Bowling Online: Social Networking and Social Capital within the Organization

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ABSTRACT

Within an organizational setting, social capital facilitates knowledge management processes in that it enables individuals to locate useful information, draw on resources and make contributions to the network. This paper explores the relationship between various dimensions of organizational social capital and the use of an internal social network site (SNS). We hypothesize that the use of a SNS contributes to social capital within the organization in that SNS users are able to maintain larger networks of heterogeneous contacts. Additionally, the affordances of the site support social interaction between users, thus helping individuals maintain existing relationships and deepen developing ones. We find that bonding relationships, sense of corporate citizenship, interest in connecting globally, and access to new people and expertise are all associated with greater intensity of use of the social network site.

Categories and Subject Descriptors

H5.3. Group and organization interfaces: Collaborative computing.

General Terms

Human Factors.

Keywords

Online social network sites, social capital, organizations, expertise sharing, knowledge management.

1. INTRODUCTION

Online social network sites (SNSs) are now well established among the general population, with sites like Facebook and MySpace boasting in excess of 100 million users each, according to a recent Comscore estimate [10]. Although some of these sites were initially directed at younger audiences such as college students, recently SNSs have been attracting large numbers of older users interested in professional networking [25]. Use of SNSs like Facebook is also becoming more visible within organizations, particularly among younger employees and recent hires who joined the site as college students [13].

Despite growing SNS use by individuals for personal and professional networking, few companies have reported deploying their own internal SNSs. Yet decades of research on social networks in the organization argues that informal relationships among coworkers are important conduits through which organizational knowledge and expertise can be shared [18, 22, 34]. Recent work examining Facebook use among college students makes a compelling argument that there is a link between use of the service and students' "social capital" [17, 32]. SNSs provide affordances that enable users to create and maintain a network of heterogeneous connections – an important component of bridging social capital [5, 15, 17]. Such a network provides access to information and opportunities that might not be available within an individual's set of close-knit relationships. It stands to reason, then, that organizational SNSs can play an important role in building social capital in the workplace. This social capital may assist individuals, who benefit from the social support associated with bonding social capital, and the organization itself, because the kinds of relationships associated with bridging social capital are likely to support other critical organizational processes, such as knowledge-sharing.

This paper describes use of an organizational SNS in IBM, a large multinational firm, and explores the relationship between its use and employees' perceived levels of social capital. It contributes to the literature on social network sites by providing an empirical analysis of the link between use of an *internal SNS at work* and social capital. This work thus lays the foundation for future explorations of SNS use in the workplace as these sites evolve to cater to intra-organizational social networking needs.

2. SOCIAL CAPITAL, ORGANIZATIONS, AND SOCIAL NETWORK SITES

The term social capital broadly refers to the resources that derive from the relationships among people in varying social contexts [9]. It has been conceptualized at individual, group, organization, community, and even national levels of analysis [2, 4, 7, 9, 24, 27-29, 33]. Theorists debate whether social capital is a private good, whereby individuals invest in the formation of relationships so they may access the benefits others make available, or a public good, such that any member of a social group with social capital may enjoy its benefits [11]. We focus here on *individual* social capital, where individuals may have varying amounts of social capital by virtue of the fact that they operate in diverse social structures.

Lin [24] defines social capital as an "investment in social relations by individuals through which they gain access to embedded resources to enhance expected returns of instrumental or expressive actions" (p. 39). In this definition, reciprocity is a key mechanism for explaining how social capital functions among individuals. Reciprocity implies that people obtain benefits from the network and give back to the network.

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Social network sites may help individuals create and maintain social capital because the technical and social affordances of SNSs enable interaction, and therefore reciprocity, with a larger network of social connections. These large networks are more likely to include "weak ties," such as acquaintances and friends of friends, who are more likely to provide new information and diverse perspectives. These benefits are associated with what Putnam [29] calls "*bridging social capital*." Our previous research has found a strong connection between use of the social network site Facebook and higher levels of bridging social capital among undergraduates at a large Midwestern university [17, 32].

A second dimension of social capital, called *bonding social capital*, refers to the kinds of support that originates in close-knit relations such as intimate friends and family [29]. These strong relationships are more likely to provide emotional support and tangible benefits, such as financial loans. Within an organization, this concept may be associated with feelings of social and tangible support. Our previous work has also documented a relationship between SNS use and bonding social capital, although it was not as strong as the connections between bridging social capital and SNS use [17].

When applied to the organizational context, the social capital concept allows us to examine the way in which social relationships might facilitate knowledge exchange [30]. Social capital within an organization enables individuals to locate useful information and also to draw on resources and make contributions to the network.

The concept of social capital has received extensive treatment in the organizational literature [2, 27, 33] and is generally viewed as being rooted in the social network structure of a firm [6, 7]. We believe the constructs of bonding and bridging are equally relevant within an organizational setting. Bonding social capital in an organization implies that there is trust and a sense of obligation that encourages reciprocity, while bridging social capital is associated with the kinds of weak ties that facilitate access to non-redundant information.

