is nowadays also published in highly renowned journals. In light of this development, we observe a steady increase in the proportion of journal papers compared to the overall number of publications on OSN from 18 percent in 2008 to 49 percent in 2013.
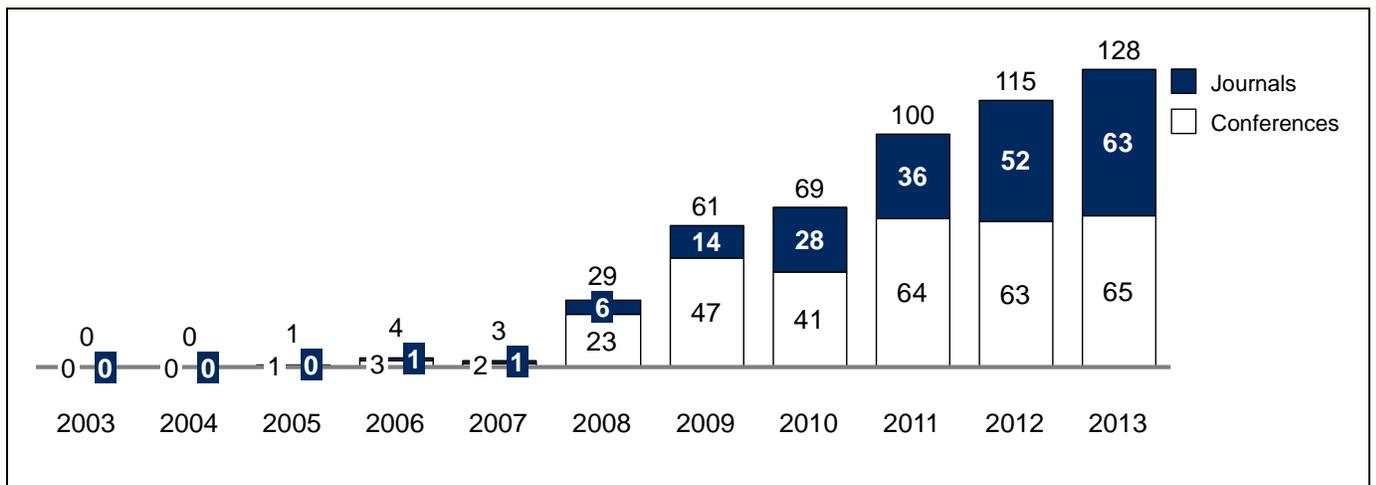
Figure 1. Number of Papers on OSN in Journals and Conferences per Year

RQ2: Which IS publication outlets are most receptive to research on OSN?

Today, the number of IS journals and conferences publishing OSN research is considerable. However, because outlets for IS research vary notably regarding the preferred research topics (Poeppelbuss et al., 2011), they may also vary in their receptiveness to OSN research. To provide guidance to researchers where to submit their work, we analyzed the potential outlets (see Tables 3 and 4 in Appendix A) and found where and to what extent OSN research was published.

Overall, 201 out of 510 papers (39%) were published in journals and 22 out of the 39 journals we considered (56%) contained at least one paper on OSN. This result shows that OSN research is not yet well-established in all IS journals. However, because the number of journal papers on OSN has been increasing considerably over the last several years (see Figure 1), we may also assume that more journals will publish OSN research in the future.

Of the papers published in journals, 81 out of the total 201 journal papers (40 percent) were published in the *IEEE Transactions* or the *ACM Transactions*. However, it might be misleading to say that these were the most receptive outlets for OSN research. Both collections contain a large number of different journals (e.g., *IEEE Transactions on Computers*, *IEEE Transactions on Software Engineering,* etc.), and therefore comprise a sizable overall number of papers. In the *IEEE Transactions,* for example, 203,689 papers were published from 2003 to 2013, with only 0.03 percent dealing with OSN. To account for this aspect in our analysis, we also included the share of OSN papers with respect to the overall number of papers published in the respective outlet between 2003 to 2013 (see Figure 2). Following the *IEEE Transactions* and the *ACM Transactions*, the three journals with the highest number of papers on OSN were *Decision Support Systems* (20 papers), *Communications of the AIS* (13 papers), and the *Harvard Business Review* (12 papers). In relative terms (each outlet's share of OSN papers against its total number of papers), the *International Journal of Electronic Commerce* (3.2 percent) published the most papers on OSN, followed by *Decision Support Systems* (2.4 percent) and *Information Systems Frontiers* (1.7 percent) (see Figure 2).
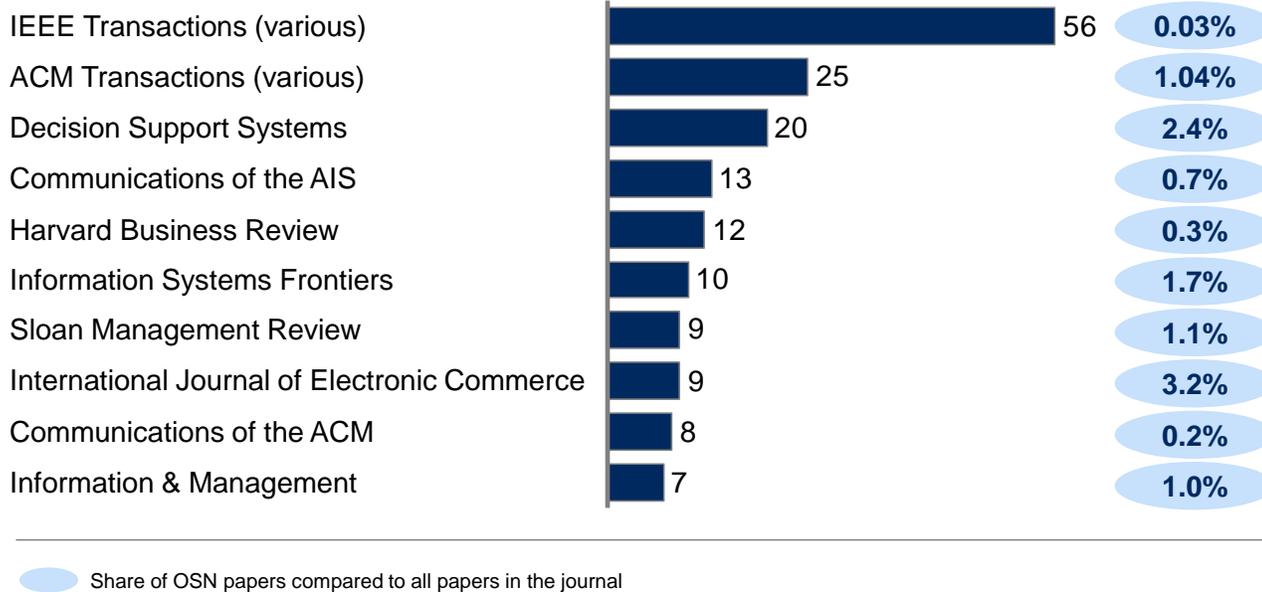
IEEE Transactions (various)	56	**0.03%**
ACM Transactions (various)	25	**1.04%**
Decision Support Systems	20	**2.4%**
Communications of the AIS	13	**0.7%**
Harvard Business Review	12	**0.3%**
Information Systems Frontiers	10	**1.7%**
Sloan Management Review	9	**1.1%**
International Journal of Electronic Commerce	9	**3.2%**
Communications of the ACM	8	**0.2%**
Information & Management	7	**1.0%**

