



Research article

Team boundary spanning: strategic implications for the implementation and use of enterprise social media

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Abstract

Recent team boundary spanning literature has recommended a shift toward assessing the role of virtual tools – such as social media. Simultaneously the proliferation of Enterprise Social Media (ESM) points to the need to theorize and investigate the supra-individual usage of these tools, such as their usefulness for organizational groups. This paper responds to both mandates through a theoretical integration of the team boundary spanning and existing ESM literature. Using data from two studies – one qualitative and one quantitative – this paper addresses two important research questions regarding the empirical relationship between team boundary spanning and ESM for understanding (i) the types of team boundary-spanning activities that group members enact through ESM and (ii) the effects of ESM on extra-team stakeholders' perceptions and reciprocating actions *vis-à-vis* the team boundary-spanning activities of these group members. The results of this study show that ESM, largely as a function of their visibility affordance, supports a narrow set of representational activities, but offers only limited support for information search and coordination. Furthermore, the findings reveal that ESM activity has a positive effect on extra-team stakeholders' recognition and financial support of the representational ESM posts emanating from the boundary-spanning group. Important implications for theory, strategy, and design are discussed.

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Introduction

Groups in organizations face many challenges today – including increased task complexity associated with knowledge work, changing environmental and economic conditions, intensified competition, and flatter work structures (Mohrman *et al.*, 1995). These challenges highlight the need for effective collaboration that leverages the differences among organizational participants with the aim of producing innovative, synergistic solutions while balancing divergent concerns and interests (Hardy *et al.*, 2005). One important aspect of effective collaboration within an organization involves processes of team boundary spanning, that is, when organizational members establish and manage interactions with others in the company who are outside their

immediate workgroup or team (Ancona, 1990; Ancona and Caldwell, 1992; Marrone *et al.*, 2007).

Today, the proliferation of social media technologies in organizational contexts – frequently referred to as Enterprise Social Media (ESM) – has profound implications for such team boundary spanning interactions and activities among both co-located and virtual teams. ESM encompass a range of information and communication tools (ICTs) for supporting interaction, collaboration, and co-creation, such as blogs, content communities, and social network sites (Kaplan and Haenlein, 2010; Aral *et al.*, 2013). As opposed to public social media, ESM support private communication within organizations, including interactions between organizational members

in teams or groups (Jarrahi and Sawyer, 2013). Early studies of ESM use suggest that these systems have the potential to enhance team boundary-spanning activities by enabling the identification of and interaction with relevant external (i.e., to the team, but still within the organization) individuals and information (cf., DiMicco *et al.*, 2008, 2009; Shami *et al.*, 2009; Steinfield *et al.*, 2009).

Much of the prior work on team boundary spanning occurred before the advent of ESM, and therefore is not well integrated with current research on organizational use of social media. Recent papers within the team boundary spanning literature, however, have proposed the need for research to move beyond traditional off-line settings to study virtual contexts and in particular assess how the use of virtual tools, such as social media, affects engagement in and success of boundary-spanning activities (Kirkman and Mathieu, 2005; Marrone *et al.*, 2007). New streams of boundary spanning research further investigate how technological gatekeepers use diverse media for accessing information external to the organization, and forward to intermediaries (connectors) who translate and circulate the information for others in the organization (Whelan *et al.*, 2010; Whelan *et al.*, 2013). Much of this new work, however, does not emphasize team-level boundary spanning, which includes more than information search and filtering, and can involve other functions necessary for the coordination of work within organizations. Nor does it explicitly examine the changing patterns of internal or team-level boundary spanning via social media. Work that does examine social media (e.g., Jarrahi and Sawyer, 2013) focuses on its use in a broad range of knowledge-sharing activities by individuals, but is not centered on team-level boundary spanning, *per se*.

An additional characteristic of the team boundary spanning literature has been its reliance on survey data from internal team members, despite the fact that team boundary spanning is oriented toward extra-team stakeholders – specifically defined in the context of this study as any group or individual inside the firm's boundaries, but outside the boundary-spanning team, who can affect or is affected by the achievement of the team's boundary-spanning objectives. This internal perspective limits our understanding of the effectiveness of boundary-spanning activities by team members. Hence, an assessment of team boundary-spanning efforts that provides the perspective of extra-team stakeholders is warranted for further advancing our theoretical understanding of team boundary-spanning processes.

As further evidence of the need for better integration of team boundary spanning and ESM research, recent studies of social media have suggested the need to move beyond the individual unit of analysis in order to study how such technologies are used by and impact the performance of supra-individual entities, such as teams (Beer, 2008; Van Osch and Coursaris, 2012). Furthermore, recent ESM papers have emphasized the need to study a broader set of organizational actions that could be supported by ESM beyond marketing and knowledge-sharing (c.f., Gibbs *et al.*, 2013; Leonardi *et al.*, 2013). This study responds to both of these mandates by investigating ESM-supported intra-organizational team boundary-spanning activities enacted by members of two organizational units within a case organization as an important mediator to various group and organizational level outcomes.

On the basis of these motivations, this paper seeks to create a conceptual link between the literature on ESM affordances and team boundary spanning and examine how employee enactment of such affordances influence team boundary-spanning activities. We note that while there has been considerable focus on the anticipated positive effects of ESM for knowledge-sharing and social capital formation, there remain relatively few empirical studies in this area. Furthermore, our current theoretical understanding of team boundary spanning is limited by a one-sided focus on the team boundary-spanning attempts by group members. This study aims to complement this internal perspective by measuring the reciprocation of these attempts by extra-team stakeholders.

In order to aid in the process of investigating how internal group members interact with extra-team stakeholders via ESM, this study further creates and validates a set of new scales that represent extra-team stakeholders' responses to team boundary-spanning attempts. These scales can be utilized by information systems and management researchers in future work.

On the basis of these goals, the central questions guiding this research include:

- (1) What types of boundary-spanning activities are enacted by group members through ESM? Do different group members, as defined by their hierarchical position in the group, enact distinct types of boundary-spanning activities?
- (2) What is the role of ESM in the formation of perceptions and reciprocating actions by extra-team stakeholders? Does the hierarchical position of extra-team stakeholders affect the likelihood of reciprocating actions?

In the process of investigating these questions, we further hope to shed light on how the affordances of ESM interact with the activities of team members to shape both the nature of boundary work undertaken by groups in organizations, as well as the potential responses by extra-team stakeholders to such team boundary-spanning efforts. Doing so not only helps us to understand which of these team boundary-spanning activities occur through ESM, but also why certain activities may be better supported by the materiality of these tools. In particular since ESM are extensible (i.e., new applications, such as tools for opinion polling, can be software additions to the integrated platforms) rather than fixed tools, these insights could result in redesigning these tools for improved team boundary-spanning support.

From a methodological perspective, this research presents two studies based on a multi-method, multi-case approach. The first study draws on qualitative data from all blog posts written by the group members of two selected units within a case organization. We analyze the content of these posts, primarily to classify each post according to the type of team boundary-spanning activity it represents. We further investigate the ESM system log data related to each post in order to better understand the characteristics of the posters. The second study draws on a survey of extra-team stakeholders, which is triangulated and supplemented with log data from the ESM system regarding extra-team stakeholder interactions with the selected organizational units. This combination of data sources – ESM content, survey responses, and log data – offers a two-sided perspective of team boundary spanning,

combining intra-organizational boundary-spanning activities, and extra-team responses.

The remainder of this paper is organized as follows. Following a review of the theoretical foundations and propositions underpinning this study, we present the research design, including the case selection, data collection, and analysis process. Subsequently, we discuss the findings and important implications for theory, future research, and ESM design and practice.

Theoretical foundation

In this section we first review the prior research on ESM, drawing implications for intra-organizational team boundary-spanning processes. We then review theoretical work on team boundary spanning, highlighting three distinct intra-organizational activities and their link to employee characteristics, in particular hierarchical position. Finally, we provide an integration of ESM research and team boundary spanning theory, showing how ESM affordances can influence how employees engage in team boundary-spanning activities within enterprise settings.

Research on enterprise social media

As noted above, ESM systems encompass a range of formerly distinct social media capabilities including blogging, micro-blogging, social networking, and tagging, in addition to providing employees the ability to post documents and other digital artifacts (Jarrahi and Sawyer, 2013). Hence, Leonardi *et al.* (2013) suggest considering social media technologies as an integrated ESM platform rather than a series of separate channels. They define ESM as 'Web-based platforms that allow workers to (1) communicate messages with specific coworkers or broadcast messages to everyone in the organization, (2) articulate a list of coworkers with whom they share a connection, (3) post, edit, and sort text and files linked to themselves or others, and (4) view the messages, connections, text, and files communicated, articulated, posted, edited and sorted by anyone else in the organization at any time of their choosing' (Leonardi *et al.*, 2013: 2).

Much of the research literature has examined public social media platforms such as Facebook and Twitter, and rightfully emphasizes the problems that may arise from the integration of personal and work lives as well as the risks of inadvertent release of proprietary information (Skeels and Grudin, 2009; von Krogh, 2012). However, many ESM systems in organizations today attempt to avoid these issues by virtue of being internal, closed systems only accessible by employees or groups of employees within an organization (Jarrahi and Sawyer, 2013; Leonardi *et al.*, 2013).

