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ABSTRACT

Currently, the information technology (IT) workforce is composed largely of males, while women remain an under represented minority. Not unlike other sectors, informal social networks exist which are often termed the "Old Boy's Network." In these networks, men are able to share information in a less formal setting, learn to trust each other, and establish personal relationships. However, these networks can be potentially problematic for women working in the field if they are excluded from important information and resources. This paper explores how women are affected by and relate to these networks. A conceptual framework is presented that explains the reactions and strategies with respect to the network that women employ for continued participation in the information technology workforce. The framework illustrates the experiences of proactive and reactive "insiders" and "outsiders" to the network.

Keywords

IT workforce, gender, social networks, Old Boy's Network, individual differences theory

INTRODUCTION

The information technology (IT) sector has experienced explosive growth since its creation. However, the rate of women's participation in that industry is not keeping up. Women are currently under represented in the IT workforce, and a great deal of research has been conducted to study the source of this problem. Explanations for this "gender gap" include biological differences and differences in socialization to technology for men and women.

However, these explanations are insufficient. According to the U.S. Census Bureau (2002) in 2001, only 26 percent of the IT workforce was composed of women. In order to better understand the IT gender gap, it is necessary to understand the broader situation from all aspects. By problematizing the under representation of women in the IT workforce, a better understanding of the problem may be achieved. By doing so, we hope to move a step closer to addressing the problem.

Social or informal networks have been defined as "the web of relationships that people use to exchange resources and services" (McGuire, 2000: 1). Research has pointed to the importance of social networks in areas such as status and power in organizations.   Additionally, social networks have been linked to gains in skills, job leads, and mobility in an organization. A popular phrase correlated with social networks is that "it is not what you know, *it is who you know."*

Presently, the information technology workforce is characterized as a male dominated industry. In this situation, if an "Old Boy's Network" exists then "women's informal isolation [could] result in men's greater influence and centrality" in networks (Moore, 1988: 575). So, the study of informal networks becomes even more important within this context. While the problem of under representation of women continues, the role of social networks may be playing a critical role in the exclusion of women from opportunities in the field. An area that is likely being directly affected by the existence of social networks is that of the retention of women in the technology workforce.

In this paper we consider the nature of the "Old Boy's Network[1]" in the IT workforce and whether the existence of these networks assist in explaining the under representation of women in IT. Our research highlights the experiences of women

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[1] Henceforth in this paper, the word "network" will be used to reference to the "Old Boys Network."

practitioners and academics currently working in the IT field. Our aim is to uncover the story behind the organizational chart. In this paper, we present a framework that will aid in researching women's interactions with social networks in the IT workforce. The framework illustrates the ways in which women are connected to or excluded from the network and how women are affected by the network.

LITERATURE REVIEW

The literature regarding social networks documents the importance of interpersonal and informal relationships with people in organizational settings. Social networking has been explored in a variety of industry contexts that are not unlike the IT industry. Social networks in general can be described in terms of strong or weak ties. Strong ties are close personal relationships that exemplify the interaction one typically has with family or friends. Weak ties are characterized by the relationship that one may have with a colleague or co-worker. The literature highlighting the benefits of social networks in organizations covers the topics of mentoring, acquisition of information, and sharing of information.

Social Networks

Granovetter (1973) discusses the importance of interpersonal ties in a social network. This work explains that the "strength of an interpersonal tie" is determined from a "combination of the amount of time, the emotional intensity, the intimacy, and the reciprocal services which characterize each tie" (p. 1361). The value of "weak ties" that is presented in this work shows an increased opportunity for community acceptance. This occurs due to the ties that reach outside of a person's immediate social network linking them to other important social networks. These networks can be viewed as additional sources of information. Importantly, Granovetter determines that weak ties were the most likely origins of job opportunities for the participants in his study. Lin et al. (1981) explains the role of networks in the job seeking process. The study suggests that individual job seekers' opportunities to reach a high status job contact are affected by both their personal resources and their use of weak ties. In addition a theory of social resources is presented that includes "wealth, status, power as well as social ties of those persons who are directly or indirectly linked to the individual" (p. 395). Wegener (1991) argues that social networks benefit subgroups of job seekers in different ways. The author asserts that those with previous experience in high status occupations benefit from weak ties, while those with previous experience in low status jobs do not. Brass (1985) states that being linked informally to management executives and supervisors in an organization will affect an individual's influence in an organization. Those individuals in an organization who reside in high level positions are referred to as the "dominant coalition" (p. 329). Historically, males have occupied the majority of these positions, which has lessened the opportunity for women to be a part of informal interactions with people in power in an organization.