Share of OSN papers compared to all papers in the journal

Figure 2. Most Receptive Journals to OSN Research

Three-hundred and nine out of the total 510 analyzed papers (61%) were conference papers. Most of the conference papers (about 43 percent) were published in the proceedings of the *Americas Conference on Information Systems,* which is thus the outlet that contained the highest overall number of papers on OSN (132 papers) in our analysis. The conference with the second highest number of papers on OSN was the International Conference on Information Systems (63 papers), followed by the Pacific Asia Conference on Information Systems (54 papers) and the European Conference on Information Systems (42 papers). In relative terms (each outlet's share of OSN papers against its total number of papers), the Americas Conference on Information Systems (2.2 percent) lagged behind the International Conference on Information Systems (2.9 percent) and even the Pacific Asia Conference on Information Systems (3.1 percent) (see Figure 3).
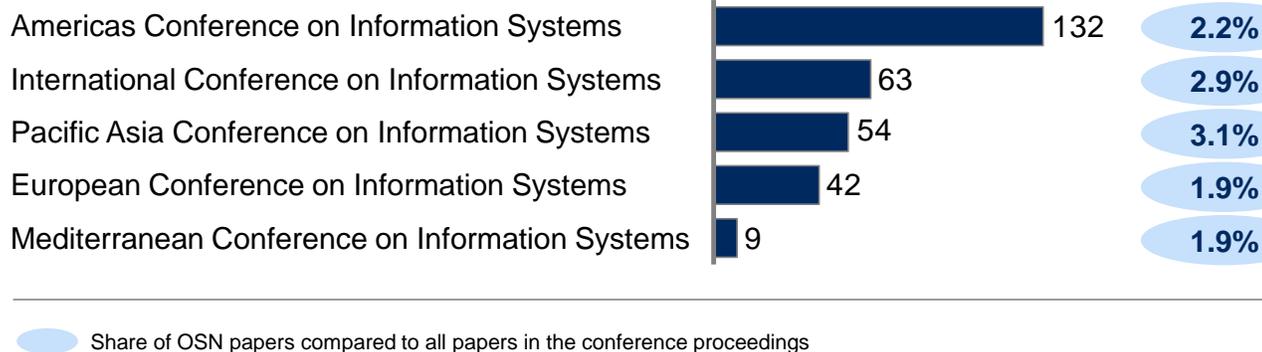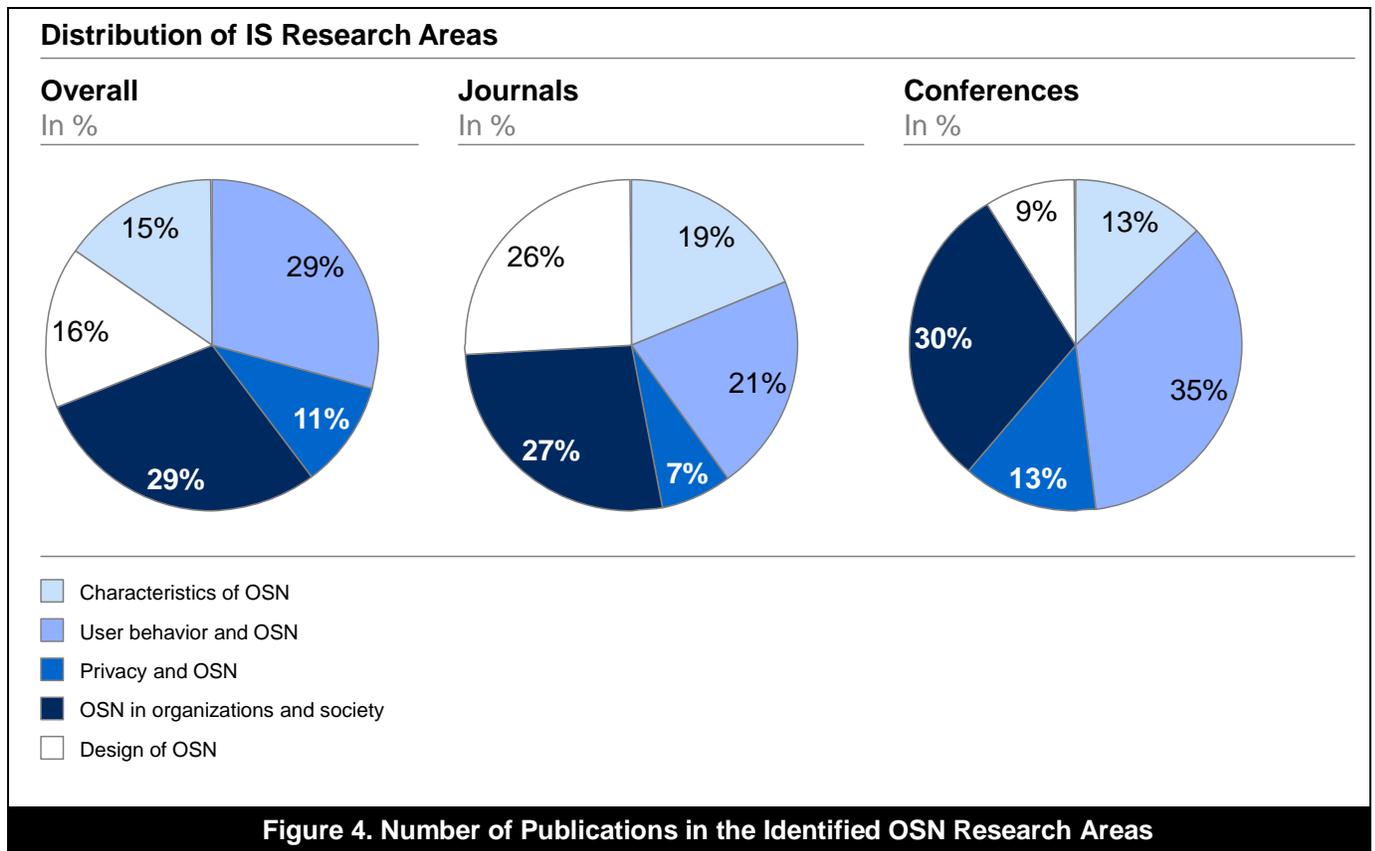
Americas Conference on Information Systems	132	**2.2%**
International Conference on Information Systems	63	**2.9%**
Pacific Asia Conference on Information Systems	54	**3.1%**
European Conference on Information Systems	42	**1.9%**
Mediterranean Conference on Information Systems	9	**1.9%**

Share of OSN papers compared to all papers in the conference proceedings

Figure 3. Most Receptive Conferences to OSN Research

RQ3: Which research areas have already been covered by IS research on OSN?

