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AN EXPLORATION OF GENDER DIFFERENCES IN THE USE OF SOCIAL NETWORKING AND KNOWLEDGE MANAGEMENT TOOLS

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ABSTRACT

This research investigated gender differences in the adoption and use of social networking in a high-technology defense firm, and sought to better understand how these differences influenced a firm's knowledge management initiatives. Differences between men and women were found in terms of *when* and *how* they adopted the technology, and the degree of relationship continuity while using the technology. These differences affected how men and women learned within their work environments and posed a hindrance to the organization's attempt to use social networking to generate new knowledge.

Key Words: Knowledge Management, Generative Knowledge, Gender, Social Networking Technologies, Information Systems, Technology Management.

INTRODUCTION

Why don't men ever stop to ask for directions?

This question has become a short hand way of stating the widely accepted view that men and women act differently in various situations. Among other topics, academic researchers have investigated whether or not gender differences can have a significant influence on whether men and women approach doing business differently. Particularly to the information systems (IS) field, it has helped to frame research questions for how gender differences can influence the adoption and use of technology.

Corporations know that information systems and knowledge are important assets for firms [9], but few organizations truly understand how to manage their technology and knowledge practices to achieve their goals [40]. To implement effective knowledge-based management practices, companies have frequently turned to IS tools such as knowledge repositories and expert

databases [12] to store and maintain the firm's knowledge. Most recently, social networking technologies (e.g., chats, blogs, firm internal employee-specific webpages, etc.) have aided firms in connecting and enhancing communication among its employees. Corporations have attempted to leverage these information systems to support and enhance knowledge creation, sharing, and learning [3].

Since the mid-twentieth century, researchers have examined the differences in how men and women conduct business. This research investigated how gender differences might exist in the utilization of social networking and whether it might influence a firm's knowledge management efforts. The foundational literature on knowledge management suggests that KM and technology exist in social contexts, which can make it problematic when organizations attempt to introduce social networking to the firm and to leverage technology to encourage new knowledge generation. However, much of the literature that exists on knowledge management

(KM) has focused on the process of capturing, disseminating, and managing knowledge. There exists an important opportunity to better understand how gender differences can influence how employees use IS tools such as social networking tools and the influence that these differences can have on an organization's ability to manage knowledge.

LITERATURE REVIEW

Social Networks. The social network theory argues that the structures of relationships between elements and the position of elements in those structures can predict and explain a host of outcomes at multiple levels of analysis [37]. The social network analysis (SNA) is one of the key analytical approaches for social network studies. The approach, which stems from structural sociology, focuses on the relationships between social entities and the structure of social relations. In social networks, *entities* or *actors*, represent nodes in a *network* (eg., network of teams, departments, or organizations). They are connected via relationships, commonly known as *ties*. A lack of shared context, or ties, within social networks can create boundaries for entities [6]. Oftentimes, this results in the employee's inability to connect with or successfully share or integrate useful knowledge with others. Another key element to social networks is the network boundaries for which the entities exist. The boundary is often defined by memberships within pre-existing teams, units, or departments. These boundaries can also be determined by geographical location, profession, or committees.

Investigations within the field of social networks span across many industries, including organizational behavior [18], healthcare [5], innovation [1], technology use and knowledge transfer [27] [33]. Research has found that the centrality within the social network is positively related to performance [6]. For example, employees use social networking tools (eg., Facebook, LinkedIn, On-line Blogs, etc.) to establish contacts and to associate themselves with experts that could be useful in exchanging knowledge and helpful in increasing job performance. However, the ability to access and to effectively incorporate knowledge from contacts in their social network can be a daunting task, as knowledge is oftentimes perishable and specific for the context for which it was established. Employees must first understand where to access knowledge within the social network, know the context for which it was created, incorporate the knowledge into their individual methods of creating knowledge, and manage the use of it within their own job responsibilities and tasks. This research investigation sought a better understanding of how the

ability (or inability) to share knowledge within the boundaries of social networking tools was influenced by gender. Next, a discussion on knowledge management and gender differences in knowledge management is examined.