Social capital is embedded in the informal networks among workers. Researchers have also considered it to be a knowledge management issue, amenable to support by information technologies [19]. Earlier knowledge management approaches focused on attempts to classify, store, and retrieve organizational knowledge via expert systems. A social capital perspective highlights the need to foster social relationships among employees who can provide information and expertise when the need arises [19]. The problem with these earlier approaches is that information is decontextualized, and therefore harder to relate to a given problem [1]. A number of systems designed to link people to others with needed expertise have been developed, including expertise directories [3], and tools to support queries to experts (e.g. [16]). Generally, such expertise sharing systems do not support the establishment of relationships over the long term, or the ability to visualize employees' social networks.

2.1 An Organizational Social Network Site

Beehive is a company-internal social network site launched in 2007 at IBM, a large, global IT corporation. Like other SNSs such as MySpace or Facebook, Beehive allows individuals to create an online profile and enables them to articulate relationships with others on the system [17]. Once a digital connection has been established on the site, users can track the activities of current friends and colleagues. User profile pages can be customized with a wide range of content, enabling users to present a comprehensive version of self, both professionally and personally. Sharing content is a primary focus of the site, which supports the sharing of photos, lists, and events that are associated with user profiles. The content and profiles on the site allow commenting, and the conversations between employees across the site are a mechanism for supporting informal communication between employees. Figure 1 shows an example of a profile page, with the user's shared content, his network connections, and a free-form "about you" section.

Figure 1. A profile on IBM's internal social network site, Beehive.

Since launching, 50,000 IBM employees have signed up with Beehive (~15% of the company) and between 10,000 and 15,000 employees visit each month. Over 400,000 network connections have been made between employees and 150,000 comments have been left on the thousands of profiles, photos and events.

Previous investigation of active Beehive users [12] suggested that user norms on the site differed from those found in externally-hosted social network sites such as Facebook [17] and internally-hosted sites such as blogging environments [20]. Earlier research on the service suggests that users are sharing a blend of both personal and professional information, connecting with people on a personal level, and learning about people they do not know. This opens the possibility of making connections in the future, either through the site or elsewhere [12, 14].

In terms of their motivations for using Beehive, interviews of key users found that they were not using the site for keeping up with close colleagues, but were instead using it for "social browsing" [23], discovering and connecting with colleagues that they did not know at all [14]. Employees reported using the site to reach out across team and division boundaries to connect with people around similar interests. They additionally reported being motivated to use the site to promote their careers and the projects within the company.

Although this existing qualitative research offers insights into user perceptions regarding their behaviors on the site and the reported benefits they receive from their use, it does not enable us to generalize to the entire site population, as the interview subjects

were highly engaged users. Additionally, while the rich data provided by interviews are useful for understanding some user motivations and perceptions, the existing research does not address the key concept of social capital and how use of an SNS inside an organization related to both bonding and bridging social capital.

2.2 Research Questions and Hypotheses

The relationship between Beehive use and social capital is nicely illustrated in the photo below (Figure 2). Serendipitously, in an unknowing homage to Putnam's [26] famous "bowling alone" concern, site users around the world have posted dozens of photos of themselves and their colleagues at the bowling alley. These illustrate the way that social software enables reflection, which can reinforce and potentially reshape social ties at work to enhance bonding and bridging social capital.

Figure 2. Photos of employees at bowling alleys, posted on the site by users in the US, China and New Zealand.

While previous qualitative work [9, 11] and evidence like these photos suggest that SNSs within the workplace can reinforce meaningful relationships within the workplace, little is known about the connection between social capital levels and SNS use at work. We hypothesize that those who use SNSs to keep in touch with their colleagues will have greater bonding social capital and bridging social capital in terms of access to their network. We expect that employees that use the SNS to initiate new relationships in the company will report higher levels of interest in connecting with others and greater access to new people and expertise. Overall, we hypothesize that the more someone uses a SNS, the greater the amount of social capital they will have.

3. METHODS

To determine the relationship between usage of Beehive and social capital, we developed a survey instrument which included items addressing SNS usage, social capital, and demographics. Measures of the intensity and purpose of usage of Beehive were adapted from Ellison et al.'s [17] Facebook Intensity scale. Additional questions about the likelihood of connecting with different types of colleagues within the workplace were also included, because previous interviews indicated that users might be using the site for connecting with weak ties rather than strong ties in their network [14]. The specific questions are shown in Table 1. For demographics, we asked subjects their gender, management level, job role, and use of other social software inside and outside the company. From server level logging, we also collected their date of joining the site and the country associated with their IP address.

Social capital measures were based on scales originally developed by Williams [35] and are similar to the items used by Ellison et al., [17] for measuring both bridging and bonding social capital. We further added several items regarding employees' abilities to find needed information or expertise in the company, given the organizational locus of this study as compared to Williams [35] and Ellison et al. [17]. Table 2 shows the individual items used.