In Leonardi and colleagues' synthesis of ESM research and practice, internal social media system usage was shown to influence how individuals access a wide range of resources within the enterprise but outside of their specific organizational units across a variety of organizational settings (see work by Guy *et al.*, 2010; Huh *et al.*, 2007; DiMicco *et al.*, 2008, 2009; Brzozowski, 2009; Steinfield *et al.*, 2009; Leonardi, 2014; Ellison *et al.*, 2014). Jarrahi and Sawyer (2013) further demonstrate that distinct components of ESM, in concert with various combinations of other communication modalities such as email, telephone, and in-person meetings, support many distinct forms of knowledge-sharing within organizations.

This suggests that the strategic implications of the growing adoption and use of ESM are significant.

Indeed, a common theme in both public and organizational social media research is that such systems help people develop and maintain various forms of social capital (e.g., Ellison *et al.*, 2007) – broadly conceptualized as the resources that are embedded in social relations (see Coleman, 1988; Tsai and Goshal, 1998; Lin, 1999; Adler and Kwon, 2002). Of particular relevance for team boundary-spanning processes is the frequent finding that ESM is associated with greater bridging social capital – a type of social capital that is derived from connections to 'weak ties' who may become sources of new information (e.g., DiMicco *et al.*, 2008, 2009; Steinfield *et al.*, 2009). This occurs because ESM provide a relatively low effort vehicle for making work activities as well as common areas of interest visible to others in the organization, and can thus help organizational participants locate and connect with relevant resources outside their local environment. Hence boundary-spanning activities are likely to be prevalent over ESM.

In addition to helping users inform others about their work and develop connections with potential sources of information, ESMs have been found to facilitate cross-unit collaborations. For example, Holtzblatt and Tierney (2011) found that a social media-based idea market was associated with broader cross-unit participation among R&D teams, because of its ability to forge new ties among researchers with common interests. Hiennerth *et al.* (2011) theorize that the open and engaging nature of interaction in ESM triggers ongoing communication between employees creating a sense of empowerment that can drive collaboration.

Recent ESM research distinguishes social media from earlier forms of computer-mediated communication using an affordance perspective focusing on the 'possibilities for action' perceived by users of these tools (Treem and Leonardi, 2012: 146). Two recent affordance typologies that can help us understand how ESM supports team boundary spanning are presented in Table 1.

An affordance view of ESM helps to reveal how boundary-spanning interactions may be enabled by the materiality of ESM tools and enacted by people in organizations in their use of these tools. For example, ESM may be conducive to boundary work because it renders the communication activities of people at work visible to others, including to those who had not participated in the interaction in the first place and may be reviewing threads of interaction long after they have occurred (Leonardi *et al.*, 2013). In addition to direct exposure to content that may be relevant to one's work, the persistence and visibility of communication activities on ESM contributes to what has been called the transactive memory system (Wegner, 1987), enhancing boundary work in organizations by allowing users to update their own internal directories of who knows what (i.e., who has specific expertise), who is connected to whom (how to reach and engage with the expertise), and by enabling the collective encoding, storage, and retrieval of knowledge (Fulk and Yuan, 2013; Whelan and Teigland, 2013).

Despite these early studies of ESM, research on the use of ESM for team boundary spanning at the group and inter-group level remains largely unexplored (Leonardi *et al.*, 2013), primarily because of a preoccupation with the individual unit of analysis (Beer, 2008; Van Osch and Coursaris, 2012). As the growing body of evidence on the impact of ESM suggests, such

Table 1 Two affordance typologies

Affordance	Definition
<i>Treem and Leonardi (2012)</i>	
Visibility	The ability of social media to make users' behaviors, knowledge, preferences, and network connections that were once invisible (or very hard to see) visible to others
Persistence	The ability of social media to allow for content previously created and published to remain permanently accessible
Editability	The ability of social media to enable users to amend, add to, revise and change collaboratively content published on the Internet
Association	The ability of social media to create and sustain relationships between people and between people and information (the author and his/her content)
<i>Majchrzak et al. (2013)</i>	
Metavoicing	Engaging in the ongoing online knowledge conversation by reacting online to others' presence, profiles, content, and activities
Triggered attending	Engaging in the online knowledge conversation by remaining uninvolved until a timely automated alert informs the individual of a change in the specific content of interest
Network-informed associating	Engaging in the online knowledge conversation informed by relational and content ties
Generative Role-Taking	Engaging in the online knowledge conversation by enacting patterned actions and taking on community-sustaining roles in order to maintain a productive dialog among participants

tools may help individual users locate and access remote sources of information as well as develop and maintain diverse networks of relationships in organizations that afford users social capital.

Research on team boundary spanning

There has been surprisingly little integration between the emergent literature on ESM and the rich literature on team boundary spanning. Team boundary spanning – sometimes also referred to as team boundary work or team boundary management – can be defined as a team's or group's effort to establish and manage interactions with parties in the external environment that enhance the team and others linked to the team in meeting performance goals (Ancona, 1990; Ancona and Caldwell, 1992; Marrone *et al.*, 2007). Team boundary spanning thus involves the engagement of diverse participants in a joint discourse, joint identification (Kilker, 1999; Hinds and Bailey, 2003; Hardy *et al.*, 2005), as well as the constitution of joint practices via the use of joint artifacts (Levina and Vaast, 2005) with actors in the external environment.

Although the external environment may refer to other actors and teams residing both within or outside of the boundary-spanning team's host organization (Marrone *et al.*, 2007), given that ESM only supports communication among members of the organization, in this study we focus on intra-organizational team boundary spanning. Understanding such team boundary-spanning activities and the role of ESM therein is important as these activities are not just crucial to the performance of the boundary-spanning team, but also to the performance of other organizational parties that are interdependent with the boundary spanning team as well as the organization as a whole (Mathieu *et al.*, 2001; Marrone *et al.*, 2007). Team boundary spanning has been shown to be crucial for information transfer, knowledge creation, and innovation inside organizations (c.f., Hargadon, 1998; Argote *et al.*, 2003). Related work by Whelan and colleagues (Whelan *et al.*, 2010; Whelan *et al.*, 2013; Whelan and Teigland, 2013) also emphasizes the critical role of internal cross-boundary

interactions performed by individuals they call connectors, particularly in R&D settings. These connectors are linked to others who obtain information from outside the organization, but aid in the process of dissemination of this information by virtue of their extensive internal social network ties and their ability to help translate this information so that it is useful to other members of the organization.

Given its focus on the importance of communication links to external sources of information (Tushman and Scanlon, 1981), team boundary spanning is closely related to popular concepts from social network theory, including as noted above, bridging or weak ties (Granovetter, 1973), and structural holes and information brokerage (Burt, 1992), all of which focus on the importance of establishing and managing external linkages as conduits to critical resources – monetary, informational, or social – as well as coordination and reputation benefits (e.g., Hargadon, 1998; Argote *et al.*, 2003). It is important to recognize, however, that not all boundary spanners are brokers (see Fleming and Waguespack, 2007); for instance, a group member seeking information may not be attempting to broker relationships between some extra-team stakeholders and other members of the group. This distinction adds to our motivation to understand the various forms of team boundary spanning that may occur via ESM.

Also, team boundary spanning is closely linked to the importance of exploration (March, 1991) – creating new knowledge from the acquisition of knowledge across intra- or inter-organizational boundaries – as established in the innovation and strategic management literature (c.f., Rosenkopf and Nerkar, 2001). Hence, the concepts of team boundary spanning and knowledge-sharing are often used interchangeably, however, information or knowledge transfer does not constitute the full range of interactions between a team and its environment; rather, boundary work encompasses the complete set of activities that are necessary to build support for new products and projects, shape the demands of other organizational parties, and coordinate product development or innovation efforts with other organizational groups (Ancona and Caldwell, 1990). Hence, beyond the

establishment of social capital and the transfer of knowledge, team boundary spanning also involves strategic development, workload and project coordination, and the management of interpersonal conflict (Marks *et al.*, 2001).

Finally, the importance of team boundary spanning does not imply that internal team activities and dynamics are inconsequential. Rather, with increasing boundary-spanning efforts, an increase in within-team coordination and information sharing is necessary to generate the requisite level of trust that enables successful cross-boundary interactions (Ancona and Caldwell, 1992). However, given our focus on the role of ESM in team members' abilities to enact team boundary-spanning activities as well as its role in influencing perceptions and reciprocating actions by extra-team organizational members, this study does not focus on internal team processes or dynamics.

Within the literature on team boundary spanning, three distinct activities have been proposed and validated empirically, namely representation, coordination of task performance, and general information search (Ancona and Caldwell, 1992; Grabher, 2004).¹ This categorization of team boundary spanning emerged from seminal survey work (e.g., Ancona and Caldwell, 1992) that focused on behaviors and outcomes of these activities for the team as a whole and its members (Marrone, 2010). The work has since been advanced to also understand team boundary-spanning actions at diverse levels of analysis, including teams and intra-organizational networks of multiple teams or actors (c.f., Marks *et al.*, 2001). Given this background, we next provide a more detailed overview of the primary types of team boundary-spanning activities identified in the prior literature, and consider them from both an internal and extra-team stakeholder perspective.