Knowledge Management. Knowledge is defined as a justified belief that increases an entity's capacity for effective action [3] [20]. The belief is often grounded in information, as well as in the values and prior understandings of the holder [24] [25]. It is also related to prior beliefs. In order to be meaningful, the belief must fit with the context for which it was developed and in which it is understood [9] [26] [28]. To be useful in business, the knowledge must also be linked in some way to effective action, so that the creation of knowledge also implies the creation of something of value [36]. Whether or not a belief has value, and therefore whether or not it is considered knowledge, is based on the context in which it is created or used, including the beliefs of others [24]. The resulting knowledge that is often generated is relational and context-specific to that individual [10].

Knowledge is comprised of both explicit (e.g., documented concepts, procedures, laws, and routines) and tacit (e.g., personal experience, relationships, and know-how) knowledge [34] [3]. Explicit knowledge can be articulated, codified and transmitted in some type of symbolic form or natural language [4] [3]. Tacit knowledge, on the other hand, has a personal quality, and is rooted in action, commitment and involvement in a specific context [25]. Tacit knowledge may be difficult to articulate and is often characterized as personal skills, mental models, and 'know-how' that are deeply ingrained in an individual [28] [29].

Studies on knowledge have shown that it is context-bound and highly specific [26], and oftentimes poses challenges for others who want to use it to create, coordinate, and establish or sustain an advantage [32]. Knowledge is held by individuals (know-what and know-how), and is socially embedded in the organizing principles by which people voluntarily cooperate within an organizational context [10]. "Socially embedded" is defined here as the manner in which the social actions and experiences of the firm -- such as responses to industry regulations, alliances, and organizational culture -- influence how organizations develop and manage IS [41] and knowledge [19]. Socially embedded knowledge can have a profound influence on how individuals are able to create and to integrate new knowledge into their own knowledge sources. Socially embedded knowledge also contributes to differences in how individuals share and acquire knowledge.

New knowledge is created through the *conversion* of tacit and explicit knowledge [4] [25].

Wittrock argued that there are four modes of conversion: socialization, combination, externalization, and internalization [38]. *Socialization* is the process of converting one individual's tacit knowledge to another individual's tacit knowledge through interpersonal interaction. *Combination* is the process of creating new explicit knowledge by reconfiguring, re-categorizing, and re-conceptualizing existing explicit knowledge. *Externalization* is the process of converting tacit knowledge to explicit knowledge, while *internalization* is the process of converting explicit knowledge to tacit knowledge. An example of externalization is the articulation of best practices or lessons learned, while internalization is exemplified by the learning that occurs from reading [3]. Since research has shown that knowledge is socially embedded, one can generally assume that the role of gender can have a profound impact between how men and women create new knowledge.

Next, we discuss foundational research that has been conducted on gender differences in the adoption and use of technologies.

Gender Differences In Knowledge Management. It has been long documented that gender differences exist and influence how individuals engage in everyday activities. Research has shown that gender plays a significant role in social and competitive preferences [11], investments [16] [8], planning [21], and risk aversion choices [30] [31]. From an IS perspective, there also exists evidence to show that there are significant gender differences between how men and women adopt and use technology [eg., 22, 30].

IS researchers have investigated the influence of gender differences in the use and the adoption of technology [7] [17] [35], the influence it has on the work environment [2], the perception and use of technology such as email [15], and social networking [14] [20]. Venkatesh and Morris [35] used a framework grounded in the technology acceptance model and conducted a longitudinal study to investigate gender differences in the use and adoption of a new technology. Employees were introduced to a new software systems in five different organizations. The researchers measured the user reactions to the systems and usage behaviors over a period of five months. They found significant gender differences in how employees used and adopted technologies, whereby men tended to more quickly adopt technology than women if they perceived the systems to be useful.

Geffen and Straub [15] conducted research investigating gender differences in the use of computer-based media. Their research found that women and men differed in their perceptions, but not in their use, of email. The authors suggested that researchers should be aware of

gender differences during the diffusion of technology and managers / co-workers need to be aware that the same mode of communications may be perceived differently by men and women. However, when controlling for social presence and perceived usefulness, their attempts to find evidence of gender differences in the use of email were inconclusive.