The survey was hosted with a web-based survey tool and was sent to approximately half of the site's users who had joined at least six weeks prior: 20,508 users. The six-week benchmark was chosen so that users would have had an opportunity to use the site and receive its potential benefits prior to filling out the survey. Due to concerns expressed by company representatives over whether surveys needed to be translated to host country languages for each company site, we suspended the survey much sooner than we would have liked: a little over 24 hours after launching. Despite the shortened time for receiving responses, we nonetheless received 2435 responds to the survey, an 11 % response rate. The response rate would have been higher if the survey had been available for a longer period of time, but this rate is reasonable and in line with response rates from other corporate surveys. Our sample may also be biased towards users who are particularly enthusiastic about the site and/or replying to surveys in general, but that bias is not apparent in the dataset when we examine items such as time spent on Beehive. All questions on the survey were optional, so for each statistical test reported below, the sample size varies between approximately 1700 and 2400 subjects.

3.1 Sample Description

We present basic demographic characteristics of our sample. IBM does not release demographic data such as the distribution of workers by age or gender, so we cannot verify how representative the data are in terms of the company's employee population, but where available, we compare the survey data demographics to the demographics of the Beehive user population.

Because Beehive is an internal SNS, its user base has a demographic profile that reflects the employee pool as a whole, thus differing from Facebook and MySpace that skew younger. For example, Figure 3 shows the age range of the users responding to the survey. The median age range is 30-39 years old and the distribution covers the ranges of ages reported by employees at the company. Figure 4 shows the number of years users have spent working at the company and median range is 5-9 years. The company reports that 40% of its employees joined less than 5 years prior; 35% of the survey respondents reporting joining in this time frame.

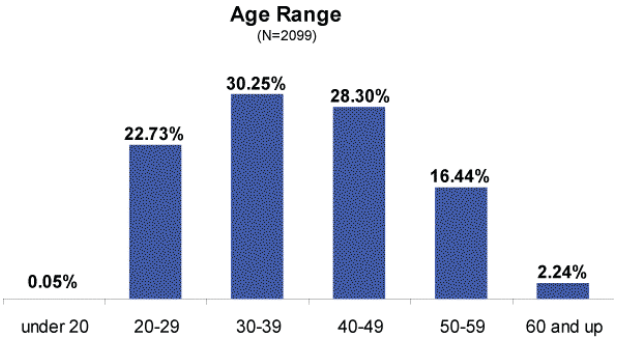

Figure 3. Distribution of ages of survey respondents

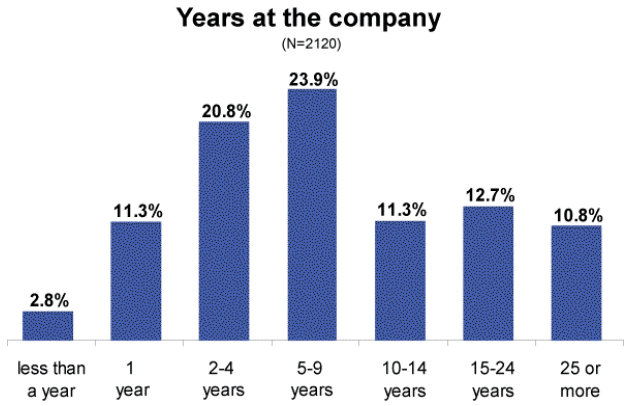

Figure 4. Years working at the company

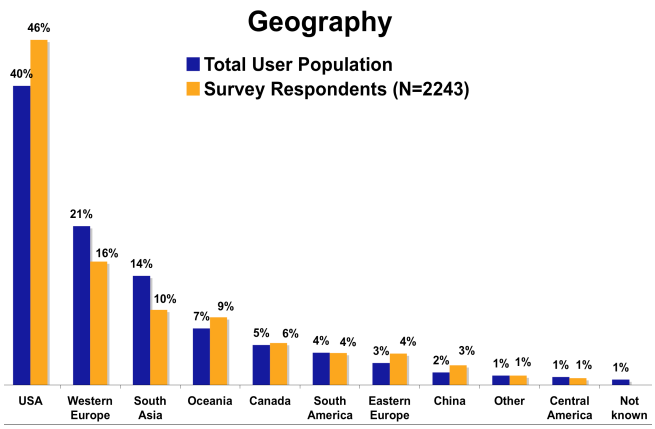

Figure 5. Geography of total site and of survey respondents

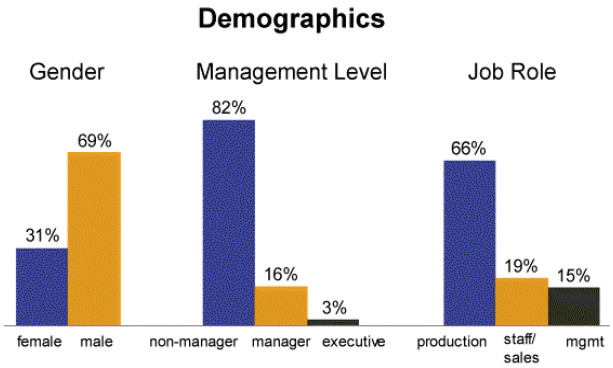

Figure 6. Gender, management and job role

Figure 5 shows the different geographies represented by the survey responses (in orange) and for the site's entire population (in blue). This is our strongest indication that the survey responses, despite the survey being suspended prematurely, are representative of the population of users on the site. There is a slightly higher response rate from the US users and slightly lower rate from Western Europe and South Asia. As shown in Figure 5, 46% of respondents work inside the US, 16% work in Western Europe, and 10% in South Asia. These values reflect the approximate regional breakdown of IBM's global workforce.