Representation, also referred to as the ambassadorial function or impression management (Ancona and Caldwell, 1992), involves the lobbying for the group up the hierarchy in order to create favorable impressions and advocate among managers and senior managers. Hence, it is a largely vertical form of team boundary spanning. From an internal perspective, given that the core activity of representation is lobbying, the group member engaging in this team boundary-spanning process tends to be a project manager (Ancona and Caldwell, 1992). Similarly, from an external perspective, although representation can occur at all levels, the target actors typically hold greater power than the boundary-spanning actor (Ancona and Caldwell, 1992). This process is crucial for group performance as the creation of a favorable impression among senior management is a prerequisite for obtaining access to key resources, including reputation, legitimization, higher-level commitment, and the financial support needed to facilitate successful product development (Grabher, 2004). This team boundary-spanning process benefits the target actors – management – as they stay informed of a group's progress. This further supports higher-level planning and resource allocation decisions, which in turn, can help the organization meet external client expectations (cf., Bettencourt *et al.*, 2005).

Coordination, also referred to as task coordination (Ancona and Caldwell, 1992) or intergroup process (Marks *et al.*, 2001), involves the facilitation of effective decision-making and design implementation through cross-boundary strategizing, planning, and evaluation. It is thus a horizontal form of team boundary spanning that can help manage intergroup dependencies. From an internal perspective, the group members

engaging in this team boundary-spanning process tend to be general members of the group (Ancona and Caldwell, 1992). Similarly, from an external perspective, it is general members from the organization – rather than (senior) managers – who are more likely to reciprocate coordination attempts by members of the focal groups. Coordination is crucial for group performance as it involves the aligning, negotiating, and monitoring of the efforts of individuals – within and outside the group – in order to accomplish individually and jointly determined project goals, for instance delivery deadlines. Hence, coordination is crucial for the efficiency, effectiveness, innovativeness, and flexibility of goal delivery (Mohrman *et al.*, 1995).

General information search, also referred to as scouting (Ancona and Caldwell, 1992), involves the general scanning of the external group environment for gaining access to relevant information, knowledge, and expertise. It is also a largely horizontal form of team boundary spanning. Again, from an internal perspective, general members of the group are more likely to engage in scouting than project managers (Ancona and Caldwell, 1992). From an external perspective, target actors of information search activities are often loosely coupled with the focal group and are general members from the organization rather than (senior managers) (Marrone, 2010). This team boundary-spanning process is crucial for group performance as it enables members to gain project-specific expertise and an understanding of trends, opportunities, and threats in the external environment (Hargadon, 1998).

In the context of ESM, this typology of team boundary-spanning activities can be useful for identifying which of these activities occur through or are supported by ESM tools. In addition, by adopting an affordance lens, as outlined earlier, one could begin to answer the question of which ESM affordances need to be perceived and enacted by users to effectively support each of these activities as well as why certain activities are more likely to occur because of enhanced strategic alignment with the affordances inherent to ESM.

Furthermore, whereas some of the early literature on boundary work posits that there are designated boundary spanners in the organization (c.f., Lysonski and Johnson, 1983), in the context of ESM, team boundary spanning has become a more natural and decentralized activity rather than the role of distinct members of the team or organization (Whelan *et al.*, 2010). We suspect, however, that even though ESM facilitates team boundary-spanning activities by more members, not all team members engage in all forms of team boundary spanning to the same extent. Some activities may be tied to one's hierarchical position; for example, managers may be more inclined to use ESM to search for support resources for their group, while group members may emphasize exchange of information relevant at an operational level. Hence, an integration of the team boundary spanning and ESM affordance literature can help us further disentangle these contingencies of team boundary-spanning effectiveness and inform the redesign of such tools with the aim of enhancing overall team boundary-spanning success.

Investigations into boundary-spanning activities almost invariably focus on the perspective of those attempting to connect to external resources. Yet boundary-spanning efforts can also be viewed from an extra-team stakeholder perspective. Attempts to access external resources must yield a

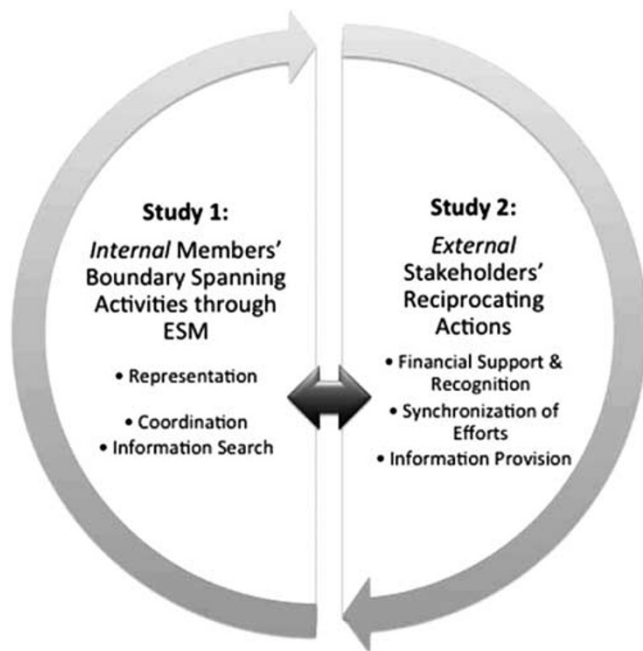


Figure 1 Toward a systemic view of team boundary spanning.

favorable response from those with the desired resource. Furthermore, attempts to engage in team representation must generate explicit recognition or financial support. Efforts to coordinate tasks across groups should produce responses that help to manage dependencies. Finally, efforts to search for information from others should yield provision of information. An implication of this perspective is that we can have a better insight into the potential team boundary-spanning benefits of ESM if we can not only investigate team boundary-spanning efforts of employees, but also examine how such efforts might influence extra-team stakeholders, that is, the people who are in some way connected to boundary spanners via the ESM.

Figure 1 summarizes this extension of the traditional team boundary spanning perspective developed by Ancona and Caldwell (1990, 1992) – encompassing representation, coordination, and information search activities – with a focus on reciprocating actions by extra-team stakeholders that include the reciprocating acts of recognition and financial support, synchronization of efforts, as well as information provision.

Toward an integration of team boundary spanning and ESM research

Because team boundary spanning connects dispersed individuals, the requirements for and frequency of the use of virtual tools, such as ESM, significantly increases (Marrone, 2010). Social media, given its informational and social value – in terms of locating and accessing remote information and individuals – are particularly apt for affording the synchronicity required for effective team boundary spanning (Kirkman and Mathieu, 2005). Indeed, in a review of the potential influence of ESM on common organizational processes, Leonardi *et al.* (2013) emphasize the need to study the implications for boundary work, describing several ways that ESM can facilitate knowledge-sharing across department, spatial, geographic, and other types of boundaries.

We offer a further integration of these two theoretical domains – team boundary spanning and ESM – focusing on the relations between the three aforementioned team boundary-spanning activities found in the literature and the potential ways that ESM might be leveraged to enact them in Table 2. We also include ESM research that, while not explicitly focusing on team boundary spanning, nonetheless finds that ESM supports the types of activities that could in turn enable cross-unit awareness (representation), coordination, and information search. The types of ESM affordances discussed in prior research are also discussed to reveal the material mechanisms through which these activities are likely enacted and supported.

With regard to *representation*, two particular affordances of ESM that represent different ways for team members to create awareness and favorable impressions are visibility (Treem and Leonardi, 2012) and meta-voicing (Majchrzak *et al.*, 2013). Visibility implies that ESM make peoples' interactions, connections, and content transparent to others, including people who are not actively engaging in a conversation. Similarly, meta-voicing refers to the continued availability of profiles, content, and activities. Hence, visibility and meta-voicing can be enacted for the creation of awareness and potentially favorable impressions through the selective presentation of positive information; a representational strategy referred to by Ancona and Caldwell as talking up (see also Levina and Vaast, 2005; Whelan *et al.*, 2011, 2013). Furthermore, as suggested by Leonardi *et al.* (2013), although many of the other affordances of ESM can be found in other applications for supporting computer-supported cooperative work, the unique and consequently dominant features of ESM are designed around the affordance of visibility.

In relation to *coordination*, there are four affordances of ESM that could be perceived and acted out by users in their coordination activities oriented toward cross-boundary strategizing, planning, and decision-making, namely persistence, triggered attending, editability, and generative role-taking. Persistence refers to the lasting accessibility of activities. Editability means that people are able to construct and refine their presentations before others view them. Triggered attending refers to the use of automated alerts to inform users of content changes. Finally, generative role taking refers to the enactment of community-sustaining roles. Such affordances support the ongoing dialog, continued involvement, and permanent archiving necessary for successful inter-team coordination.

Finally, for *information search*, two affordances of ESM represent different ways of engaging in activities oriented toward scanning the external environment for relevant information and individuals, namely associations and network-informed associating. Both affordances deal with the ability to create explicit connections between individuals, or between people and content, as well as the subsequent engagement emerging from relational and content ties.