Researchers have generally agreed that there exist gender differences in the use and adoption of technology, but little research has investigated how gender differences exist in the context of social networking and KM tool technology adoption and use. Further, little is known about the effects that gender differences can have on a firm's ability to leverage social networking tools to enhance its knowledge management efforts. Hence, this is the point of departure for this research. The purpose of this research was to gain a better understanding for how gender differences in the use and adoption of social networking technologies can impact and affect a firm's knowledge-management efforts.

METHODOLOGY

The research was conducted by means of a single longitudinal case study. The case study approach was appropriate for this investigation because the unit of analysis was the system as a whole, rather than individuals or groups, and the viewpoints of multiple respondents were desired [39]. The use of a case study research methodology allowed the study to focus on understanding the use of social networking technologies to support knowledge management efforts at one company, *Defense Technologies Incorporated (DTI)*¹, and facilitate a better understanding for how those technology initiatives facilitated (or hindered) the exchange of knowledge among the corporation's employees. The longitudinal analysis aided in providing a rich understanding and evaluation of continuity and change in the firm's KM initiatives. In particular, using a case-study approach enabled the examination of the phenomenon in a natural setting and an exploration of new theoretical ideas where there have been relatively little prior research and theory formulation [23] [39]. DTI was selected for this study because it had implemented social networking and KM tools within a recent five year period prior to this research.

Data Collection. Data collection involved using multiple sources of historical data. These data were then triangulated to establish construct validity and reliability.

¹ Acronym used for company name to protect the identity and confidentiality agreements made with the firm.

The data collection was performed in two phases during a 12-month time period. In the first phase the researcher reviewed both public and confidential corporate archival data related to the firm’s KM initiatives. The primary sources of data were archived corporate internal analyses, organization charts, strategic planning documents from the KM department, minutes of meetings, external consultant reports, internal correspondence, memos, and e-mails. Secondary sources included industry reports, public disclosures, media publications, and Internet articles. Through the use of these archival data, the author documented the general direction of the process that DTI followed to design and implement KM initiatives. The researcher also identified the primary actors involved, as well as the features and the actual use of the KM systems.

Table 1: Sources of Data Analyzed

Sources of Data Analyzed	
Primary data	Archived corporate internal analyses, organization charts, strategic planning documents from the KM department, minutes of meetings, external consultant reports, internal correspondence, memos, and e-mails.
Secondary data	Industry reports on KM initiatives; public disclosures; media publications; Internet articles; white papers on social networking; identification of primary actors involved with implementation.
Supplemental data	Participant observation; field notes and journal reflections; informal hallway conversations with employees; status report meetings; planning meetings.

In the second phase of data collection, the researcher and 15 members of DTI’s KM team together spent two months conducting formal interviews with individuals who sponsored, supported, or participated in the project. Included in this process were 40 top executives from the firm’s eight product groups and six program teams. These interviews provided detailed data on how the KM systems were perceived and experienced, and how initiatives evolved. To ensure accuracy and to promote triangulation, case data were reviewed and verified by key actors involved in the project. Participant observation activities were conducted, which culminated in field notes and journal reflections. Included in this

process were activities such as informal hallway conversations with employees, status report meetings, and planning meetings. A database was generated to organize and store the data.

Table 2: Interviews by Alliance & Rank / Department

Interviews By Alliance	
KM Team	8
Information Technology	11
Project / Program Research Management Team	17
Senior Corporate Administrators	4

Interviews By Rank / Department	
Executive / Vice President	6
Senior Business Manager	11
Program / Project Managers	18
IT Management	5

Also during the second phase of the data collection, the researchers downloaded five years of usage data (2007 – 2011) from each of the social networking and KM tools used to facilitate corporate learning. Included were the employee blogs, inter-company profile pages, and chat sessions. This research only analyzed data from users that had ten-or-more entries into the systems. To provide detail to and to supplement the case study research methodology, the researchers conducted a SNA to examine how employees within the organization interacted with each other. A SNA was appropriate for this investigation, as it showed the connections that linked employees to each other. The SNA data analysis included establishing a diagram of relationships among the employees, mapping the frequency for which employees communicated and shared knowledge within the social networking tools, and analyzing the communication patterns among employees. A detailed analysis was conducted to understand the five primary questions of the research: *How long did it take the scientists to begin using the social networking and KM tools? Whom did the scientists contact to share knowledge? How many contacts did the scientists communicate with and include in their personal network of contacts? How frequently did the scientists contact other employees to share or obtain knowledge? What were the topics being discussed within the network of scientists?*