IS research on OSN covers various areas ranging from users' motivation for engaging in OSN to social influence in OSN and OSN's impact on organizations. To obtain an overview of the research areas that have already been covered, we screened all 510 papers in detail and clustered them with respect to their subject. In this way, we were able to identify five main research areas that deal with the thematic and methodical diversity of the existing research contributions on OSN: characteristics of OSN, user behavior and OSN, privacy and OSN, OSN in organizations and society, and design of OSN. The first research area (characteristics of OSN) contains papers dealing with OSN's elementary characteristics and structure, which can be represented by sets of nodes (users) and edges (links between pairs of users; also referred to as ties). The second research area (user behavior and OSN) focuses on

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OSN users and their behavior. Papers included in this research area include those trying to answer the question why people engage in OSN and those investigating the influence of several determinants (e.g., user characteristics) on OSN use. The third research area (privacy and OSN) contains papers that deal with privacy concerns and the protection of privacy in OSN. Beyond the focus on individuals, the fourth research area (OSN in organizations and society) refers to OSN's impact and business value on organizations including internal (e.g., collaboration) and external (e.g., advertising) usage potentials and the role of OSN for society (e.g., politics and education). Finally, the fifth research area (design of OSN) deals, for example, with designing OSN features that arise from user requirements. Obviously, the subjects of a small number of papers can be attributed to more than one research area. Here, we chose the best-fitting research area (cf. Poeppelbuss et al., 2011). Again, as with our original search for papers, at least two independent researchers classified the relevant papers into the five groups above, with a Krippendorff's alpha of 0.896, which again reflects a high reliability of agreement among the team of researchers (see Krippendorff, 2004). We resolved disagreement through discussion.

Based on the number of the papers we analyzed, the research areas OSN in organizations and society (29 percent) and user behavior and OSN (29 percent) dominate past OSN research. The other three research areas design of OSN (16 percent), characteristics of OSN (15 percent), and privacy and OSN (11 percent) account for about 40 percent of all analyzed papers. Moreover, we observed considerable differences between journal and conference papers. For instance, contributions in the research area design of OSN add up to 26 percent of the journal papers, but only to 9 percent of the conference papers. In contrast, research on user behavior and OSN appears in only 21 percent of the journal papers, but in 35 percent of the conference papers (see Figure 4). In addition, we also analyzed how the different research areas developed over time. In this context, we found that, with respect to the number of publications and compared with the other research areas, OSN in organizations and society gained in importance over time. While 21 percent of the papers dealt with this research field in 2008, this proportion increased to 35 percent in 2013. The proportions of the other research areas, however, barely changed between 2008 and 2013.

Distribution of IS Research Areas

Overall
In %

Journals
In %

Conferences
In %

Characteristics of OSN

User behavior and OSN

Privacy and OSN

OSN in organizations and society

Design of OSN

Figure 4. Number of Publications in the Identified OSN Research Areas

Research area 1: Characteristics of OSN

Because OSN are a rather new phenomenon, a number of papers exist that describe and describe their elementary characteristics (e.g., Kim, Yue, Hall, & Gates, 2009; Medaglia, Rose, Nyvang, & Sæbø, 2009; Quinio, & Marciniak, 2013; Richter, Riemer, vom Brocke, & Große Böckmann, 2009; Sutter, 2009; Wigand, Wood, & Mande, 2010; Wilson, Lin, Longstreet, & Sarker, 2011). Further contributions assigned to this research area deal with OSNs' emergence (e.g., Heidemann et al., 2012; Sutter, 2009; Wigand et al., 2010; Wilson et al., 2011) or identify different

types or classes of OSN in order to differentiate and understand them from their manifestations (e.g., Medaglia et al., 2009; Quinio & Marciniak, 2013; Richter et al., 2009). Richter et al. (2009), for example, analyze the marketplace and identify seven different classes of OSN.

The existing body of knowledge includes also several contributions on OSNs' structural characteristics. OSN can be represented by social graphs or activity graphs with sets of nodes (users) and edges (ties) linking pairs of users representing either friendship relationships (social graph) or different activities (activity graph), such as the exchange of messages (e.g., Adamic & Adar, 2003; Bampo, Ewing, Mather, Stewart, & Wallace, 2008; Heidemann, Klier, & Probst, 2010). A major part of contributions in this field is based on social network theory (e.g., "small world phenomenon" (Milgram, 1967) and "strength of weak ties" (Granovetter, 1973)) and applies methods of social network analysis (see, for example, Wasserman & Faust, 2009). Most of the papers on the structural characteristics are based on the social graphs of OSN and investigate, for instance, how users create new relationships and construct their personal networks (e.g., Krasnova et al., 2010b; Schaefer, 2008). The results provide insights into the motives for creating connections to other users (e.g., Schaefer, 2008) and users' reactions to friendship requests in OSN (e.g., Krasnova et al., 2010b). Moreover, some papers analyze whether personal networks in OSN can be increasingly extended (e.g., with respect to the number of friends a user can actually know and the intensity of the relationships) or how OSN can change people's social capacity (Adams, 2011). An average U.S. Facebook user has about 350 so-called "friends" (Statista, 2014). For 18- to 24-year-old users, this number reaches 649 (Statista, 2014). Such high numbers of social relationships observed in OSN are not in line with the results of prior studies regarding offline social networks. Here, the concept of Dunbar's number refers to a cognitive limit to the number of people with whom one can maintain stable social relationships (i.e., to knowing each individual and how they relate to everyone else) (Dunbar, 1992). In this context, literature proposes Dunbar's number values of between 100 and 250, although it most commonly limits the number to 150 (Hernando, Villuendas, Vesperinas, Abad, & Plastino, 2010). Some studies state that the concept of Dunbar's number also applies to OSN (e.g., Gonçalves, Perra, & Vespignani, 2011). Other authors have found that technology can extend this number of social relationships due to the large number of users and ease with which one can keep in touch with people (Adams, 2011). Many papers on OSNs' structural characteristics build on Granovetter's (1973) fundamental work and investigate the strength of ties in OSN to evaluate the relationships between users (e.g., Chen, Chiu, Joung, & Chen, 2011). Koroleva and Štimac (2012), for example, found that tie strength affected the value of information a user derived from an OSN. Furthermore, there is an increasing body of research that investigates the edges (ties) resulting from interaction and communication activity of users in OSN (e.g., Feng, Wang, & Zhang, 2013; Probst, 2011; Schöndienst & Dang-Xuan, 2011, 2012; Shriver, Nair, & Hofstetter, 2013; Wilson, Sala, Puttaswamy, & Zhao, 2012; Xu, Zhang, Xue, & Yeo, 2008). Measurements of user interactions, for instance, can also be used to assess the strength of ties between users (e.g., Wilson et al., 2012) or to examine a user's influence on other users (e.g., Xu et al., 2008). Further research in this field refers to the correlation of connectivity and communication frequency (e.g., Schöndienst & Dang-Xuan, 2011), the prediction of users' future communication behavior (e.g., Probst, 2011), and the codetermination of users' social ties on their creation of content in OSN (e.g., Shriver et al., 2013).