It is important to recognize that not all ESM research concludes that team boundary-spanning activities would be prevalent on an ESM. An opposing view is offered by Gibbs *et al.* (2013), who argue that such affordances as visibility can actually discourage employees' willingness to post information on an ESM. Loss of control over information that may be perceived as providing a competitive edge, or unwillingness to share project information before it is fully ready for public consumption are just some of the reasons why ESMs might

Table 2 Integrating perspectives on team boundary spanning and ESM

Team boundary-spanning activity:	Team boundary-spanning activity	
	Representation	Coordination
Definition:	Lobbying for favorable impressions	Inter-unit strategizing for effective decision-making and implementation
Direction:	Vertical	Horizontal
Target actor:	Managers	Peers in interdependent units
Anticipated performance effect:	Reputation, legitimization, managerial commitments, financial support	Efficiency, effectiveness, innovativeness, and flexibility of goal delivery
Research on ESM with implications for team boundary spanning	DiMico <i>et al.</i> (2008, 2009), Holtzblatt and Tierney (2011), Majchrzak <i>et al.</i> (2013)	Huh <i>et al.</i> (2007), Von Krogh (2012), Jarvenpaa and Lang (2011), Hiennerth <i>et al.</i> (2011), Fulk and Yuan (2013)
Potential uses of ESM	Creating awareness and impressions	Enhancing communication and decision-making
Affordances	Visibility, meta-voicing	Persistence, triggered attending, editability, generative role-taking
		Association, network-informed associating
		General scanning of the environment for relevant information and expertise
		Horizontal
		Loosely coupled experts
		Project specific expertise and info on environmental trends, opportunities, and threats
		Steinfeld <i>et al.</i> (2009), Guy <i>et al.</i> (2010), Brzozowski (2009), Leonardi <i>et al.</i> (2013), Treem and Leonardi (2012), Fulk and Yuan (2013)
		Locating information and individuals

discourage some forms of team boundary spanning. Hence, we believe it is necessary to empirically examine the relative prevalence of such activities.

Summary and propositions

On the basis of this integration of the team boundary spanning and ESM literature, we offer the following four general propositions to guide our empirical analyses. First, in general, based on the affordance-based explanations for the existence of team boundary-spanning activities on ESM, we expect to find evidence of all three types of activity in answering our first research question pertaining to the types of team boundary-spanning activities enacted through ESM. Hence:

Proposition 1: All three forms of team boundary-spanning activity – representation, task coordination, and information search – will be evident on ESM.

Specifically, we anticipate that the ESM activities of groups will include efforts to represent activities to extra-team stakeholders, coordinate with other groups, and search for information relevant to their group work. If perceived and enacted by team members, the ESM affordances discussed above could support all three team boundary-spanning activities.

Furthermore, in answering our second research question, we anticipate that:

Proposition 2a: The ESM comments on a group's blog by extra-team stakeholders will correspond to the three team boundary-spanning activities, including expressions of support following representation posts, synchronizing information following task coordination posts, and provisions of information following information search posts.

That is, we anticipate that extra-team stakeholders' overall perceptions of their interactions with a group will mirror the three team boundary-spanning activities, including willingness to provide support, synchronization of task activities, and provision of information.

In addition, greater use of the ESM by extra-team stakeholders should also result in more opportunities to become aware of a group's activities and needs, and hence should be associated with increases in expressions of support, task coordination, and information provision. Hence:

Proposition 2b: Greater activity on the ESM by extra-team stakeholders will be associated with increased expressions of support, task coordination, and information provision.

Our review of the current body of team boundary spanning literature suggests, however, that an organizational participant's hierarchical position is likely to influence the types of team boundary-spanning activities in which he or she engages. As noted in the review, since representation is a vertical form of team boundary spanning (Ancona and Caldwell, 1990; Marrone, 2010), managers are more likely to engage in efforts to seek needed resources to support the group, and, if successful should be reciprocated by senior-level stakeholders who control these resources. Group members rather than managers are more likely to engage in task coordination efforts – a largely horizontal form of team boundary spanning (Ancona and Caldwell, 1990; Marrone, 2010) – with

extra-team stakeholders, and such efforts, if successful, should result in responses from these stakeholders that help synchronize interdependent work. Finally, group members are also more likely to be involved in information search and scouting activities, which also both represent horizontal forms of team boundary spanning (Ancona and Caldwell, 1990; Marrone, 2010). Again, if successful, these efforts should be reciprocated by information provision from peer-level extra-team stakeholders. These expectations are summarized in the following third proposition:

Proposition 3a: Hierarchical position is positively associated with representational activities on ESM, while it is negatively associated with coordination and information search activities.

Proposition 3b: Hierarchical position is positively associated with the likelihood of reciprocating team representational activities by extra-team stakeholders, while it is negatively associated with the likelihood of reciprocating team coordination and information search activities.

Hence, we anticipate that project managers are more likely to leverage ESM for representational activities than regular group members, whereas the latter are more likely to engage in coordination and information search activities with external parties. Similarly, we anticipate that the hierarchical position of extra-team stakeholders will affect their willingness to reciprocate representational activities on ESM, so that more senior managers more willing to provide resources such as financial support. Alternatively, non-managerial extra-team stakeholders will be more willing to reciprocate coordination activities by managing dependencies as well as information search activities through information provision.

Research design

In this section, a description of a case organization employing an ESM and the group selection process is provided, after which we discuss the mixed-method approach to data collection and analysis.

Case organization

Our case organization (hereafter referred to as The Company) is a worldwide provider of workplace furnishings, products, and services. The Company has approximately 10,000 employees around the world and is headquartered in the United States with offices and divisions in nearly 40 countries in North and South America, Europe, Africa, Asia, Oceania, and the Middle East. The Company's international growth and expansion in the last decades has been realized through a number of acquisitions of existing furnishing companies around the world, thereby further highlighting the potential disconnect and the heightened need for effective inter-team boundary spanning between the organization's many dispersed teams.

In March 2012, The Company launched an ESM tool based on the Jive Platform. Jive (<http://www.jivesoftware.com>) is a provider of corporate social technologies that assist business connections, communications, and collaborations among employees by providing a platform offering built-in support

for group chat, group blogging, social networking, social bookmarking, telephony integration, and strong security. Jive's customer base includes many multinational corporations and global institutions, including Nike, HP, T-Mobile, and the World Bank.

Product development and client consulting at the case organization is provided through global teams that rely on a multiplicity of ICTs for collaboration, including Email, GoogleDocs, MSN, Sharepoint, and Skype. With the introduction of the ESM – which offers a large number of communication functionalities – the technology providers within The Company hopes to offer an umbrella tool that can better support intra-organizational communication and collaboration and potentially replace the plethora of tools currently available to teams, thereby serving as a single intra-team and inter-team knowledge repository.

Following the ESM global launch in March 2012, adoption and use has grown substantially, with a total user base of 9247 users (with an account) as of June, 2014; out of which 6712 are active users (defined as at least one viewing activity in the previous 30 days), nearly 1700 users are participating users (defined as at least one instance of active engagement in the form of commenting, liking, rating, or editing in previous 30 days), and just under 900 are contributing users (defined as at least one instance of active creation of content in the previous 30 days).² Thus, 9.7% of current users actively create content (i.e., contributing users) and an additional 18.4% engages with content in other ways, such as following, sharing, bookmarking, liking, commenting, or rating existing content (i.e., participating users).

Unit identification

In this study, we selected two organizational units that conduct client-oriented research and consulting through project teams, one that focuses on more immediate client-centered needs (hereafter referred to as Applied Research), while a second pursues research that informs future product concepts (hereafter referred to as Futures Research).

These units were selected for four reasons. First, both units are among the most proactive ESM adopters. Second, both units operate on the interface between various internal departments within The Company (including product development, marketing, sales, and procurement); hence, team boundary spanning is at the heart of their daily activities and existence. Third, both units are similar in size and goal – client-oriented research – hence, allowing for effective cross-case comparisons. Fourth, within the context of the ESM tool, both units maintain a public (i.e., open to the organization as a whole) blog aimed at creating organizational awareness and cross-boundary communications with extra-team stakeholders, making these blog pages an ideal case for an assessment of the effect of ESM on team boundary spanning. However, it is important to note that these public blog pages are only one communication modality supported by the ESM. Nonetheless, given its public, rather than team-specific (e.g., secret team blogs or project spaces) or individual (e.g., microblogging or profile pages), nature, these public blog pages are the most likely communication mode for team boundary spanning and the focus of this study. An example of a blog post has been included in Appendix A.

Given the ability for within-case analyses and cross-case comparisons as well as the use of (i) longitudinal and

(ii) behavioral (i.e., exact and unobtrusive) data available for each unit, generalizability of our findings is enhanced (Yin, 2011).

Data collection

Data for the two studies were collected from different sources and different research subjects, encompassing both behavioral and self-reported data (see summary in Table 3), over the period of March 2012 to April 2013 (i.e., 14 months), as will be further explained below.

For Study 1, aimed at identifying the types of team boundary-spanning activities that are enacted by internal members from applied research (AR) and futures research (FR), all blog posts rather than a sample of posts from the public blog pages of both units were collected for the purpose of examining and classifying the content of posts. Furthermore, to understand the relation between the types of team boundary-spanning activities that are enacted through these public blog posts and the characteristics of the individual poster – that is, member of AR or FR – we collected ESM log data to determine their hierarchical position in one of the two organizational groups.