The data extracted from these multiple sources were then coded to reflect the constructs identified in the theory being used. After the data had been coded and grouped, they were put into a temporal process model which was used to identify gaps and to compare trends in the observed data with those predicted by theory [39]. The technique of pattern matching was used to move back and forth between the empirical data and possible theoretical conceptualizations [13] [39]. Specifically, the author began by looking for examples of new knowledge creation through socialization, combination, externalization and internalization. In instances where the researcher identified gaps between the empirical data and possible theoretical conceptualizations, the author revisited the data by going back to the interviewees to obtain additional data or to clarify data that already had been collected.

Case Study: Defense Technologies Incorporated. *Defense Technologies Incorporated* (DTI) was a leader in the United States aerospace and defense industry. One of the company's main core competencies was the development and manufacturing of rocket propulsion and space-exploration engines for the defense industry. Over 4,000 scientists were employed at DTI. When scientists were hired into the company, they were assigned to both a process group and a program-group. Throughout their careers at DTI, scientists were encouraged to rotate among process and program groups to diversify their skill set and knowledge base. Limited project budgets encouraged a competitive environment at DTI, causing scientists to generally not want to share their expertise with other scientists so that they would be more valuable to the firm. The motivation to help others through knowledge sharing was constrained and generative learning was stifled.

DTI was under constant pressure from their customers to develop products that were better, faster, and cheaper. However, individualized KM systems and program efforts across the process and product groups in the firm continued to plague effective KM in the organization as a whole. Scientists rarely shared their knowledge with others outside their process and product groups. Methodologies for managing knowledge were typically documented within process groups and program groups, and existing knowledge was stored at the desks of the scientists. Knowledge that was created within process and program groups often remained in the minds of the seasoned scientists, or it was documented on notepads and stored in personal filing cabinets and computer hard drives. This made the creation of new knowledge challenging across the organization since existing knowledge was rarely exploited or refined by others. Existing knowledge was seldom experimented with in

new contexts and knowledge generation was not promoted.

As a first step in improving knowledge management at DTI, a new position, Chief Knowledge Office (CKO), was created. The CKO was tasked with rejuvenating the firm's KM efforts. Within a month of investigating the current state of the firm's KM environment, the CKO and the KM team found there were two key issues that plagued the firm's ability to leverage existing knowledge and to create new knowledge. First, scientists did not leverage existing knowledge because they were not aware that other knowledge sources existed within the firm. Secondly, the KM team acknowledged that the culture of the firm typically did not support leveraging of existing knowledge, as scientists hoarded knowledge to make themselves more valuable to the firm. As a result, scientists were prevented from learning of their colleagues' work and using it to generate new knowledge. The team recommended that the IS infrastructure be improved to support and maintain knowledge so that new knowledge could be generated.

In May 2007, the CKO and the KM team embarked on introducing social networking and KM tools into the organization in hopes of boosting communication among employees and encouraging scientists to learn from each other. They deployed several social networking tools that were intended to capture and disseminate knowledge from different sources or to facilitate new ways of sharing knowledge across the program and product groups. Examples of social networking tools and capabilities that were implemented within the firm's infrastructure were blogs, chat session, and intra-company employee profile pages. All employees were given equal and unrestricted access to utilize the social networking tools at once. The CKO and KM team did not limit the type or kinds of content that could be shared or discussed within the company's social networking and KM infrastructure. Employees were unconstrained in what they could use the social networking and KM tools for and were allowed to share or distribute professional (e.g., work- and industry-related documents) material, as well as engage in socially related topics of discussion (e.g., sports, travel, food, and entertainment).

FINDINGS

Four key findings emerged from this research investigation. The first three findings were discovered through an analysis of only the work-related blogs and chat sessions. First, the study found that there were gender differences in the adoption rates of social networking and KM tools. Secondly, there was a

difference between men and women in the frequency in which social networking and KM tools were used. Thirdly, there were differences in the depth of content between the knowledge shared across the social networking tools. And, the final finding was discovered by analyzing both work- and socially-related blogs. The final finding indicated that there were significant gender differences in how social networking and KM tools were used for professional versus social topics. The details of the findings are discussed in the following sections.