Based on OSN's structural characteristics mentioned above, multiple papers in this research area deal with identifying so-called key users or influential users in OSN (for an overview, see Probst et al. (2013)). Key users or influential users are, among other things, particularly well connected; that is, they have many direct and/or indirect edges (ties) to other users and can therefore be highly important for promoting brands or products and for viral marketing campaigns (de Valck, van Bruggen, & Wierenga, 2009; Kiss & Bichler, 2008; Landherr, Friedl, & Heidemann, 2010; Staab et al., 2005). Besides papers drawing on diffusion models (see Probst et al. (2013) for an overview), papers have applied well-established measures from social network analysis (e.g., degree centrality, closeness centrality, or betweenness centrality) (Wasserman & Faust, 2009) to identify key or influential users in OSN (see, for example, Landherr et al., 2010). Moreover, numerous papers deal with the further development of well-established measures to identify key or influential users in OSN (see, for example, Heidemann et al.'s (2010) PageRank based approach or Lu, Li and Liao's (2012) graph-based action network framework). Finally, some papers in this research area apply social capital theory and its core idea that social networks have an inherent value for individuals and groups. Topics of research in the field of OSN include, for example, the general relevance of social capital in virtual worlds (e.g., Peng, 2009) or the formation (e.g., Wu, Wang, Su, & Yeh, 2013) and measurement of social capital benefits (e.g., Koroleva, Krasnova, Veltri, & Günther, 2011a).

Research area 2: User behavior and OSN

Much of the OSN research is concerned with users and how they behave (see Figure 4). Several such contributions focus on user participation in OSN (e.g., Hu & Kettinger, 2008; Lankton, McKnight, & Thatcher, 2012; Qin, Kim, Tan, & Hsu, 2009; Xu, Ryan, Magro, & Wen, 2012a; Xu, Ryan, Prybutok, & Wen, 2012b; Yin, Cheng, & Zhu, 2011) and analyze users' motives for joining OSN (e.g., Hu, Poston, & Kettinger, 2011; Krasnova, Hildebrand, Günther, Kovrigin, & Nowobilska, 2008; Maier, Laumer, & Eckhardt, 2011). Drawing on the theories of needs, planned behavior, and diffusion theory, Krasnova et al. (2008), for example, found that the need for belongingness and

esteem through self-presentation and peer pressure were major motives to use OSN. Further research analyzes users' continued usage intention (e.g., Hu & Kettinger, 2008; Mlaiki, Walsh, & Kalika, 2013; Wang, Xu, & Chan, 2008; Yin et al., 2011). Based on the expectation-confirmation model, Yin et al. (2011), for instance, show that perceived usefulness and perceived enjoyment are major factors of influence in this context. Mlaiki et al. (2013) use the concept of computer-mediated social ties to explain usage continuance and argue that the number of a user's social ties in OSN influences an individual's usage continuance. Beyond personal and social reasons, some papers also investigate the influence of features and network characteristics on user participation (e.g., Polinar & Lee, 2011; Qin et al., 2009; Xu et al., 2012a; Xu et al., 2012b; Zhang, Wang, & Tam, 2010). For instance, several papers analyze the usage of functionalities and features as core elements of OSN (see, for example, Kalb, Pirkkalainen, Pawlowski, & Schoop, 2012; Kim et al., 2009; Kim, Chan, & Kankanhalli, 2012; Lu & Hsiao, 2010; Oestreicher-Singer & Zalmanson, 2009). In so doing, they investigate the use of certain features (see, for example, Kalb et al., 2012) and analyze under which conditions users are willing to pay for special features and premium services (see, for example, Kim et al., 2012; Oestreicher-Singer & Zalmanson, 2009). Oestreicher-Singer and Zalmanson (2009), for instance, show that the willingness to pay for premium services is significantly affected by a user's social and community activity.

Aside from research on users' motivation for using OSN, some publications analyze the influence of personal characteristics (e.g., age and gender) and cultural aspects (e.g., region) on users' usage of OSN. Here, it was shown that gender and age have a significant influence on usage behavior (e.g., Brooks & Anene, 2012; Chai, Das, & Rao, 2011; Chakraborty, Vishik, & Rao, 2013; Kefi, Mlaiki, & Kalika, 2010; Koroleva, Brecht, Göbel, & Malinova, 2011b; Venkatsubramanyan & Hill, 2009). Koroleva et al. (2011b), for example, studied teenage user behavior by applying grounded theory and found that even teenagers weighed benefits and gained enjoyment against costs, such as waste of time. Research in this area also suggests that users' cultural background plays a decisive role in how often users use OSN (Guo, Shim, Luo, & Gurung, 2011; Guo & Yu, 2009). Guo and Yu (2009), for instance, illustrate that there are differences in the development and usage of OSN in the US, China, and South Korea. Further studies examine negative effects caused by using OSN, including, for example, stress and social overload (e.g., Maier, Laumer, Eckhardt, & Weitzel, 2012a, 2012b), depression contagion (e.g., Xu, Phan, & Tan, 2013b), envy of other users (e.g., Krasnova, Wenninger, Widjaja, & Buxmann, 2013), or antisocial behavior in OSN such as racist and homophobic attacks and cyberbullying (e.g., Dinakar, Jones, Havasi, Lieberman, & Picard, 2012; Griffiths, Light, & McGarrie, 2008).

Another important line of research in this area is dedicated to users' information disclosure. Personal profiles in OSN allow users to present themselves in many different ways. Users can decide how they want to be represented and how much personal information they want to disclose (see, for example, Maghrabi, Oakley and Nemati, 2011; Rhee, Sanders and Simpson, 2010). A couple of papers deal with motivations for information disclosure in OSN (see, for example, Chen, 2012; Krasnova, Spiekermann, Koroleva and Hildebrand, 2010c; Lo, 2010; Loiacono, Carey, Misch, Spencer and Speranza, 2012; Pike, Bateman and Butler, 2009; Xu, Visinescu and Kim, 2013a). In this context, the effects of relationship development, social validation, OSN user commitment, trust, use gratification, platform enjoyment, and self-expression (Krasnova et al., 2010c; Yang and Tan, 2012; Xu et al., 2013a) were examined just like the impact of users' personal characteristics like age (see, for example, de Souza and Dick, 2008), cultural background (see, for example, Krasnova, Veltri and Günther, 2012; Tow, Dell and Venable, 2010), and privacy concerns (see, for example, Lo, 2010).