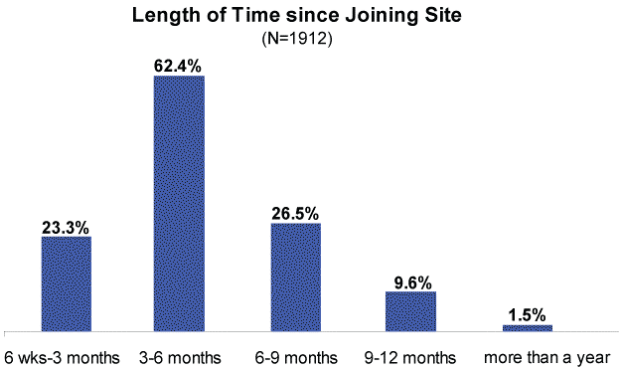

Figure 7. The amount of time since joining the site

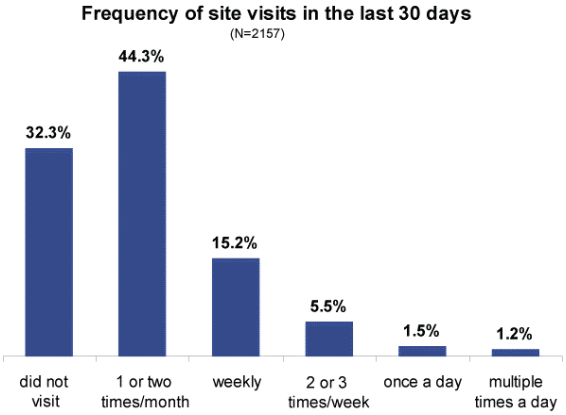

Figure 8. The frequency of visits to Beehive in the last 30 days

Figure 6 shows that the gender distribution is 31% female and 69% male among survey respondents. The distribution of non-managers, managers, and executives is 82%, 16%, and 3% (Figure 6). We further categorized the company's job roles into three types: production and line worker type jobs (e.g. engineering and manufacturing); staff, administrative, and sales; and management, which included project management. Most respondents work in production-type jobs (66%), 19% work in staff jobs and 15% work in management roles (Figure 6). We also asked subjects for their company division, and there was a reasonable distribution across divisions.

4. RESULTS

4.1 Site Usage

The survey was sent to users who had joined at least 6 weeks prior, so each person had an opportunity to be established as a member of the community. The majority of the respondents joined Beehive between 3 and 6 months prior to filling out the survey (Figure 7), with a mean of 182 days on the site. More than half of the respondents said they either visited once or twice in the last 30 days, or not at all (Figure 8). The site has a visible population of highly active users – however most respondents do not visit frequently.

In order to have more robust measures of usage that capture both attitudes and behaviors, we developed three different usage scales: an intensity of site usage, a scale reflecting the tendency to use the site to connect with new people, and a scale reflecting the tendency to use the site to connect with existing and former contacts (Table 1).

The intensity of use scale parallels [17], combining behavioral aspects of system usage (visits, number of connections) with items reflecting the degree to which respondents felt site usage was integrated into their work routines. The number of connections on the site varied considerably, from a low of zero to a maximum of 1127. However only two respondents reported more than 400 connections, so these were treated as outliers. The mean number of connections was just under 17, as shown in Table 1. As might be expected by the relatively limited frequency of site visits reported by respondents, they generally did not consider the site a part of their everyday work routine. The behavioral and attitudinal usage items were combined into an intensity of use scale that exhibited high reliability (Cronbach's alpha = .89, Table 1).

We did not find significant differences in the intensity of Beehive usage by gender, management level, or job role. However, intensity of use did decline modestly with age ($r = -.13$, $p<.0001$), and, as shown in Figure 9, varied by world region. Respondents outside North America and Western Europe showed slightly *higher* usage rates than in North America and Western Europe (ANOVA $F=11.23$, $p<.0001$, $R^2=.05$). Higher SNS use in newly emerging regions such as South Asia, China, Oceania, Eastern Europe, Central America and South America suggests a potentially higher need for tools to support making work connections in these areas.