For Study 2, aimed at characterizing the role of ESM in the formation of perceptions and reciprocating actions by extra-team stakeholders to the AR and FR blogs, we collected data from a variety of qualitative and quantitative data sources. First, to disentangle the response and subsequent enactment of team boundary spanning by extra-team stakeholders within the same organization, such as executives, directors, managers, and employees from other organizational units, comments in response to original blog posts by the two units were also content-analyzed. The main aim was to identify whether or not the original aim of a blog post by AR and FR was reciprocated in the same fashion. To illustrate, if a member of AR creates a representational post focused on ‘talking up’ group achievements as a means for creating favorable impressions, the appropriate and anticipated response from an extra-team stakeholder would be a recognition-type comment. Alternatively, an information search post directed at collecting technical information from other members from other units – such as a question to a product development team – would ideally be reciprocated with an answer, that is, an information provision comment.

Second, to further assess extra-team stakeholders’ perceptions of team boundary-spanning activities by these two organizational units, we distributed a survey to all extra-team stakeholders who had visited or interacted with the blog pages of AR and/or FR, as evidenced by the ESM log data (see response rates in Table 3). For this survey, we developed a mirror scale of the original Ancona and Caldwell (1992) scale in order to measure extra-team stakeholder’s perceptions of or response to each unit. Rather than measure team boundary spanning *per se*, instead the scale measures an extra-team stakeholder’s possible recognition of and/or response to a team’s boundary-spanning efforts. For example, if a team member engages in an information search, we might expect an extra-team stakeholder to respond by being willing to provide information. Likewise, if a team member engages in a representation activity like ‘talking up’ the team to enhance its reputation, we might expect an extra-team stakeholder to perceive that team as being more visible or important

Table 3 Data sources and population or sample sizes

	Organizational unit	
	FR (Futures Research)	AR (Applied Research)
<i>Study 1: What types of team boundary-spanning activities are enacted by group members of FR or AR through ESM?</i>		
ESM content data (Population)	15 original blog threads (avg. length: 5 pages of text; total 77 pages of printed text)	11 original blog threads (avg. length: 2 pages of text; total 23 pages of printed text)
ESM log data (Population)	20 users, that is, team members (181 log data points or 9.05 data points per team member) ^a	15 users, that is, team members (132 log data points or 8.8 data points per team member)
<i>Study 2: What is the role of ESM in the formation of perceptions and reciprocating actions by extra-team stakeholders?</i>		
ESM content data (Population)	63 comments (avg. of 4.2 comments per original thread)	47 comments (avg. of 3.6 comments per original thread)
ESM log data (Population)	1910 data points	3773 data points
External surveys (Sample)	223 surveys (28% response rate)	399 surveys (30% response rate)

^aThe creation of a blog post or any interaction with the post (viewing, tagging, liking, modifying, or commenting).

(see Appendix B for the scale items). The results of the Exploratory and subsequent Confirmatory Factor Analysis will be discussed in the next section. No other questions were included in the survey; except for basic demographic questions that were used to match survey responses to ESM log data.

Third, to specifically answer if perceptions and willingness to reciprocate is a function of the frequency and type of use of ESM by extra-team stakeholders, we collected log data including a large number of data points – each of which capture a single activity on ESM, such as the creation of a blog post, an upload of a document, or the sharing of existing content – for each of the survey respondents. Furthermore, ESM log data was used for determining the hierarchical position of the extra-team stakeholders in our sample to establish an empirical link between hierarchical position in the company and their willingness or ability to reciprocate team boundary spanning. To illustrate, an equal employee in another unit may have increased visibility of the activities of FR and AR because of ESM, but most probably does not have the resources or authority to provide monetary support.

Finally, it is important to note that that, with respect to the various data sources used for this study as summarized in Table 3, all available content and log data was used. In other words, no sampling approach was used, but it was decided to use the complete available data. As for the survey, given the 28 and 30% response rate, this is the only data source that presents a sample from the total population of extra-team stakeholders.

Combining the two studies and their respective data sources allows us to not only provide a two-sided perspective of team boundary spanning – both inside-out and outside-in – but also to disentangle the distinct ways that ESM use might influence intra-organizational groups and stakeholders. In other words, do extra-team stakeholders who use an ESM to interact with members of a group perceive and respond to the group's activities in line with the underlying intentions of the original blog posts from members of FR or AR.

Data analysis

In what follows, the data analysis process for each of the two studies will be discussed in detail.

For Study 1, encompassing content data from the original blog posts on FR and AR as well as log data for qualifying characteristics of the posters, we used two data analysis strategies. First, in order to analyze the content from the FR and AR blog pages, we developed a coding scheme to reflect each of the overarching team boundary-spanning activities – that is, representation, coordination, and information search – as well as each of the underlying sub-activities. The coding scheme was developed deductively using the original definitions and denominators of the three activities (i.e., factors) as proposed by Ancona and Caldwell. Furthermore, we used the individual items from Ancona and Caldwell's three-factor model to provide definitions of the underlying sub-activities. The final coding scheme can be found in Appendix C.

One of the authors and a graduate student – with no prior knowledge of the coding scheme or study aim – independently coded all blog posts and comments. An initial interrater reliability of 89% percentage agreement and 0.71 Cohen's κ^3 provided a strong assessment of the coding process reliability and the emergent coding scheme validity. The coding process

thus allowed for the classification of each original blog post into a particular type of team boundary-spanning activity.

Second, to further assess the relationship between a poster's hierarchical position – general member or leader – and the type of team boundary-spanning activity enacted in blog posts, the thematic analysis of content data was followed up with a qualitative form of pattern matching (Trochim, 1985) to compare the *a priori* theoretical with the observed empirical pattern. Qualitative pattern matching was selected as an alternative to statistical tests for comparison of group means (e.g., ANOVA or *t*-tests) given the small sample size of group members and blog posts for each of the two groups.

For Study 2, encompassing content data from comments posted by extra-team stakeholders', survey data on their team boundary-spanning perceptions and reciprocating actions, as well as log data regarding their ESM usage and hierarchical position, three data analysis strategies were employed. First, the comments by extra-team stakeholders in response to original blog posts on FR and AR were content-analyzed using the same coding scheme discussed above (see Appendix C). The classification of the comments for each blog post thread was important to determine whether the team boundary-spanning activity as perceived or reciprocated by extra-team stakeholders was consistent with the original poster's intention.

Second, the survey responses by extra-team stakeholders were analyzed using an exploratory factor analysis (EFA) to investigate whether the same three factors (i.e., team boundary-spanning activities) – representation, information search, and coordination – as proposed and empirically validated in the team boundary spanning literature (Ancona and Caldwell, 1992), held for extra-team stakeholders. Given that the development of a mirror scale was exploratory and required a new assessment of internal consistency, EFA was deemed a more appropriate and more honest approach by enabling the emergence of a structure from the data rather than enforcing an *a priori* structure (Hurley *et al.*, 1997).

Third, following the results of the EFA, regression analyses were conducted on a combination of survey responses (dependent variables) and log data (independent variables) to assess the association of ESM usage with extra-team stakeholders' perception of team boundary spanning, in addition to the potential mediating effect of an employee's hierarchical level.

Results

In what follows, we first present the results of our qualitative study of the use of ESM for team boundary spanning by internal members of FR and AR and continue with the results of our quantitative study of perceptions and reciprocating actions by extra-team stakeholders.

Study 1: ESM-supported team boundary-spanning activities by members of FR and AR

In this section, we present the findings of the content analysis of public blog posts created on ESM by internal members from FR and AR to answer the first research question pertaining to the types of team boundary-spanning activities that are enacted through ESM. Furthermore, we will explore the empirical link between hierarchical position of the poster and the enacted activity.

Table 4 Classifying team boundary-spanning activities on ESM blogs

Post	Number of comments	Number of views	Activity	Subactivity	Additional (Sub)Activity (if applicable):
<i>FR public blog page</i>					
1	4	141	Representation	Informing	
2	1	251	Representation	Informing/Talk Up	
3	14	61	Representation	Informing	Info Search: Tech Scan
4	2	46	Representation	Informing	
5	1	129	Representation	Informing	
6	0	119	Info Search	Tech Scan	
7	2	39	Representation	Informing	Rep: Progress
8	4	39	Representation	Informing	Rep: Progress/Talk Up
9	12	41	Representation	Informing	
10	2	29	Representation	Informing	Rep: Progress; Info Search: Tech Scan
11	5	217	Representation	Informing	Rep: Progress
12	4	152	Representation	Informing	Rep: Progress
13	1	148	Representation	Informing	Rep: Progress/Talk Up
14	14	35	Representation	Informing	Rep: Progress/Talk Up
15	2	450	Representation	Informing	Rep: Support
<i>AR public blog page</i>					
1	4	85	Representation	Informing	Info Search: Tech Scan
2	1	21	Representation	Talk Up	
3	14	199	Info Search	Tech Scan	Rep: Support/Resources
4	2	167	Representation	Talk Up	
5	1	31	Representation	Informing	
6	0	18	Representation	Talk Up	
7	2	336	Representation	Informing	Info Search: Tech Scan
8	4	183	Representation	Informing	Support
9	12	193	Representation	Informing	
10	2	158	Representation	Informing	
11	5	125	Representation	Informing	

The content analysis of public blog posts from FR and AR reveals a consistent and uniform pattern across the two units. As Table 4 shows, 14 out of 15 FR posts (93%) and 10 out of 11 AR posts (91%) are primarily representational posts, with the majority aiming to inform extra-team stakeholders – for example, about new projects or new findings. The second most popular representational activity was talking up, which refers to the ostentatious display of project successes to create favorable impressions. Both blogs only contained one information search post and no instances of coordination posts. Some posts though had multiple goals, which we have listed in the last ‘additional (sub)activity’ column in Table 4. Hence, contrary to our expectations in Proposition 1a, when using ESM, internal members of the two units perform only a limited set of team boundary-spanning activities, primarily directed at representing their unit to extra-team stakeholders through informing about or by ‘talking up’ their activities.