Research area 3: Privacy and OSN

This research area covers contributions on data privacy issues in OSN and their impact on individuals and organizations (e.g., Borena, Belanger, & Ejigu, 2013; Bulgurcu, Cavusoglu, & Benbasat, 2010; Chen, Ping, Xu, & Tan, 2009; Dwyer et al., 2007; Harden, Al Beayeyz, & Visinescu, 2012; Jung, McKnight, Jung, & Lankton, 2011; Krasnova, Kolesnikova, & Günther, 2010a; Lo & Riemenschneider, 2010; Rizk, Gürses, & Günther, 2010; Xu, Dinev, Smith, & Hart, 2008). The semi-public user profiles in OSN containing personal information such as a user's name, age, and contact data serve as a common starting point for research in this area. Indeed, data provided in user profiles may—in the right hands—foster networking and communication in and beyond OSN. Aside from these benefits, however, providing personal data entails a serious risk of data abuse, and users are generally deeply concerned about the security of their data (Dwyer et al., 2007; Lo & Riemenschneider, 2010). Research in this area shows that users perceive not only OSN operators such as Facebook as threats to their privacy (e.g., Dwyer et al., 2007; Krasnova, Hildebrand, & Günther, 2009), but also other users who have access to their data (e.g., Krasnova et al., 2010a). Moreover, because personal information is a valuable source for commercial purposes such as advertising and for third party providers, research in this area suggests that users suspect the misuse of their data for many reasons (Bulgurcu et al., 2010; Rizk et al., 2010).

OSN users' and society in general's increasing concerns about data privacy bring forth research dealing with the improvement of data protection in OSN (e.g., Chen & Mitchell, 2011; Collins, Dwyer, Hiltz, & Shrivastav, 2012;

Dhillon & Chowdhuri, 2013; Gürses, Rizk, & Günther, 2008; Wu, Ryan, & Windsor, 2009; Xu, Wang, & Grossklags, 2012c; Zhang, Wang, & Xu, 2011). In this context, factors and motives that influence the behavior of users regarding the protection of their privacy have been investigated (e.g., Chen & Mitchell, 2011; Collins et al., 2012; Deuker, Rosenkranz, & Albers, 2012; Lankton & Tripp, 2013; Marett, McNab, & Harris, 2011; Wu et al., 2009). Deuker et al. (2012), for instance, analyze motives that drive Facebook users to set individual privacy settings, while Lankton and Tripp (2013) investigate how factors such as privacy concerns or trust influence user behavior (e.g., causing users to change their privacy settings or limit their number of friends). Other authors suggest that users have to weigh the effort to protect their privacy and related risks and the benefits of participating in OSN (Hu & Ma, 2010). Krasnova et al. (2009), for instance, examine how users value the protection of their private data. By means of a conjoint analysis, they found that a user of an OSN would be willing to pay on average between € 14.14 and € 17.24 a year to ensure that their data was not used for advertising purposes. Furthermore, research in this field provides first concrete and innovative measures and procedures that help users to protect their privacy in OSN (e.g., Gürses et al., 2008; Kshetri, 2011; Xu, Dinev, Smith, & Hart, 2011; Xu et al., 2012c). Xu et al. (2012c), for instance, propose a novel approach for privacy authorization dialogues, which addresses privacy concerns towards third party applications.

Research area 4: OSN in organizations and society

This research area relates to the application of OSN in organizations. Companies can leverage OSN along the whole value chain (Heidemann et al., 2012); for instance, for developing new products and generating new ideas using the crowd (Jain, 2010). Furthermore, they can leverage OSN as a new channel for customer services (Storni & Griffin, 2009) or even in human resources management. For instance, initial research underlines the potential of using OSN to recruit business professionals (e.g., Garg & Telang, 2012; Pike, Bateman, & Butler, 2012; Plummer, 2009) or for employer branding (e.g., Brecht, & Eckhardt, 2012).

However, the majority of papers examine how companies can use OSN for marketing and brand-building purposes (e.g., Cao, Knotts, Xu, & Chau, 2009; Chang, Chen, & Tan, 2012; Chen, Papazafeiropoulou, Duan, & Chen, 2013; Dholakia & Durham, 2010; Eisingerich, Bhardwaj, & Miyamoto, 2010; Kumar & Mirchandani, 2012; Larosiliere & Leidner, 2012; Wen et al., 2009; Xu, Lu, Goh, Jiang, & Zhu, 2009). In this context, a considerable number of papers deal with word of mouth and the viral distribution of advertising messages via OSN (e.g., Cao et al., 2009; Chang et al., 2012; Kumar & Mirchandani, 2012; Li, Zhao, & Lui, 2012). Based on findings from research area 1, it is for instance analyzed how to use influential users to spread advertising messages in the most effective way to foster positive word of mouth (e.g., Eisingerich et al., 2010; Wen et al., 2009). Further studies show how companies can use OSN to strengthen their customer relationships and increase customer loyalty (e.g., Dholakia & Durham, 2010; Larosiliere & Leidner, 2012; Xu et al., 2009). Research in the area of communicating with (potential) costumers (e.g., Espinoza-Reyes, Huiman-Diaz, Melendez-Cuadros, Suazo-Veliz, & Robles-Flores, 2012) also highlights how using monitoring tools helps companies to determine where and in which way people talk about them in OSN and allows decision makers to quickly react (Durval & Ornellas, 2012). By posting new content and replying to customer messages, companies may also actively encourage their customers to interact with them (Huber, Landherr, Probst, & Reisser, 2012). Moreover, research pays considerable attention to OSN's role in the sales context (Liang, Ho, Li and Turban, 2011; Shen & Eder, 2009). For example, social shopping sites enable users to post product recommendations, create wish lists, post photos, make purchases, and form social shopping communities (Shen, 2008). Research in this field, taking into account an interactive functional, a consumer behavior, and a business strategy perspective, deals with the successful use of social commerce (e.g., Liu & Sutanto, 2011; Wang, 2009). Analyses of the influence of different factors (e.g., recommendations and product ratings) on consumers' purchasing behavior (e.g., Huang, Boh, & Goh, 2011; Li & Lee, 2012; Olbrich & Holsing, 2011) and studies investigating the intention of users to participate in social commerce (e.g., Liang et al., 2011; Ng, 2013) complement this line of research.