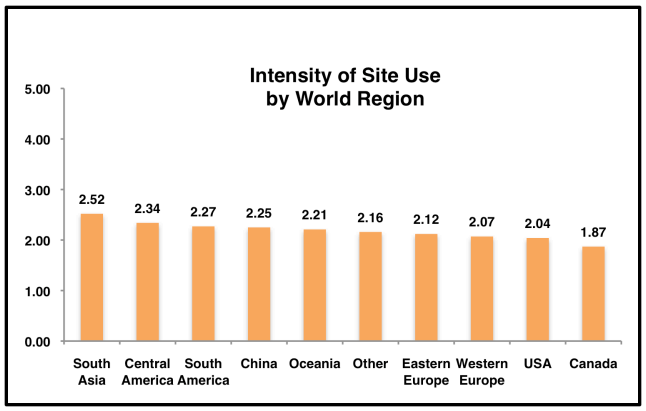

Figure 9. Intensity of site use among world regions

We also asked respondents to describe their connections, noting the degree to which they connect with other members of their work group, former colleagues, friends in the company, people they initially met on the site, or people they have never met in person. In addition, we asked respondents to tell us how much they used the site to connect with these kinds of people. We grouped items as shown in Table 1, creating one scale that measured the use of the site for connecting with existing and former colleagues in the company (Cronbach's alpha=.75), and one scale that measured the use of the site for connecting with entirely new people (Cronbach's alpha=.81). Generally, respondents report more use to connect with existing and former contacts in the company than to meet entirely new people, a finding that parallels use of other SNSs that emphasize networks defined by an institution or region [23]. Note that it reveals a different pattern of usage than reported among interviews with very active site users, who do seem to be more likely to use the site to meet new people [14].

Table 1. Site Usage Measures

Measures and Scales	Mean	S.D.
Days since joined Site	182.5	73.99
Intensity of Site Use (Cronbrach's Alpha=.89)	**2.11**	**.73**
Visits to Beehive in past 30 days[1]	1.03	1.01
Number of Beehive connections (i.e. friends)[2]	16.79	29.89
Beehive has become part of my workday routine[3]	2.01	.91
Beehive is part of my everyday activity[3]	1.93	.85
I am proud to tell people I use Beehive[3]	3.12	.95
I feel out of touch when I haven't logged into Beehive in a while[3]	2.08	.96
I feel I am part of the Beehive community[3]	2.61	1.09
I would be sorry if Beehive shut down[3]	3.09	1.14
Use Site to Connect with Existing and Former Contacts (Cronbach's Alpha = .75)	2.64	.90
How many connections are from your work group[4]	2.65	1.54
How many connections are former colleagues[4]	2.44	1.45
How many connections are friends at IBM[4]	2.83	1.51
I use Beehive to communicate with colleagues in my work group[3]	2.29	1.05
I use Beehive to keep in touch with former colleagues[3]	2.74	1.19
I use Beehive to keep up with my network at IBM[3]	2.95	1.21
Use Site to Connect with New People (Cronbach's Alpha = .81)	2.31	.89
How many connections are people you initially met on [the site][4]	1.59	1.03
How many connections are people you have never met face-to-face[4]	2.05	1.35
I use Beehive to get to know people I would otherwise not meet at IBM[3]	2.65	1.17
I use Beehive to find people who know something about a particular topic[3]	2.54	1.12
I use Beehive to discover people with similar interests[3]	2.66	1.16

[1] scale ranged from 0=none, 1=1 or 2 times, 2=weekly, 3=2 or 3 times a week, 4=once a day, 5=multiple times a day
[2] outliers were recoded to 400. The log of connections was used when creating the intensity of use scale
[3] scale ranged from 1 = strongly disagree to 5 = strongly agree
[4] statement scales ranged from 1=none to 5 = a lot

4.2 Social Capital Scales

Respondents were asked to indicate how much they agreed or disagreed on a five-point scale with a series of statements that tapped into various dimensions that have previously been associated with the concept of social capital. In order to analyze these data, we subjected them to an exploratory factor analysis, using principal components with varimax rotation. As shown in Table 2, these items factored into five distinct dimensions.

The first dimension we labeled ***bonding social capital***, as the high loading items clearly reflected the degree to which respondents have strong ties in the company who provide emotional and other forms of tangible support (like a loan of $500) that one would only expect from a close connection.

We considered the remaining four dimensions to be aspects of ***bridging social capital***, since they reflected the degree to which respondents felt connected to or interested in a broader community of weaker ties. The first bridging dimension, ***ability to access expertise***, has high loading items that reflect a classic weak tie benefit - the extent to which the respondent reports being able to

ask people for information or help, including those outside their work group or even in another country. The second bridging dimension, ***interest in global connections***, measures respondents' perceptions that they are part of a global, connected community and their interest in other cultures. The third bridging dimension, ***access to new people***, reveals an important structural aspect of bridging - the extent to which respondents' report coming into contact with new people at work. Finally, the fourth bridging dimension, ***citizenship***, taps into another critical aspect of social capital, the extent to which respondents are willing to "give back" to the company. We averaged the high loading items in each of these dimensions, creating scales that each demonstrated adequate reliability. Respondents generally reported somewhat higher scores on the bridging social capital scales than the bonding social capital scale.