In addition to exploring the occurrence of each type of team boundary-spanning activity present in the blog posts, we aim to validate our theoretical propositions regarding the link between a poster’s hierarchical position within the unit (FR or AR) and their tendency to engage in particular team boundary-spanning activities. Using qualitative pattern matching, we found that – based on the proportion of leaders to general members in the population of FR and AR (ratio of 1 to 2) – the fact that more than half of the representational posts were created by those holding a leadership position was disproportionately large. In addition, the single information search post

was created by a general member of AR. Furthermore, the three representational posts that had information search as a secondary function were all created by general members of FR or AR. Although the lack of information search posts and statistical validation makes it difficult to derive any definite conclusions, the overall observed pattern was in line with our theoretical Proposition 3a regarding the link of poster position and activity type.

Summary of results

Study 1 only partially confirmed our first theoretical proposition; namely, whereas ESM appears to offer excellent support for representational team boundary-spanning activities – confirming our expectations – the group blog component of the ESM platform seems to be only of limited utility for engaging in information search or coordination activities. In line with our remaining theoretical propositions regarding internal group use of ESM (3a–5a), representational posts are more likely to be created by members occupying a leadership role, whereas information search posts are more likely to be created by general members of the groups.

Study 2: ESM-supported perceptions and reciprocating actions by extra-team stakeholders to FR and AR

In this section, we present the findings of the content analysis of comments created by extra-teams in response to original blog posts by internal members from the FR and AR groups.

Table 5 Team boundary-spanning activities in blog posts and associated comments

	<i>Blog posts (internal members)</i>				<i>Comments (extra-team stakeholders)</i>			
	<i>Total</i>	<i>Representation</i>	<i>Coordination</i>	<i>Information Search</i>	<i>Total</i>	<i>Representation</i>	<i>Coordination</i>	<i>Information Search</i>
FR	15	14 (93%)	0 (0%)	1 (7%)	63	43 (68%)	10 (16%)	10 (16%)
AR	11	10 (91%)	0 (0%)	1 (9%)	47	27 (57%)	3 (6%)	17 (36%)

Table 6 Pattern matrix of EFA for extra-team stakeholders' boundary-spanning items^a

<i>Factors</i>	<i>Support</i>	<i>Coordination</i>
Eigenvalues	4.2495	1.5023
Variance Explained (R^2)	38.13	25.78
<i>Items</i>		
I would be willing to support FR/AR	0.702	
I would provide resources (e.g., money, equipment) to FR/AR	0.714	
I would provide FR/AR with important information on The Company's strategy or political situation.	0.758	
I would provide FR/AR with important information on what competing firms or groups are doing	0.795	
I would provide FR/AR with information on marketing ideas/expertise	0.785	
I would provide FR/AR with information on technical ideas/expertise	0.700	
I or my unit coordinate(s) activities with FR/AR		0.858
I or my unit negotiate(s) with FR/AR for delivery deadlines.		0.878
I or my unit reviews FR's /AR's outcomes		0.790

^aAll items had significant factor loadings (>0.7) to ensure construct validity (Shimp and Sharma, 1987).

Furthermore, we present the findings from the EFA of the survey responses to explore the types of reciprocating actions extra-team stakeholders engage in *vis-à-vis* the team boundary-spanning activities enacted by the two units – FR and AR – through ESM. Finally, we present the findings of the regression of ESM use and hierarchical position on the reciprocating action.

First, our content analysis of blog posts reveals that – contrary to the uniformity of activity types in original blog posts by FR and AR – the comments represent a much more diverse set of team boundary-spanning interactions, providing modest support for Proposition 1b. The distribution of blog posts and comments across the three activity categories is displayed in Table 5.

For the FR blog, from a total of 63 comments, 10 comments are about information provision (the mirror response to a technical scan), that is, 16% of comments in contrast to only 7% of original blog posts being information search. In addition, we identified 10 comments that are coordination-oriented; either in the form of coordinating activities or problem resolution, thus accounting for an additional 16% of comments compared with 0% coordination in the original blog posts. Finally, the majority of comments ($N=43$) on the FR blog comprise responses to representation, primarily in the form of support ($N=28$), that is, an acknowledgment or validation, and some additional talk up or persuasion by extra-team stakeholders.

For AR, with a total of 47 comments, 17 comments provide information (technical scan), that is, information provision accounts for 36% of comments in contrast to only 9% of original blog posts. In addition, we identified three comments that are coordination-oriented; thus accounting for an additional 6% of comments compared with 0% of original blog

posts. Finally, the majority of comments ($N=27$) on the AR blog are composed of responses to representation, primarily in the form of support ($N=20$), that is, an acknowledgment or validation, and some additional talk up or persuasion by extra-team stakeholders.

Furthermore, for both blogs we found that the majority of representational posts received some form of information sharing or provision in addition to expressions of support. So even when the purpose of a blog post is merely to inform others about or talk up a project, it will likely elicit the provision of relevant new information by extra-team stakeholders. Triangulating the content analysis findings with the log data, we were able to establish that 95% of comments (i.e., 60 out of 63) for FR and 98% of comments (i.e., 46 out of 47) for AR came from extra-team stakeholders rather than internal team members.

Regarding the overall perceptions of the extra-team stakeholders' interactions with FR and AR, the EFA pattern matrix following varimax rotation reveals that contrary to the three team boundary-spanning activities as identified by Ancona and Caldwell (1992), only two factors with eigenvalues greater than 1.0 were identified, yielding mixed support for Proposition 1c. Interestingly, two team boundary-spanning items from the original scale – importance and visibility – did not load on either of these factors. The remaining items and the two emergent factors are presented in Table 6.

Following the recommendation of Gaskin (2012), we assigned labels to these two factors after reviewing the items and identifying a common theme. Hence, based on the patterns of factors among the nine items, the following two constructs emerged, namely: Support and Coordination. The coordination factor is a 3-item version of the original Ancona and Caldwell (1992) 5-item scale. The support factor is a

Table 7 Regression analyses of extra-team stakeholders

<i>Models</i>	<i>Independent variables</i>	β	<i>Models</i>	<i>Independent variables</i>	β
<i>FR</i>			<i>AR</i>		
<i>Support</i>	ESM visits in last 30 days	0.08	<i>Support</i>	ESM visits in last 30 days	0.11***
	ESM Activity	0.14*		ESM Activity	0.02
	Position (Hierarchy)	0.14*		Position (Hierarchy)	0.21***
	$R^2 = 0.08$			$R^2 = 0.19$	
	$N = 220$			$N = 394$	
<i>Coordination</i>	ESM visits in last 30 days	-0.19**	<i>Coordination</i>	ESM visits in last 30 days	0.11*
	ESM Activity	0.18**		ESM Activity	-0.02
	Position (Hierarchy)	0.11 (n.s.)		Position (Hierarchy)	0.11*
	$R^2 = 0.09$			$R^2 = 0.09$	
	$N = 220$			$N = 394$	

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

Note: We used the log2 of ESM Activity in the regressions to make the range in values roughly equivalent to the ranges for the other variables in the equation.

compound factor that includes both items from representation and information search. Although for internal members, representational and information search activities are clearly distinct in purpose, for external people all these items appear to relate to resource provision or support, whether monetary or informational. Both factors for the two data sets – that is, extra-team stakeholders from FR and AR, respectively – displayed adequate reliability, with high Cronbach's α values (Support: 0.855/0.885 and Coordination: 0.826/0.861).

Given the exploratory nature of this study, we conducted basic regression analyses to assess the effect of ESM usage (recency and activity-level) as well as hierarchical level (position) on perceptions and reciprocations of team boundary-spanning activities to investigate Propositions 2 and 3b–5b.

As Table 7 shows, the findings for the two units, FR and AR, are dissimilar. Whereas recent ESM visits (visits in the last 30 days) has no effect on Support and a significant negative effect on Coordination for FR, it has a significant positive effect on Support and Coordination for AR. Thus, the number of recent visits, that is, passive engagement, did not emerge as a reliable predictor of enhanced team boundary-spanning support or coordination by extra-team stakeholders for FR.

Furthermore, Log Activity – a variable reflecting the total number of activities (e.g., views, likes, comments, created posts etc.) performed on the ESM – has a positive effect for both Support and Coordination in FR and has a positive effect for Support in AR, but a negative effect on Coordination in AR. It thus appears that Log Activity is a reliable predictor of team boundary spanning for FR. One explanation for this improved reliability is that simple visits to an ESM may not result in activity, and hence may or may not contribute to team boundary spanning. A visit might provide an extra-team stakeholders with new information, which may be helpful in the future. However, unless this person takes some action (which may happen outside the system), the original poster will remain unaware that his or her post has had some effect. Recent research on the social capital benefits of public social media similarly finds that active use is more likely to result in payoffs than passive use (Burke *et al.*, 2010).

Finally, with respect to position (i.e., hierarchy), we notice a positive effect on Support for FR and on both Support and Coordination for AR, confirming that higher-level managers are more likely to be able to provide resources and other forms of support and therewith form important target audiences for representational activities.