Further to the external use of OSN, companies also engage in setting up OSN for internal purposes (Heidemann et al., 2012). Such enterprise social networks (ESN) can be used to foster collaboration, communication, and knowledge-sharing among employees (Aral, Dellarocas, & Godes, 2013; von Krogh, 2012). As knowledge workers in organizations collaborate increasingly as virtual teams in distributed setups, internal OSN provide new means to create social structures and support information transfer between individuals. In this context, users who communicate their professional knowledge help other users to do their daily work more effectively. The literature, for example, has found that such value-adding users tend to be particularly well-connected in ESN (Berger, Klier, Klier, & Richter, 2014). Research on the internal use of OSN focuses on, among other things, the use of OSN for knowledge management (e.g., Koch, Richter, & Schlosser, 2007; Richter & Koch, 2009) and challenges when introducing OSN in enterprises (e.g., Figueroa & Cranefield, 2012; Koch, Gonzalez, & Leidner, 2011; Richter, & Riemer, 2013; Vaezi, 2011). Vaezi (2011), for example, emphasizes the importance of management support for the successfully implementing OSN for internal applications. Further studies in this field of research show that

companies can benefit from internal OSN with an improved morale and a stronger commitment of their employees (e.g., Koch, Gonzalez, & Leidner, 2012).

Further research in this field focuses on how the above mentioned possibilities to use OSN in a business context actually generate value (e.g., Kettles & Smith David, 2008; Nath, Singh, & Iyer, 2009). Nath et al. (2009), for instance, state that OSNs' business value is composed of its various potential applications such as advertising or recruiting. Prior research has also shown that the successful application of OSN in companies depends on specific success factors, which range from effectively managing the community to the quality and the usefulness of the information provided (e.g., Kane, Fichman, Gallaugher, & Glaser, 2009; Seol, Lee, Yu, & Zo, 2012). Because there is a plethora of OSN that have failed (e.g., Friendster), not all studies regarding success factors focus only on a corporate perspective. Rather, several papers also examine success factors for OSN providers. In this context, Ou, Davison and Cheng (2009), for example, argue that the system quality plays an important role in satisfying users' needs and therefore an OSN's success. Further studies in this field investigate the potential profit opportunities of OSN (e.g., Han & Windsor, 2012) or assess the firm value of OSN (e.g., Gneiser, Heidemann, Klier, & Weiß, 2009).

Beyond the application of OSN in a business context, research has also explored the use of OSN in society. Various papers investigate, for example, the application of OSN in the field of higher education. In this context, OSN can support communication and collaboration among students and among faculty and students (e.g., Hamid, Waycott, Kurnia, & Chang, 2010; Magro, Ryan, Ryan, & Sharp, 2012; Shim, Dekleva, Guo, & Mittleman, 2011; Thongmak, 2011). Hamid et al. (2010), for instance, show how different OSN features for sharing work and ideas can be specifically used in teaching cases. Further research focuses on OSN in politics (e.g., Maghrabi & Salam, 2013; Misiolek & Wozencroft, 2010; Stieglitz, Brockmann , & Dang-Xuan, 2012). In this context, studies have analyzed OSNs' role in forming the political movement seen during the 2011 Egyptian Revolution (Maghrabi & Salam, 2013) and OSNs' role in political communication (e.g., Misiolek & Wozencroft, 2010; Stieglitz et al., 2012). Stieglitz et al. (2012), for instance, analyzed the presence of members of the German political parties in OSN and surveyed the members of the parliament regarding their engagement with OSN.

Research area 5: Design of OSN

Contributions in this research area deal with the design of OSN (e.g., Finger & Maciel, 2012; Iriberri & Leroy, 2009; Messinger et al., 2009). In this context, research especially focuses on identifying users' OSN design requirements. Many studies also focus on OSN design for special purposes such as emergency management (Babu & Singh, 2013; Chou et al., 2011; Plotnick, White, & Plummer, 2009; Zagaar & Paul, 2012). Zagaar and Paul (2012), for example, examine the knowledge sharing behavior of cancer survivors to identify success factors for an online health community, while Babu and Singh (2013) conducted an explorative field study to investigate OSN design improvements for blind persons. Also, technical aspects such as storage and scaling of large amounts of network data (e.g., Pujol et al., 2012) or bandwidth issues (e.g., Pope & Shim, 2010) have been investigated. Since OSN features are a critical success factor (e.g., Jung & Lee, 2011) and add value to them (Rabbath, Sandhaus, & Boll, 2011), numerous papers deal particularly with these factors (e.g., Albert & Salam, 2012; Demetz, Heinrich, & Klier, 2011; Koroleva & Bolufé Röhler, 2012; Shrivastav, Collins, Hiltz, & Dwyer, 2012; Tan, Nguyen, Tha, & Yu, 2009; Wu, Wang, & Chang, 2011; Xia, Huang, Duan, & Whinston, 2009). In this context, papers analyze, for instance, the use of existing features such as Facebook's Publisher (e.g., Demetz et al., 2011; Ho, Liao, & Sun, 2012; Shrivastav et al., 2012; Wu et al., 2011) and their impact on an OSN's success (e.g., Jung & Lee, 2011). Jung and Lee (2011), for instance, argue that one reason for Facebook's sucess was Open API, which allows third parties to create their own APIs. Other research contributions deal with the design of new features (e.g., Albert & Salam, 2012; Dellarocas, 2010; Köbler, Goswami, Koene, Leimeister, & Krcmar, 2011; Koroleva & Bolufé Röhler, 2012; Rabbath et al., 2011; Tan et al., 2009). Rabbath et al. (2011), for instance, propose a new feature allowing an automated creation of printable photo books using photos uploaded in OSN.

RQ4: What are potential future research areas that have not been covered by IS research yet?

Research area 1: Characteristics of OSN

Online and offline social networks might not be the same

Many contributions on OSNs' structural characteristics are based on research on offline social networks (Probst et al., 2013). For instance, the fundamental contributions by Milgram (1967), Granovetter (1973), or Wasserman and Faust (2009) rely on the analysis and examination of offline social networks. To a certain extent, these and other authors have applied the knowledge and theories gained in an offline context to OSN without the necessary critical reflection, and thus have not considered that online and offline social networking might not be the same in several aspects (cf. Kane et al., 2014). Few contributions compare offline and online social networks or mention possible differences explicitly (see, for example, Brown, Broderick, & Lee, 2007; Howard, 2008). Howard (2008), for example,

states that the average path length between two users is shorter in OSN compared to offline social networks (see small world phenomenon (Milgram, 1967) and the concept of six degrees of separation). Hence, OSN research on structural aspects should be confronted with further research questions such as: are there differences in the structure of online and offline social networks? Are there differences in the interconnectedness of users online and offline; and, if so, what are these differences? Does online social networking impact a user's offline social network? We believe that further research is needed to enrich our understanding of OSNs' characteristics.