Table 2. An exploratory factor analysis of social capital dimensions

Measures[1]	Bonding Social Capital	Ability to Access Expertise	Interest in Global Connections	Access to New People	Citizenship
If I need an emergency loan of $500, there is someone at IBM I could ask to loan it to me	**0.77**	-0.02	0.09	0.05	0.09
If I need to borrow money for lunch, I know someone at IBM who would loan me a few dollars	**0.75**	0.08	0.01	0.10	0.04
I know people at IBM who would put their reputation on the line for me	**0.61**	0.29	0.02	0.04	0.16
When I feel lonely, there are several people at IBM I can talk to	**0.60**	0.31	0.16	0.17	-0.09
I know my work group well on a personal level	**0.53**	0.15	0.08	0.04	0.21
If I need it, I can ask for expertise from someone outside of my IBM division	0.05	**0.73**	0.07	0.22	0.31
When I have a problem at work, there are several people at IBM I know I can call on for help	0.26	**0.72**	0.09	0.11	0.00
If I need it, I can find out the opinion of a IBM employee working in another country	0.07	**0.66**	0.12	0.28	0.24
There is someone at IBM I can turn to for advice about making important career decisions	0.36	**0.63**	0.20	-0.04	0.00
Interacting with people at IBM reminds me that everyone in the world is connected	0.09	0.13	**0.85**	0.11	0.06
Interacting with people at IBM makes me feel like a part of a world-wide community	0.10	0.22	**0.81**	0.06	0.16
Interacting with people at IBM makes me curious about other cultures	0.08	0.02	**0.74**	0.14	0.19
At IBM, I come in contact with new people all the time	0.14	0.19	0.14	**0.88**	0.09
I consistently have new people to talk to at IBM	0.14	0.19	0.16	**0.87**	0.17
I am willing to spend time outside of my normal work responsibilities to contribute to IBM	0.15	0.12	0.24	0.15	**0.78**
I am willing to contribute some of my personal time to mentor IBM employees	0.17	0.20	0.16	0.10	**0.81**
Eigenvalue and Percent	5.48 (32%)	1.92 (11%)	1.38 (9%)	1.09 (7%)	1.08 (6%)
Scale Means and Standard Deviations	3.53 (.69)	4.00 (.66)	4.06 (.73)	3.83 (.86)	4.00 (.76)
Cronbach's Alpha for scale	.73	.74	.79	.73	.87

[1] responses ranged from 1=strongly disagree to 5=strongly agree

4.3 Associations Between Demographics and Site Use with Social Capital

In order to test our hypothesis that greater use of the site would be associated with higher amounts of bridging and bonding social capital, we conducted a series of regression analyses. Our goal was to see if the associations held up, even after controlling for respondents' job roles, management levels, and other organizational and demographic characteristics. Hence we treated the five social capital dimensions as dependent variables, and used simultaneous linear regression to control for these other independent factors. The results of this analysis are displayed in Table 3. We focus below on findings that are statistically significant at the .05 level at a minimum.

After controlling for organizational and demographic factors, site usage did associate positively with each of the social capital measures.

Bonding social capital is predicted by intensity of use and using the site to connect with existing and former contacts. Using the site to connect with new contacts is negatively associated with this form of social capital. This makes sense, as use of the site to reinforce existing relationships should help to strengthen these ties.

Table 3. Regressions predicting dimensions of social capital from individual, organizational, and site usage variables

Independent Variables	Dependent Variables				
		Bridging Social Capital			
	Bonding Social Capital	Citizenship	Interest in Global Connections	Access to New People	Ability to Access Expertise
Number of days on Beehive	-.06	.00	.01	.06	.01
Intensity of Beehive use	.30 ****	.44 ****	.51 ****	.38 ****	.32 ****
Use Beehive for new contacts	-.16 ***	.07	.13 **	.10	-.04
Use Beehive for existing contacts	.26 ****	.17 **	.01	.17 **	.19 ****
Gender:					
Female	.01	-.03	.06 ***	.01	.04 *
Male	-.01	.03	-.06 ***	-.01	-.04 *
Age	-.18 ****	-.02	-.03	-.02	-.04
Years employed at company	.19 ***	.05	.15 *	.14 *	.13 *
Division:					
Corporate	.02	.14	.14	.07	.04
Business Consulting	-.04	-.02	-.04	-.05	-.08 *
Technical Consulting	-.14 ***	-.09 *	-.02	-.13 *	-.11 **
Operations	-.02	.00	.09	-.01	.02
Research	.20 *	-.04	-.07	.26*	.04
Sales	.02	.07	.00	-.01	.01
Software Development	.02	-.07	-.05	-.04	.01
Hardware Development	-.07	.01	.04	-.08	.06
Mgmt. Level:					
Executive	.13 *	.16 *	.09	.18 *	.17 **
Manager	.01	.07	.00	-.03	-.05
Non-mgr.	-.12 ***	-.23 ****	-.09 *	-.15 **	-.12 ***
Job:					
Line/Production	-.04	-.04	-.10 ****	-.17 ****	-.05*
Management	.04	.03	-.01	.04	.02
Staff/Sales/Infrastructure	.00	.00	.10 ***	.13 ***	.03
Region:					
Canada	-.06	-.09	-.15 *	-.15	-.02
Central America	.20	.14	.42 ***	.11	.09
China	.14	.15	.05	-.10	.00
East Europe	.11	-.09	.03	.24	.01
South Asia	-.07	.04	.08	-.11	.04
Oceania	-.07	-.07	-.09	.00	-.11
South America	-.14	.13	.21 **	.01	.03
US	-.09 *	-.01	-.15 ***	-.05	-.04
Western Europe	.06	-.04	-.04	.19 ***	.03
Other	-.08	-.17	-.35	-.13	-.04
Regression Summary N = 1744	Adj R^2=.10 F=8.33 ****	Adj R^2=.14 F=11.30 ****	Adj R^2=.16 F=13.39 ****	Adj R^2=.11 F=9.36 ****	Adj R^2=.09 F=7.23 ****