Finding #1: Gender differences existed in the timing for adopting social networking and KM tools. An analysis of the research data collected for this study revealed that after five years (2007 – 2011) of the social networking and KM tools being available to all employees (4000+) at *DTI*, 77% of the total users were men (2079 users) and 23% of the total users were women (621 users). Digging deeper into the data, the study found that the majority (92%) of the men who adopted and used the social networking and KM tools, did so almost immediately after the applications were made available for all employees to use. Conversely, the majority of the women (83%) waited three to six months to actually begin to use and to adopt the social networking and KM tools. Recall that all employees at *DTI* were given the option to sign up and to use the social networking and KM tools at the same time.

One reason that helped to explain this finding was that men typically relied more on, and often accessed, a wider range of knowledge sources when attempting to acquire or share knowledge with others in the corporation. For example, when men users wanted to find information on a topic (eg., combustion rates of fuel), they solicited input or assistance from the general population KM user group. In the case of this study, the social networking and KM tools were only one source of knowledge that men accessed when attempting to obtain or to create new knowledge. This finding also implied that men were not as apt to rely on social networking and KM technologies as their first choice when attempting to access and to generate new knowledge for the firm.

During the interviews, women explained that they were hesitant to adopt the technologies until they understood *how* the technology worked and *how* to use it properly. The study participants revealed that one of the primary ways that women attempted to learn about the usefulness and functionality of the social networking technology was by first discussing these tools with their colleagues and peers in the organization rather than experimenting with the systems themselves. These actions not only provided women employees with an opportunity to understand and assess the technology, but also contributed to the establishment of alliances and

contacts to build their social networks. Conversely, the interviews revealed that the male employees were generally more eager to experiment with the technology themselves in order to understand how it worked and to determine how to use it in their everyday job functions.

Finding #2: Gender differences existed in the depth of content when using social networking and KM tools. This study found that women generally made comments or contributions that were more lengthy (i.e., # of words used in each entry) per blog entry than men. In general, the men's comments were shorter and more concise than their women counterpart's comments. Women made an average of 138 words per blog entry, while men had an average of 57 words per entry. Women's contributions to social networking blogs typically contained more detail and explanation per blog entry response than their male counterparts' contributions.

The interview data revealed that while using the social networking and KM tools, women more frequently attempted to associate and integrate existing knowledge with the knowledge that they obtained during online discussions, thus creating new knowledge. Hence, this typically resulted in a more detailed and robust responses to discussion topics. This helped to explain the difference in the number of words used in each entry between men and women users. Men generally contributed to new knowledge creation by commenting or contributing a few new facts or opinions to the discussion blogs, oftentimes without any attempt to reference or integrate the new knowledge with what was previously discussed within the blog's history.

The research data also revealed that women initiated fewer original blog entries and made less frequent number of comments overall. But once women had established their online social network of colleagues and experts, they were generally more willing to engage in detailed and lengthy discussions. Women tended to provide more detail in blog discussions. On average their posts were almost three times longer than the posts of men. One explanation for the longer and more detailed responses by females can be attributed to their establishing relationships and networks with other users of the KM tools and thus feeling more comfortable sharing knowledge with people with whom they had an established relationship. Women expressed the need to first develop closely knit networks and build longer-term relationships before using the social networking and KM tools to share or to obtain new knowledge. However, once the women began to use and adopt the social networking and KM tools, they also began to establish long-term relationships with subject-matter experts and with colleagues in their physical-world network. Generally, the data indicated that these individuals were

contacts who often possessed a narrow range of expertise within their networked community. The women explained that their actions were attempts to establish a network of subject-matter experts so that they could regularly return to these experts to seek advice for future discussions. Once these personal networks were established, they tended to primarily seek out the opinion of individuals within their own networks rather than a range of experts within the general user population. The study also learned that once these social networks and relations were established, women were more willing than men to integrate the new knowledge obtained from the social network and KM tools with their other personal knowledge sources.