Patterns may help to investigate the structural characteristics of OSN

So far, scarce attention has been paid to identifying and explaining patterns in OSNs' structures (see, for example, the work by Sundararajan, Provost, Oestreicher-Singer, & Aral (2013) who have, however, a broader focus compared to OSN). Such patterns may be used to investigate the further growth of an OSN. Nevertheless, there is a lack of research on growth patterns that indicate how an OSN increases in size and develops over time. Patterns may also help to identify groups of users with certain characteristics or help to identify sub-networks in OSN. In an offline context, Marsden (1988) found that users in social networks tended to form stronger ties to other users with similar demographic characteristics. However, other user characteristics or structural aspects such as tie strength or the direction of edges may also be relevant. Further research is needed to gain deeper insights and to examine whether earlier findings from an offline context can be confirmed in the OSN context. Moreover, the question arises about how influential users can be detected in business practice. Although approaches to identify influential users in OSN do already exist, the research on the development of practical approaches still needs to overcome several hurdles (Probst et al., 2013).

Research area 2: User behavior and OSN
User behavior may differ in special interest networks

Existing research on users' motives for participating in OSN and their behavior almost exclusively focuses on large, general OSN, and especially on Facebook (see, for example, Koroleva et al., 2011b; Tow et al., 2010; Wang et al., 2008). However, there are hardly any contributions that focus on special interest networks (SIN), such as CarGurus.com or Lawyrs.net, which target special target groups. A generalization or direct transfer of knowledge gained in the context of large, general OSN to SIN may not be done without further reflection (Hargittai, 2007, p. 283). For instance, according to the theory of positive network effects, adopting a standard becomes the more economically worthwhile the more other users also choose this standard (Farell & Saloner, 1988; Katz & Shapiro, 1985). From this perspective, it would not be reasonable to use small SIN, but rather rational to use (sub-networks of) large general OSN, such as Facebook. In practice, however, SIN are able to successfully coexist (see, for example, Heidemann, Klier, Landherr, Probst, & Calmbach, 2011). Therefore, future research should especially focus on users' motives for participating in SIN and their usage behavior. For example: why do users join a SIN? How do users behave when using a SIN? Are there any differences in the behavior of SIN users compared to users of large, general OSN? Further research in such directions might help to explain the success of SIN and allow for the development of new successful SIN that are able to coexist with market leaders such as Facebook.

The use of OSN also induces negative effects

Noticeably, most research contributions mainly deal with the positive effects of using OSN. Negative effects of using OSN on users or organizations have mostly been ignored. However, first contributions show that OSN can be a trigger for stress or social overload (Maier et al., 2012a, 2012b), induce depressive symptoms (Xu et al., 2013b), and may make other users envious in other users (Krasnova et al., 2013). Of course, there is still a need for further research in this direction. For instance, Maier et al. (2012a) (2012b) and Krasnova et al. (2013) mainly refer to Facebook users. However, as in the case of SIN, there might be differences between individual OSN, for instance, depending on varying available features (e.g., newsfeeds) and their negative influence on users. The negative effects of using OSN may also depend on user characteristics or cultural backgrounds. From an organizational point of view, the handling of negative word of mouth in OSN (so-called "shitstorms") raises several questions (Kunz, Munzel, & Jahn, 2012). How likely is it that some issue will evolve into a shitstorm? Which factors influence the processes behind the creation of negative word of mouth? How should companies react on negative word of mouth? In order to better understand negative effects of OSN, future research should address these and other open issues.

Research area 3: Privacy and OSN
The role of privacy for users of OSN

Our analysis of the existing literature on OSN shows that many papers have dealt with privacy in OSN. While many of these papers address users' concerns and the protection of personal data, the value that users assign to the

protection of their data has been hardly studied at all (Krasnova et al., 2009). Even though OSN have been repeatedly subject to criticism due to data protection and privacy issues, they continue to enjoy rising popularity and increasing membership numbers. Existing studies explicitly show that, despite concerns about data protection, users do not want to quit the use of insecure services (see, for example, Nguyen & Hayes, 2010). Although there are some papers already dealing with the impact of privacy issues on user activities in OSN (see, for example, Hu & Ma, 2010), more research on the interplay of data protection and the perceived value of OSN usage is required.

The value of privacy

In addition, it is of interest how users of OSN value their privacy. Since participation in an OSN is mostly free, OSN providers have often depended on revenue derived from personalized advertising based on personal user data. As privacy concerns are increasing, further research on new business models for OSN providers is needed. Although Krasnova et al. (2009) have already dealt with the monetary value of privacy, many questions remain open: would users accept payment models based on the value of privacy? Are users willing to do without features of OSN that conflict with data protection? Would users agree to a partial use of their data if privacy had a price tag? More research in these directions might help to overcome the dilemma between the need to generate revenues and users' needs for privacy and data protection.

Research area 4: OSN in Organizations and Society

The actual value of the organizational use of OSN has not yet been studied in detail

Although many possible applications of OSN can be found in the IS literature, statements about the actual value of the organizational use of OSN have not yet been studied in detail. Further research should investigate how the value of a company's internal and external use of OSN can be measured and evaluated from an economic point of view. So far, existing work has mainly investigated the return on investment (ROI) of social media marketing (see, for example, Kumar & Mirchandani, 2012). Apart from that, OSN such as Facebook offer organizations the opportunity to collect various indicators for measuring success. However, these indicators often comprise solely the reach and activity of users, which seems to be insufficient for many applications, such as using OSN as a service channel or for crowdsourcing. Therefore, future research should especially focus on how to measure organizations' success in OSN and the related monetary value. How can the success of OSN activities be measured beyond reach? Which indicators allow for meaningful statements about the success of OSN activities? How can organizations valuate the ROI of their OSN activities? Further research regarding such questions could help companies to evaluate their OSN engagements in a value-based way instead of being driven by bandwagon behavior and gut feeling.

New potential applications of OSN implicate challenges for companies

Due to the growing success of OSN, the way how companies interact with customers has changed significantly. For example, in customer relationship management (CRM), a social CRM has additionally evolved over the last several years. By combining traditional CRM with social media, social CRM offers the opportunity to strengthen customer relationships, reduce costs, and develop new customer segments (Woodcock, Green and Starkey, 2011). Although initial research on social CRM can be found (see, for example, Alt & Reinhold, 2012), results have, thus far, rarely been published in leading IS journals and conference proceedings. Besides open questions regarding data protection, analyses based on data obtained from OSN are confronted with several validity issues (Alt & Reinhold, 2012). Even though first papers on specific data quality dimensions such as currency can be found (Probst & Görz, 2013), more research is needed to develop methods to measure data quality in OSN. Further problems can be induced by the structure of data from OSN such as user comments. Because this data is mostly semi- or unstructured, practical approaches are needed to structure such data and to measure its quality. Finally, OSN provide huge amounts of data, often referred to under the umbrella term of big data. Initial works have tried to use social business intelligence (social BI) methods to support various areas of a company such as sales or customer services (Bose, 2011). For a further discussion of research gaps in the field of social BI, see Dinter and Lorenz (2012).