* p<.05, ** p<.01, *** p<.001, **** p<.0001

We make no assessment of causality, especially given the limited time people had access to Beehive. It is equally plausible that those with stronger ties were more motivated to use the site to connect to existing colleagues.

Demographic and organizational factors that relate to higher bonding social capital include being younger, working for the company for a longer period of time, not being in the division that provides technical consulting, and being an executive. Those in the US region report somewhat less bonding social capital.

Site usage is also positively associated with the four bridging social capital dimensions after controlling for organizational and demographic factors. For each aspect of bridging social capital, intensity of use is the strongest and most significant predictor. The nature of use differs, however, in that use of the site for connecting to existing and former colleagues is related to citizenship, having access to new people, and having the ability to access expertise when needed. However, people who use the site to connect with new people are more likely to be interested in global connections and cultures.

Generally, executive level managers have more bridging social capital, while non-managers have less. Additionally, people working in administrative, staff, or sales positions have more bridging social capital, while production workers have less. There were also occasional regional differences that resulted in significant coefficients. For example, as shown in Table 3, respondents from Central and South America have more interest in

global connections, while those in the US and Canada have less. People in Western Europe are more likely to have access to new people at work.

Finally, we explored whether use of Beehive interacted in some way with other organizational variables when predicting bridging and bonding social capital. That is, we wanted to see if greater use of Beehive had a differential payoff for managers vs. non-managers, for example, or for people in one region vs. another. To do these analyses, we constructed interaction terms by multiplying intensity of site use with each of the demographic variables. We then performed new simultaneous regressions, adding in each interaction term separately in addition to the other independent variables to see if the interaction was significant.

Greater use of Beehive did not have a differential impact on the social capital outcomes according to job role or management status. However, there were some interactions by gender, world region, and measures of age and time with the company. In terms of gender, there was a small but significant interaction with Beehive use, such that that men who used the site more intensively reported higher scores on both access to new people (scaled beta = .15, $p<.05$) and interest in other cultures (scaled beta = .12). Perhaps use of the SNS enabled men who were less interested in other cultures or outgoing to make connections that might not otherwise occur.

Regional differences were somewhat complex, given that we had ten different regions. In order to simplify this test, we created a US vs. non-US variable, given that the headquarters of IBM is in the United States. This allowed a crude test of whether there was a greater or lesser benefit from the use of the SNS for those outside the home base of the company. Employees from outside the US who used the SNS more intensively did, in fact, report somewhat higher scores on bonding social capital (scaled beta = .11, $p<.05$), citizenship (scaled beta = .10, $p<.05$) and access to expertise (scaled beta = .10, $p<.05$). We might interpret these findings as suggesting that US employees might have other means of building these forms of social capital, but those outside the US rely more on virtual forms of interaction to make or maintain connections that generate social capital.

Finally, use of the SNS appeared to benefit newer and younger employees more than older employees with greater seniority. Younger employees who used the SNS more intensively report significantly greater access to new people in the company than older employees (scaled beta = -.21, $p<.05$). Employees who had worked at the company for less time, and used the SNS more intensively, report significantly greater bonding social capital (scaled beta = -.23, $p<.05$), greater access to new people (scaled beta = -.32, $p<.05$), and greater access to expertise (scaled beta =-.25, $p<.05$). One interpretation is that more older and more senior employees have had a long time to form the connections that create these kinds of social capital, while the SNS helps to enable such connections more quickly for newer and younger employees

5. DISCUSSION

Our results suggest that even with limited use of the site over a relatively short amount of time (less than 6 months in most cases), there are associations between types of usage and the different types of social capital. When someone is using the SNS for meeting new contacts, they report a greater interest in making new contacts at the company in general. When someone is using the SNS for keeping up with known colleagues, both in their workgroup and in their extended network of loose ties, they report having closer ties with their immediate network (bonding social capital), a higher sense of citizenship (willingness to help the greater good of the company), and greater access to both new people and expertise within the company. And finally, the more intensely someone uses the SNS (meaning more frequent visits and stronger associations with the community on the site) the higher their social capital scores are, across all measures. They have closer bonds to their network, a greater willingness to contribute to the company, a greater interest in connecting globally, greater access to new people, and a greater ability to access expertise.

We do not claim a causal relation between the use of the site and these social capital measures: we do not know the directionality of the relationship. Furthermore, factors in the regression model only explain 9-16% of the variance in the social capital measures. We would be surprised if social capital, a complex measure of resources related to human relationships, could be entirely explained by the use of technology or demographic measures.