Interestingly, the work-related blog discussions initiated by women received 66% or more responses than did the blogs that men had initiated. This fact may imply that the establishment of a social network made it easier for women to connect with other knowledge experts within the organization, which, in turn, enabled them to participate in others' knowledge sharing and dissemination.

In contrast, men sought input from the general public and did not seek to establish any formal type of network structure within the organization. Instead, men sought or requested knowledge from the social network and KM system user group by putting out general requests to all users within the social networking communities. (This helps to explain the 9:1 men to women ratio for original discussion topics.) Men's interaction on the social networking and KM tools tended to be quick solicitations of information or question-and-answer exchanges. Interestingly, the research data revealed that less than 50% of the male users returned to, or sought out, particular individuals who previously contributed to their knowledge discussions or requests.

The interview data also highlighted the fact that men primarily used the social networking and KM tools to *obtain* knowledge. There was little evidence of them returning to the blogs to contribute additional knowledge back to the public discussion blogs by providing feedback or the integration of new knowledge into the discussion. In the interviews with DTI employees, men *integrated* new knowledge obtained from the social networking and KM tools with their own personal knowledge sources *outside* of the formal social networking environment, sometimes including co-workers located in close physical proximity of their desks. Additionally, the data analyzed in the SNA suggested that there was little evidence of men attempting to establish alliances or to facilitate relationships with colleagues in their departments.

Finding #3: Gender differences existed in the frequency for using social networking and KM tools.

The data also indicated that across all social networking and KM tools, men made more comments than women. Recall that this research only analyzed the data of employees who made more than ten entries into the social networking and KM tools. An analysis on the data revealed that there were a total of 25,700 comments made using the DTI social networking and KM tools over the five year period (2007 – 2011). Of the total work-related comments, men made 19,700 of the comments and women made 6,000 of the comments. This disparity represented an approximate 3:1 ratio of men to women for the usage frequency for the overall blog content. However, after rationalizing the data for more males being hired than women in the defense industry, this finding seems to be unrevealing.

However, upon a deeper investigation into the data, the study found that men were generally more willing to use the social networking and KM tools to quickly engage other employees in obtaining, sharing, and disseminating their knowledge across the entire organization than their women counterparts. The data exposed the fact that men initiated a higher rate of original blog authorships than women did. After analyzing all original blog authorship entries with 10+ entries/comments, this research found that there were a total of 310 original blog topics created by DTI's scientists. Of these blogs, 280 original authorships were created by men, and 30 by women. Interestingly, the ratio of original blog authorships between men to women was significantly different, at a 9:1 ratio. This finding also seemed to indicate that men were more willing to use, engage in, and facilitate a quick and simple knowledge exchange using social networking and KM tools.

During our interviews for this study, 67% of the male employees disclosed that they attempted to use the social networking and KM tools to engage in discussions for general topics and to share general knowledge with the DTI community. This study learned that they were more comfortable and willing to seek input or to discuss topics with the general social networking population, and didn't necessarily target specific individuals or established networks when attempting to obtain new knowledge. This finding implied that the men who used the social networking and KM tools were less inhibited at offering their opinions or seeking contributions and discussions from a more general audience than women were. In comparison, women initiated fewer original blog discussions and tended to first engage with their known and respected colleagues in their established social networks when they wanted to discuss or to obtain new knowledge. The study also learned that they preferred seeking input or contributions from individuals with

whom they were already comfortable and who they felt they could trust.

Finding #4: *Gender differences existed while using social networking and KM tools for social versus professional use.* Recall the first three findings presented above were discovered through an analysis of only professional-oriented blog exchanges. For finding #4, we compared both work- and socially-related blogs together. This research found that there was a significant difference between the professional work versus social blog entries and discussions. Socially related blog discussions outnumbered work-related blogs. Earlier we mentioned that the CKO and KM team set up social networking and KM tools to facilitate knowledge sharing and dispersion across the organization. However, the team allowed scientists to use the tools for both work- and socially-related discussion topics, because they assumed that if the tools facilitated employees building of a virtual community in the organization, these employees would be more apt to adopt the technology and to use it for formal knowledge sharing when the occasion arose. Little to no restrictions was put on the usage rules and regulations of the social networking and KM tools at DTI.