Finally, through triangulation of the survey data with the ESM log data, we were able to further determine the proportion of extra-team stakeholders – who interacted with the public blog pages – that belonged to a senior management level. In total 18 out of the 149 people that had engaged passively or actively with the AR and FR blog were executive or director-level managers and the remainder consisted of general managers and employees. In other words, 12.1% of all engagement originated with senior level managers, which is substantially higher than their proportion inside The Company, where only 1.5% (145 out of 10,000) of all employees belong to the senior management level. Hence, there is a strong representation of higher-level managers among the extra-team stakeholders engaging with the public blog pages of AR and FR, further underscoring the applicability of representational activities aimed at lobbying up the hierarchy.

We would like to note that the R^2 values of both Support and Coordination are relatively small for FR (i.e., 0.08 and 0.09, respectively) and the R^2 value of Coordination is relatively small for AR (i.e., 0.09). This, however, does not represent a threat to the model's validity. suggests that the amount of actual association between variables, in many cases, is greater than the proportion of variance explained by computing R^2 . In addition, low R^2 values are common in behavioral science research (frequently cited examples include Davis *et al.*, 1989; Davis, 1993; Cyr *et al.*, 2009). Moreover, both Support and Coordination are influenced by a very small set of constructs (i.e., ESM use and position). In comparison with multi-relationship models encompassing more variables, a relatively simple model – like the one presented in Table 7 – tends to provide low R^2 values (Nunnally, 1978). Finally, it is important to mention that ESM is only one platform available among a plethora of communication modes – both computer-mediated and face-to-face – that is likely to further account for the relatively low R^2 values.

Summary of results

Coordination – like the factor describing internal members' team boundary-spanning efforts – clearly emerges as a distinct factor for extra-team stakeholders' reciprocating actions. However, whereas representation and information search – that is, lobbying for monetary support or scouting for information – are two separate factors for boundary spanners internal to the group; these emerge as a single factor – namely

Support – when describing the reciprocating actions of extra-team stakeholders.

In line with our theoretical propositions, greater ESM activity (but not simple visits to the site) is associated with expressions of support by extra-team stakeholders. In addition, the hierarchical position of extra-team stakeholders positively affects their perceptions about willingness to reciprocate through expressions of support for FR and AR. With respect to coordination, the results were ambivalent. Although in the case of FR hierarchical position plays no role – as anticipated – its role in the case of AR was significantly positive. These results will be further discussed in the next section of this paper.

Discussion and conclusion

Today, the proliferation of social media technologies in organizational contexts has profound implications for the ability of groups in organizational to engage in team boundary-spanning activities. Yet, given the lack of empirical research on the use of ESM for team boundary spanning and the one-sided focus of the team boundary spanning literature on internal group members – despite the external orientation of such activities – this paper set out to answer two research questions aimed at understanding (1) the types of intra-organizational team boundary-spanning activities that are enacted by groups through ESM and (2) how ESM influences the perceptions and reciprocations of these activities by extra-team stakeholders.

To answer these two research questions, two separate studies were conducted. Study 1 used largely qualitative data from public blog posts from the two organizational units – FR and AR – to infer the types of team boundary-spanning activities enacted through ESM and their relation to the poster's hierarchical position in the unit, as inferred from ESM logs. On the basis of previous studies and existing theories taking an affordance-approach to ESM use, we anticipated that ESM would be useful for all three team boundary-spanning activities – representation, coordination, and information search. Our findings from Study 1, however, show that internal members enact a uniform set of representational activities using ESM, but do not leverage the ESM tool for informational or coordination activities. Although, based on a review of the ESM literature, we anticipated ESM to offer support for the full range of team boundary-spanning activities, previous boundary spanning studies have shown that representational activities are frequently enacted in order to help build and develop external social networks (Levina and Vaast, 2005; Whelan *et al.*, 2011, 2013). Furthermore, the dominance of representational activities seems a direct consequence of the core affordance characterizing the organizational use of social media, namely *visibility* (Treem and Leonardi, 2012). *Visibility* involves the ability to make behavior, knowledge, and connections visible to others, thereby lending strong support for representational activities.

Although we identified other affordances from the literature that have been shown to support similar types of behaviors (see summary in Table 2 earlier in this paper), the *visibility* affordance seems to restrict ESM use for more organized and perhaps private communications between various units in the organization that is required for effective information search and coordination to occur. As shown by Gibbs *et al.* (2013),

concerns over job security and confidentiality – following ESM's inherently fluid and open nature – may limit people's willingness to openly share information and coordinate on a blog page that is open to all employees in the organization, especially in units such as AR and FR that handle sensitive client data. Hence, these groups may leverage other, more private modes of communication for necessary risk avoidance. This echoes the findings of Jarrahi and Sawyer (2013), who find utility in examining suites of communication media rather than the use of any modality in isolation.

Our second set of findings relates to the link between a poster's hierarchical function and post type. In this context, we found a general trend where higher-level members – that is, those with a leadership position on the team – are more likely to create representational posts, whereas general team members are more likely to engage in information search activities. Although the relatively small sample size of blog posts and team members limited our ability to test for significance, this general trend did confirm our theoretical proposition that a poster's hierarchical position is likely to influence the types of team boundary-spanning activities in which he or she engages.

Study 2, which combined quantitative data from surveys and ESM logs of extra-team stakeholders, revealed a similar pattern underpinning their reciprocating actions. Regression analyses on the combined results from the survey and the ESM log data revealed an ambivalent and contextual role of ESM in the support and coordination extended by extra-team stakeholders *vis-à-vis* team boundary-spanning activities from internal members of FR and AR. Although positive effects of active (not passive) use were found consistently with respect to *support* activities from extra-team stakeholders, the relation between ESM use and coordination activities was inconsistent.

These mixed results for coordination may be in line with dominant configurations and usage patterns of current ESMs as better tools for the representational team boundary-spanning needs of organizational units. It may be that ESM are less well-equipped to support real coordination with other units. It may be that excess activity harms coordination when team blog posts are trivial or aimed too much at self-presentation and reputation management. Although we focused on public (i.e., to the whole organization) group posts – which are the team-level equivalent of an individual profile page – similar issues may occur for individuals with profile pages that solely attempt to self-promote. Alternatively, it may be that other organizational media such as email, phone, or video conferencing are considered better tools for coordination activities, as suggested by Jarrahi and Sawyer (2013). However, an analysis of the use of these other communication media is beyond the scope of this study.

In addition to the effect of ESM use, we discovered that hierarchical position plays a pivotal role in extra-team stakeholders' ability to recognize and reciprocate team boundary-spanning activities aimed at obtaining monetary or other forms of support. Thus, in line with team boundary-spanning theory, hierarchy plays a role when it comes to both the originator of posts and the reciprocator in a boundary-spanning relation.

Implication for the literature on ESM and team boundary spanning
This study provides four novel contributions to the literature on ESM and team boundary spanning.

First, it offers insight into the role of ESM in supporting team boundary-spanning activities, responding to calls in both the ESM and team boundary spanning literature. Although the embryonic literature on ESM has suggested that these tools may support various social capital formation, knowledge-sharing, and coordination related activities; this study highlights that whereas ESM offers adequate support for representational team boundary-spanning activities – that is, impression management at supra-individual levels – it is less well-equipped for supporting information search and coordination. Although this finding may appear to suggest that ESM lacks overall usefulness for team boundary spanning, we believe this is an erroneous interpretation. Rather, ESM serves to initiate a crucial awareness of relevant individuals and possible collaborators in the organization – as a function of its inherent visibility – triggering more direct interactions via other media that offer specific support for intensive collaboration and coordination. A possible implication of this finding is that it may be that, just as certain individuals serve as crucial intermediaries or connectors, spreading information from gatekeepers connected to sources outside the organization (Whelan *et al.*, 2010; Whelan *et al.*, 2013), some teams may perform this role via the ESM's team blog. Given that we only examined two organizational groups, we cannot know if such role specialization via ESM at the team level occurs, but we offer it as a future research question.

Second, by offering the extra-team stakeholder view – that is, complementing the one-sided, inside-out, perspective dominating the existing team boundary spanning literature with an outside-in perspective – we discovered three important insights for extending the team boundary spanning literature. One, extra-team stakeholders have significant freedom in their responses to original team boundary-spanning posts by internal members; for example, one can provide information or engage in coordinating actions even when the original post is representational in nature. Two, although from the originator's point of view three team boundary-spanning activities exist – representation, coordination, and information search; the extra-team stakeholders only perceived two such activities, namely support – which involves both monetary and informational resource provision – as well as coordination. Three, ESM appears to play an ambivalent role in team boundary spanning by strongly enhancing external support for groups – whether informational or monetary – however, offering limited tangible evidence of coordination activities.

Third, given that team boundary spanning appears to be foundational to many of the organizational processes of interest to ESM researchers, our study provides a first step toward exploring a broader range of outcomes that may be associated with ESM use in organizations, such as coordination, knowledge, resources needed for innovation (Hargadon, 1998); learning (Edmondson, 1999); generative capacity (Van Osch and Avital, 2010; Jarvenpaa and Lang, 2011); customer satisfaction (Bettencourt *et al.*, 2005); and time compression/efficiency (Mohrman *et al.*, 1995) for which team boundary spanning seems to be a crucial mediator. To the team boundary spanning literature we contribute an understanding of the use of virtual tools to support a range of activities in response to recent calls for validating existing theories in virtual settings (Kirkman and Mathieu, 2005, Marrone *et al.*, 2007).