Formal hierarchies may affect the use of internal OSN

Prior research emphasizes ESN's potential to foster collaboration and communication among employees (Aral et al., 2013; von Krogh, 2012). Beyond that, practice-orientated contributions argue that ESN can contribute to flatter organizational hierarchy in companies (McAfee, 2009). Hierarchy is as an essential and pervasive characteristic of organizations that heavily influences informal social relations and strongly limits the variety of potential network structures (Corominas-Murtra, Goñi, Solé, & Rodríguez-Caso, 2013; West, Barron, Dowsett, & Newton, 1999). Conversely, it is still largely unanswered whether and how formal organizational hierarchies influence communication and networking in OSN. Although initial studies on the role of hierarchies in ESN can be found (e.g.,

Stieglitz, Riemer, & Meske, 2014), further research is needed to obtain deeper insights. How is the formal organizational hierarchy reflected in the communication and networking behavior of users in internal OSN? How is user behavior in ESN affected by a user's hierarchical level in the organization? Do internal OSN contribute to flatter organizational hierarchy? More research in these directions might help us to understand the interplay of formal organizational hierarchies and users' behavior in internal OSN.

Research area 5: Design of OSN
The design of ESN may affect their success

ESNs' design and available features are important factors influencing how users use them, In general, the design of OSN based on users' motives to use them has already been intensively researched. However, an OSN's design needs to be tailored to the respective target group in order to address the specific users' needs. While some papers have already dealt with the design of OSN for specific purposes (e.g., emergency management) or groups of users (e.g., cancer survivors), research on the design of ESN can hardly be found. Although there are initial contributions that deal with user requirements or success factors of ESN (see, for example, Richter & Bullinger, 2010; Richter & Koch, 2009; Richter, Heidemann, Klier, & Behrendt, 2013), meaningful implications for the design of ESN are still missing. Therefore, further research should address questions such as: what is the structure of a successful ESN? Which requirements do users have regarding the features to be integrated in ESN? How does the design of an ESN affect its success? Further research in such directions might help to transfer OSNs' success to ESN.

VI CONCLUSION

Over the last decade, OSN have evolved into a global mainstream medium with increasing social and economic impact, and can be considered as one of the outstanding techno-social phenomena of the 21st century. This paper overviews IS research on OSN via a structured literature review. Based on our search resulting in 510 papers published in IS journals and conference proceedings, we carved out and assessed the knowledge and the research fields predominantly addressed by the IS community so far, and identified research gaps to be addressed in future research. In so doing, we analyzed how the academic discussion on OSN developed in the IS literature over time (RQ1), which IS publication outlets are most receptive to research on OSN (RQ2), which research areas have already been covered by IS research on OSN (RQ3), and what potential future research areas exist that have not been covered by IS research yet (RQ4). Regarding the first two research questions, we found that research on OSN is published across most major IS journals and conferences today. While the *International Journal of Electronic Commerce, Information Systems Frontier*s, and *Decision Support Systems* were the most receptive journals to research on OSN (measured by the share of OSN papers in the respective outlet), the highest shares of papers on OSN were published in the proceedings of the International Conference on Information Systems, the Pacific Asia Conference on Information Systems, and the Americas Conference on Information Systems. With respect to the third research question, we found that IS research has covered five dominant research areas on OSN: characteristics of OSN, user behavior and OSN, privacy and OSN, OSN in organizations and society, and design of OSN. Finally, we addressed our fourth research question by highlighting starting points for future work in each of these research areas. We hope that our results regarding these four research questions will stimulate and guide future research in the field.

Of course, our findings are also subject to limitations. First, although we conducted a broad and structured database search that covered the major outlets of the IS community, the number of sources selected for our literature search is indeed limited and there is a certain possibility that we did not identify all relevant articles. Even though we selected appropriate search terms derived from literature, additional search terms might have uncovered a few more relevant papers. However, this structured literature review allows for a transparent, systematic, replicable, and broad overview of IS research on OSN including major outlets of the IS community and insightful quantitative analyses with respect to the number of publications and their development over time. Second, by focusing on OSN, we excluded articles that analyze content-oriented sites such as Twitter or YouTube. Thus, our perspective is naturally a narrowed one, and we do not consider certain approaches and findings dealing with such sites. Future research could build on our findings and could, first, extend the analysis to content-oriented sites, and, second, investigate commonalities and differences between content-oriented sites and OSN. Besides these limitations, we hope that our findings help interested parties in and beyond the IS community to gain an initial overview and better understanding of the body of knowledge created during the last several years of IS research on OSN.

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APPENDIX A: FULL NAME OF SELECTED PUBLICATION OUTLETS

Table A-1: Full Name of Selected Journals	
ACMTDS	ACM Transactions on Database Systems
ACMTrans	ACM Transactions (various)
ACS	ACM Computing Surveys
AI	Artificial Intelligence
AIMag	AI Magazine
AMJ	Academy of Management Journal
BISE	Business & Information Systems Engineering
CACM	Communications of the CACM
CAIS	Communications of the AIS
DSI	Decision Sciences
DSS	Decision Support Systems
EJIS	European Journal of Information Systems
HBR	Harvard Business Review
I&M	Information & Management
IEEESw	IEEE Software
IEEETC	IEEE Transactions on Computers
IEEETrans	IEEE Transactions (various)
IEEETSE	IEEE Transactions on Software Engineering
IEEETSMC	IEEE Transactions on Systems, Man, and Cybernetics
IJEC	International Journal of Electronic Commerce
ISF	Information Systems Frontiers
ISJ	Information Systems Journal
ISR	Information Systems Research
JAIS	Journal of the AIS
JComp	Journal on Computing
JCSS	Journal of Computer and System Sciences
JIT	Journal of Information Technology
JITTA	Journal of Information Technology Theory and Application
JMIS	Journal of Management Information Systems
JMS	Journal of Management Systems
JSIS	Journal of Strategic Information Systems
MISQ	MIS Quarterly
MS	Management Science
OS	Organization Science
PAJAIS	Pacific Asia Journal of the Association for Information Systems
RELCASI	Revista Latinoamericana Y Del Caribe De La Associacion De Sistemas De
SJIS	Scandinavian Journal of Information Systems
SMR	Sloan Management Review
THCI	AIS Transactions on Human-Computer Interaction

Table A-2: Full Name of Selected Conference Proceedings	
AMCIS	Americas Conference on Informations Systems
CONF-IRM	International Conference on Information Resources Management
ECIS	European Conference on Information Systems
ICIS	International Conference on Information Systems
ICMB	International Conference on Mobile Business
MCIS	Mediterranean Conference on Information Systems
PACIS	Pacific Asia Conference on Information Systems
WHICEB	Wuhan International Conference on e-Business

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Katharina Berger is a research assistant and a PhD student at the Department of Management Information Systems at the University of Regensburg, Germany. She holds a bachelor's and a master's degree in Business Informatics from the University of Regensburg. Her research interests include Social Media with a special focus on Online Social Networks and Enterprise Social Networks.

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