The data indicated that work-related blogs typically received anywhere between 10 – 30 posts per topic, whereas socially-related blogs oftentimes received 100+ posts per topic. These facts initially seem to indicate that employees were more apt to use and adopt the social networking and KM tools if the topics being discussed could be tied to and associated with their personal and social lives. One data point that stood out from the data was a socially related blog on the Los Angeles Laker's Basketball season, which received 15,000+ viewings, and 1,100+ blog posts.

Although this finding may not be surprising at first, it seemed to indicate that employees appeared to be more comfortable and willing to use the social networking and KM tools to engage in informal exchange of comments. This finding can also be used to explain how DTI employees used communication from the SNT first to find and to establish trusted alliances or establish network associations across the corporation. These relationships were then later used to seek or to obtain knowledge needed to do their jobs.

DISCUSSION

This research has demonstrated that gender differences existed in the adoption and utilization of corporate social networking and KM tools. Specifically, the study learned that gender played a very important role in the willingness of employees to use social networking

and KM tools to create and to share new knowledge throughout the organization.

Earlier it was mentioned that the manner in which individuals leverage IS to create knowledge can be socially embedded [10] and can have a profound influence on how individuals create new knowledge. Through this research, it was found that women, on average, tended to adopt the social networking and KM tools three to six months after their counterpart males did. The data indicated that women first determined that the technology was useful and easy to use before they adopted it. This finding on delayed adoption of technologies was consistent with the arguments provided by Venkatesh & Morris [35] when they argued that with increased experience with the system, women were more adept to adopting and using systems. This finding was also in line with the arguments of Sapienza, et al. [31] whose research indicated that women were generally more risk adverse than men. This was represented in the three month delay in adoption and use of the technology. The implications behind this finding was that a woman's delayed adoption of the social networking and KM tools at DTI actually temporarily inhibited the ability of the company to create new and disseminate knowledge throughout the organizations.

From this investigation, it was found that men tended to quickly experiment with social networking technologies and did not hesitate in engaging in quick and frequent knowledge exchange with the general public in order to obtain, utilize, and create new knowledge. Conversely, the study found that women tended to engage their personal social network of alliances for more in-depth discussions of knowledge and to create deeper meanings of the knowledge.

This research also found gender differences existed in the depth of content and frequency of use when using social networking and KM tools. These findings surfaced in the study's research data through evidence of technology tool perception and use. Recall that Geffen and Straub [15] found that women and men differ in their perceptions, but not the use of email. This research found otherwise. Firstly, as it relates to *perception*, our findings were consistent with Geffen and Straub that within the context of social networking and KM tools, there were perception differences between genders. This research discussed that when men are first introduced to new technologies, they eagerly experimented with the technology in order to learn of its usefulness or functionality. Men perceived the technology as a tool to access additional knowledge needed in their jobs. This study found that the first-hand ability to play with and experiment with the tools contributed to their ability to

learn about how the systems worked and for what it was useful in accomplishing.

These findings contradicted Geffen and Straub's [15] findings in that evidence was found to confirm that there were gender differences in how the men and women used the technology tools. Earlier it was mentioned that men used the social networking to solicit or to obtain quick access to knowledge, but integrated this knowledge outside of the social networking environment. This study found that men used the tools to access new knowledge, but did not necessarily use the technology to integrate it with the knowledge that existed in their own individual sources. In contrast, women perceived the technology as a vehicle to help them to establish a network of experts within the company in order to gain access to knowledge. This finding was consistent with Arling & Subramani [6] where an individual's ability to use technology to centralize themselves to communications and to knowledge exchange can positively influence job performance. Further, we learned that women used the tool to access new knowledge and to integrate it with their own knowledge to generate new knowledge. Compared to men, women were more likely to engage their social networks to obtain diverse pieces of knowledge and to integrate their own personal knowledge with that of their colleagues and peers *within* the boundaries of their social networking environments. Overall, the finding is that there were gender differences for how men and women used the corporate social networking and KM tools to access and generate new knowledge. Men generally generated new knowledge outside of the context of using the social networking and KM tools, while women generally generated new knowledge within the contexts of the technology tools.