Fourth, methodologically we provide a coding scheme that can be used with high reliability for analyzing ESM posts for team boundary-spanning activities as well as a survey scale that can be employed for measuring an extra-team stakeholder perspective in relation to team boundary-spanning efforts from an organizational team or unit. Furthermore, by triangulating findings from mixed data types – qualitative and quantitative – and sources – behavioral and self-reported – confidence in the reliability and validity of the findings presented in this paper is enhanced.

Strategic implications

On the basis of our findings, several implications for corporate strategy regarding the organizational implementation and use of ESM emerge. First, this paper illustrates the importance of leading by example and thus the need for managers to become active participants in ESM. Furthermore, to motivate individuals and units in an organization to employ ESM in ways that enhance the efficiency and effectiveness of team boundary spanning, it is important to develop adequate incentive structures. Simply encouraging any form of activity may not provide enough incentive for employees to incur the costs of providing informational and other resources, and may, on the other hand, yield activity with minimal team boundary-spanning payoffs.

Second, following our finding that ESM use may have a negative or at best ambivalent effect on coordination, follow-up conversations with AR and FR members revealed that whereas ESM may serve to enable initial awareness (i.e., representation), other tools – such as email, phone, or video conferencing – are considered better tools for coordination and co-creation. An important strategic question emerges, namely how do you weave ESM into the portfolio of IS/ICTs available to employees, teams, and units inside the organizations. With the adoption of ESM, managers need to craft explicit strategies and policies informing not just the appropriate uses of ESM but also desired uses to avoid fragmentation – that is, a situation where different groups and units develop separate and diverse portfolios of tool usage – that could lead to the potential deterioration of team boundary spanning.

Third, based on our framework of team boundary-spanning activities, managers should actively assess if there is a match or mismatch between the activities that are realized through ESM and the ones that are strategically important. This again reveals the importance of leading by example, creating the right incentive structures, as well as establishing an ESM environment characterized by psychological safety (Edmondson, 1999), so that concerns about job security or confidentiality do not undermine the strategic use of these tools (c.f., Gibbs *et al.*, 2013).

Challenges and future research

Given the exploratory nature of this study, our findings can only be considered preliminary. A primary limitation stems from the analysis and comparison of only of the team blog use and only from two organizational units which were rather small in size. In future iterations of this study, we wish to expand our multiple-case study to include more organizational units – including units belonging to other organizational departments (e.g., product development, marketing,

procurement, etc.) – and to grow the number of cases studied within each unit.

Although this paper represents an initial attempt to assess how ESM is used in boundary-spanning activities by internal team members as well as how ESM affects perceptions and reciprocations of these activities by extra-team stakeholders, more work remains to be done. Future research, by expanding the number and nature of groups under investigation as well as exploring ESM potential for team boundary spanning, should aim to further disentangle which team boundary-spanning activities are best supported by these novel tools and how.

In addition, in this study we focused on the role of hierarchy as a predictor of the types of boundary-spanning activities that are enacted by team members as well as reciprocated by extra-team stakeholders. Our selection of hierarchy as an important mediating factor was guided by the existing team boundary spanning literature, however, other mediating factors, such as organizational culture and organizational norms, such as reciprocity, could be interesting factors to explore in future research studying the role of ESM in team boundary spanning.

Furthermore, given that ESM is only one technology in a portfolio of IS/ICTs available to employees, a promising direction for future research is to utilize the approach from Jarrahi and Sawyer (2013) in their analysis of knowledge-sharing, and employ a multimodal approach that looks at the interplay of multiple (computer-mediated) communication modes in the context of team boundary spanning to understand their respective usefulness for supporting distinct activities – representation, coordination, and information search.

Also, future research leveraging behavioral log data of ESM could explore if the network structures characterizing intra-organizational communication patterns are suggestive of or optimal for the focal team boundary-spanning activity. For instance, for ESM to support ambassadorial representation, a network structure should reveal links between the boundary spanner and higher-level managers, while groups engaging in awareness creation should exhibit more lateral relations. On the other hand, network structures indicative of coordination or information search would consist of peer-level interactions, with the former likely displaying a smaller but denser network structure – that is, repeated interactions – and the latter a wider yet looser structure – that is, a large number of one-off exchanges. Therefore, adopting a network view in future studies could improve our understanding of the interplay between ESM and team boundary spanning.

Notes

- 1 Please note that the actual terms used to describe these three team boundary-spanning activities by various authors differ.
- 2 This classification of user types is based on algorithms from JIVE software rather than imposed by theory
- 3 Cohen's κ is a statistical measure of interrater agreement and it is generally considered to be a more robust measure than simple percentage agreement because it takes into account the agreement occurring by chance. A Cohen's κ coefficient of 0.71 is considered substantial agreement (Landis and Koch, 1977). The reported coefficient is a cumulative (omnibus) score computed across the three categories of the coding scheme – representation, coordination, and information search.

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Appendix A

Table A1 Examples of the three team boundary-spanning activities from the AR and FR public blog posts

	<i>Representation</i>	<i>Coordination</i>	<i>Information search</i>
1.1.1.1.1. Example	Here is a great video showing the work of our team in Vodafone's new workplace	OK, CDC folks, the cancellation of the innovation center meeting threw us a little curve ball, but here's the revised planning	Has anyone worked on an innovation center that they could share?

Note: Select information has been removed to protect the identity of the case organization and research subject involved.

Appendix B

It is important to note that whereas all original information search items were used to construct the mirror items for extra-team stakeholders, some of the representation and coordination items were not adapted into mirror items, either because of substantial overlap with existing items or the lack of relevance to the context of this study. Ancona and Caldwell's (1992) original study focused on product development teams as reflected in items pertaining to product design and procurement, hence, these items are not appropriate in the applied research teams we studied.

Excluded items include:

- Keep other groups in The Company informed of your team's activities
- Scan the environment inside your organization for threats to your team
- Report the progress of the team to a higher organizational level
- Resolve design problems with external groups
- Procure things which the team needs from other groups or individuals in The Company

Table B1 Mirror team boundary-spanning scale for extra-team stakeholders

<i>Extra-team stakeholder items</i>	<i>Original items (Ancona and Caldwell, 1992)</i>
<i>Representation</i>	
FR's/AR's activities are important	Persuade other individuals that the team's activities are important
FR's/AR's activities are visible	'Talk up' the team to outsiders
I would be willing to support FR/AR	Persuade others to support the team's decisions; Find out whether others in The Company support or oppose your team's activities
I would provide resources (e.g., money, new members, equipment) to FR/AR	Acquire resources (e.g., money, new members, equipment) for the team
I would provide FR/AR with important information on The Company's strategy or political situation that may affect their activities	Find out information on your company's strategy or political situation that may affect your project
<i>Coordination</i>	
I or my unit coordinate(s) activities with FR/AR	Coordinate activities with external groups
I or my unit negotiate(s) with FR/AR for delivery deadlines	Negotiate with others for delivery deadlines
I or my unit reviews FR's/AR's outcomes	Review product design with outsiders
<i>Information Search</i>	
I would provide FR/AR with important information on what competing firms or groups are doing on similar projects	Find out what competing firms or groups are doing on similar projects
I would provide FR/AR with information on marketing ideas/expertise	Scan the environment inside or outside the organization for marketing ideas/expertise
I would provide FR/AR with information on technical ideas/expertise	Collect technical information/ideas from individuals outside of the team; Scan the environment inside or outside the organization for technical ideas/expertise

Appendix C

Table C1 Coding scheme and manual

<i>Team boundary spanning</i>	<i>Sub-activity label</i>	<i>Definition</i>
<i>Representation</i>		Ambassadorial or impression management; involves the lobbying for the group up the hierarchy in order to create favorable impressions and advocate among managers and senior managers, hence, is a largely vertical form of team boundary spanning
	Talk Up	Persuade other individuals that the group's activities are important or otherwise 'Talk up' the group to outsiders
	Persuasion	Persuade others to support the group's decisions
	Resources	Acquire resources (e.g., money, new members, equipment) for the group
	Progress	Report the progress of the group to a higher organizational level
	Support/Oppose	Find out whether others in The Company support or oppose your group's activities
<i>Coordination</i>	Strategy/Politics	Find out information on your company's strategy or political situation that may affect your project
	Informing	Keep other groups in The Company informed of your group's activities
		Task coordination or intergroup process; involves the facilitation of effective decision-making and design implementation through cross-boundary strategizing, planning, and evaluation; hence it is a horizontal form of team boundary spanning
	Resolution	Resolve design problems with external groups
	Coordination	Coordinate activities with external groups
	Procurement	Procure things which the group needs from other groups or individuals in The Company
<i>Information search</i>	Negotiation	Negotiate with others for delivery deadlines
	Review	Review product design with outsiders
		Scouting; involves the general scanning of the external group environment for gaining access to relevant information, knowledge, and expertise; hence, is a largely horizontal form of team boundary spanning
	Competition	Find out what competing firms or groups are doing on similar projects
	Market Scan	Scan the environment inside or outside the organization for marketing ideas/expertise
	Technical Scan	Collect technical information/ideas from individuals outside of the group



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