The main finding from this analysis is that use of a social network service inside of a company is associated with organizational and personal factors related to social capital. More intense users have stronger ties with their network and their weak ties appear to become more productive (in the sense that respondents feel more able to access information when needed) and are perceived to be more accessible. These individuals' feelings of citizenship and of belonging to the larger global corporation are higher. We cannot make a causal claim regarding this relationship, but use of Beehive was significantly related to all of our social capital measures.

We had anticipated that using the site for meeting new people would be related to having greater access to new people and expertise, but we did not find a relationship between them. Rather, it appears that those who report greater overall access to expertise and new people use the site more to connect with existing and former connections. It may be that SNSs can help reveal existing contacts' interests and areas of expertise more fully, helping to reduce the perceived costs of asking for help because of the improved relationships they may foster, or by helping to broker access to expertise through others' contact lists.

A second unanticipated finding is that certain types of employees have lower levels of social capital; in particular, employees in non-management positions and roles. While one might argue that a company should not encourage non-managers to spend time on social network sites because doing so is not directly job task related, if usage increases social capital, it may be a productive use of their time. We explored whether the relationship between site use and the measures of bridging and bonding social capital held up for non-managers only, and it does. This suggests that SNSs can have value, even for those who face social capital deficits in the organization. Because Beehive supports both online and offline social interactions, greater use might prove to remediate these social capital deficits.

Finally, the interactions between Beehive usage and various measures of social capital were revealing. The fact that use of the SNS site appeared to be associated with greater social capital benefits for newer and younger employees, as well as those further from the company headquarters (i.e. outside the U.S.), suggests that these services can be useful tools for employees who are otherwise "network disadvantaged." Without an SNS, these employees would need to put in considerable "face time" to build up their network of contacts in the organization. These results suggest that SNSs can contribute to organizational socialization for new employees and those outside the U.S. Other interactions also suggest fascinating topics for further analysis, such as teasing out

why men appear to gain more from their use than women. In general, the pattern of findings hint at the possibility that SNS usage helps to overcome barriers – either in terms of how quickly and easily an employee makes productive new connections or whether employees overcome geographic barriers – in order to create social capital benefits in work settings for multinational firms.

6. CONCLUSIONS AND IMPLICATIONS

Much more work is needed to fully understand the relationship between internal SNS tools and social capital. Previous studies of how intranet tools relate to social capital primarily focused on how these tools support what has been called the opportunity dimension of social capital, whereby the tools provide the structure for exchanges to take place [19]. Prior work in this area has not focused on how technology can support the ability or the motivations a person has for exchanging social capital [19].

As the field of social network technologies and expertise location services move forward, there are design implications evident from our findings that relate to access to expertise. In order to encourage both social capital formation and exchange, social technologies should support both informational and social requirements. While it is important in an organization to know who knows what, it is also important to have a social framework for information-sharing to occur. An email message bereft of any personal content or shared connection may be more likely to be ignored (purposefully or not) than a request coming from a weak tie or one that speaks of common interests. These personal informational tidbits, typically found in SNSs, may serve as social lubricants, smoothing the way in which transactions unfold when social capital is earned and spent.

Existing tools for locating and connecting experts with information-seekers provides employees with the structure for social capital exchange [1, 21, 26]. Our results show that an organizational social network site is associated with both the structural and motivational conditions that enable users to get to know others and exchange resources. Because of these complementary roles, we recommend integrating or cross-linking expertise tools with social network tools so that users can both socialize and maintain their networks, while simultaneously having an ability to search for additional resources within their well-maintained network.

While we did not ask users about the specifics of which features on the site enabled them to make the strongest connections, the overall design of the site emphasizes conversational exchange around both professional and personal topics. We recommend designing explicit support for this type of casual exchange, because it supports employees with an interest in connecting with globally dispersed others or in contributing more to the company. Offering communication channels for personal expression may help those interested in expanding their social capital to achieve their goals.

Social network sites have recently started adding features that recommend new connections to their users [8]. These recommendations can be based on evidence of prior interactions or mutual acquaintances or similar interests. If the benefit of social network sites is fuller access to experts, it is crucial that users are able to easily connect to their extended network through these sites. Providing recommendations for connections is a useful mechanism for making this important task easier for the user.

In order to have more confidence in the direction of the relationship between usage of sites like this and social capital outcomes, future research needs to collect data on the same users at multiple points in time. Ideally, one might conduct a quasi-experiment, comparing the gains in social capital from those who use a site over time with those who do not have access. Our study is limited by being a one shot survey.

As companies are becoming increasingly aware, their employees use social software outside of the company to exchange and share with their friends and family. This paper has provided initial evidence that social network sites can potentially play an important role in helping employees maintain and develop connections within the company – and can be especially useful for those who might otherwise be disadvantaged in terms of their ability to form productive connections in the company. These results lay the groundwork for determining the value of social network site features within the organization, particularly to improve knowledge management. A direct implication is that we now need to investigate the effects of building social network site features into other knowledge management and expertise sharing tools.

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