Finally, this research discovered that there were gender differences in the topic focus of using social networking and KM tools. The data that was examined indicated that the social networking and KM tools were used frequently for socially-related blogs. However, as mentioned above, the socially related blogs served a purpose that allowed employees to engage in knowledge exchange and discussions in non-professional environments (i.e., social blogs), so that they could rely on these network alliances when they needed to tap the network for professionally-related discussions at a later time.

These findings, applied to a firm's knowledge management efforts, suggest that gender differences in adopting social networking and KM technologies exists, and points to the fact that men and women differ in the ways that technologies are used to generate new knowledge. The findings also indicated that gender differences existed in terms of *how* and *when* existing

knowledge was used in the context of social networking and KM technologies to generate new knowledge. Managers need to be reminded that in order for technology adoptions and use to be successful, they must take into consideration the varying aspects of technology adoption. In this case, gender mattered.

CONCLUSIONS

Implementing social networking and KM tools to aid a firm's knowledge management initiatives typically does not happen overnight or without planning. While prior work has provided a high level understanding of gender differences in the adoption and use of technology, there is a need to better understand what specific aspects of gender differences exist in organizations attempting to implement social networking and KM tools. These differences can influence and affect the rate at which employees generate new knowledge and to learn from each other. A major contribution of this work is the better understanding for how men and women use social networking technologies to generate new knowledge.

With a growing understanding of the effective utilization of social networking and KM tools, and what it takes to facilitate knowledge sharing and learning across the firm, DTI continues to develop initiatives to help them progress further in facilitating new knowledge. In particular, they are in dialogue with other aerospace and defense firms to benchmark their KM initiatives. There were two primary benefits for their efforts. First, they wanted to be able to share their best known methods and learn from the best known initiatives of other firms. Second, they want to help facilitate an open dialogue with other firms in their industries. Together the firms collaborated, brainstormed, and discussed the common KM initiatives and tools that may work for the entire aerospace and defense industry, as well as any firm's KM environment.

While this research sought to understand whether gender differences existed while using social networking and KM tools of one company, *Defense Industry Technologies*, the case offers valuable insights for other practitioners embarking on leveraging social networking for their own company's KM efforts. Lessons learned at DTI and from this case study include:

Provide users with tools and training appropriate to their needs and on their own terms. Knowing that men and women adopt and use social networking and KM tools at different rates and for different reasons, companies can engage and support users by providing them with useful tips (e.g., user-group meetings, user documents / manuals) or activities (e.g., brown-bag lunch discussion groups that help to build

face-to-face networks that compliment online social networks) to support knowledge sharing and learning in styles that everyone can be comfortable with.

Look holistically at KM initiatives within the organization. The portfolio of social networking and KM tools should work together systemically to provide opportunities to share, to distribute, and to generate new knowledge. Take time to review and reflect on how all tools relate to, integrate with, and impact each other. An advancement in one tool may possibly be detrimental to the usefulness of another.

Assess prior KM implementation efforts, identify gaps, and build lessons learned into new initiatives. Investigate and highlight the benefits and failures of prior social networking and KM systems. A lot can be learned from past accomplishments and mistakes. Speak with previous implementation teams and users to identify areas that can be used to improve the current use of social networking and KM tools.

Benchmark social networking and KM tool implementation against other companies in similar industries. Create alliances in your industry. Be aware for how the alliances or competitors are using social networking and KM tools, as well as their ability to understand and take advantage of gender differences in using and adopting technologies. This exercise can also help to set expectations and to guide future efforts of social networking and KM tool adoption. Attend regional and national KM conferences to share key learning.

Generalizability was the main limitation of this study, a limitation which is typically experienced with a single case study methodology. This investigation used a theoretically based approach to understand whether or not there are gender differences in the adoption and use of social networking and KM technologies, and to understand how these differences affects an employee's ability to generate new knowledge. However, knowledge is socially embedded and is composed of both tacit and explicit knowledge from knowledge bases that are not typically fully understood. While the findings at DTI led to useful insights, the findings may not be directly translatable to other organizations. More studies are needed to assess the validity and reliability of these research findings in the context of multiple organizations.

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