Mentoring

Burke and McKeen (1990) provide a literature review of the mentoring process and its implication for women. The authors raise an important point that a possible barrier to women being engaged in cross gender mentor relationships is due to their inaccessibility to information networks. This situation is attributed to women not being informed about how to create informal networks, the tendency to develop relationships with similar people, or male management excluding women. Eby (1997) explores the concept of mentoring and the benefits achieved through the mentoring process in the organization. The author believes mentoring to be a vehicle through which people gain specialized skills and knowledge that is consequently beneficial to their ability to adapt to organizational change. By participating in traditional mentoring, an individual increases his or her opportunities for developing peer networks. These peer networks may additionally result in peer mentoring, which provides additional leverage for the protégé. By expanding one's peer network there is increased access to informational resources about career openings, strategies, and skill sets.

Information Acquisition

Podolny and Baron (1997) support the idea that a large, informal network enhances a person's organizational mobility through the acquisition of important information and resources. Also, the authors argue the absence of 'structural holes' in one's network to those persons in the organization with 'fate control' helps to improve mobility. Those in an organization with 'fate control' are described as persons who have some critical stake in the direction of the organization. In addition, the types of information that may flow through one's social network are described as task advice, strategic information, buy-in, and social support. Seibert et al. (2001) developed a framework explaining the importance of social capital on career success. The authors show that the impact of a person's social network on his or her possible career success was influenced by access to information, access to resources and career sponsorship.

Information Sharing

Ibarra (1992) shows how gender inequality is reinforced in organizations by sex-related differences in social networks. The author cites homophily as a cause of gender inequality. Homophily is defined as the preference to form same-sex network relationships. Also, another factor contributing to the difficulty in joining a social network is in translating an individual's characteristics and resources into advantages in a network situation. Mehra et al. (2001) discusses how individual interaction in social networks both enhances and inhibits different actions. According to the authors, individuals in networks may experience different outcomes due to the attributes of their network. Those people who are able to bring together less similar individuals generally enjoy a gain in information, control, resources, and mobility. People who participate in smaller, less extensive networks do not benefit from the diversity of information that is gained through circulation among wide-ranging networks spanning many individuals. Therefore, further research is needed to better understand this situation.

METHODOLOGY

The methodology guiding this paper is derived from the first phase of a NSF funded study on the individual differences in the social shaping of gender and IT. This study is a multi-year qualitative research effort engaged in developing an empirically-grounded theory that contributes to a better understanding of women in IT. The data for this paper are based on in-depth interviews conducted between October 2002 and December 2003 with forty-four female practitioners and academics working in the American IT field. These interviews are held with practitioners in three different geographical regions of the U.S.: Northeast (Massachusetts), Southeast (North Carolina) and Mid Atlantic (Pennsylvania). Furthermore, these women represent a wide range of demographic characteristics including, but not limited to: age, race, income level, relationship status, sexual orientation, educational background, career level and employment sector. The participants in the study have been provided aliases to ensure their confidentiality. The interviewees range in ages from twenty-three to fifty-seven. The racial backgrounds of the women in the study include Caucasian, African Americans, Asian American, Hispanic American and Middle Eastern American. Additionally, thirty women reported being married or in a committed relationship, thirteen women are single, divorced or widowed (one relationship status was not reported). Forty-two participants hold bachelor's degrees, twenty six have attained master's degrees and fifteen women have completed PhDs. The academic degree specializations range from IS, CS, engineering and MIS programs to psychology, nursing, communications, math, and liberal arts. In addition, the participant's job titles include software architect, quality assurance engineer, professor of IS and MIS/business, program/project manager, IT administrator, system and web developer, and small IT business owner. Interview data is being enhanced by participant observation data and documented data about gender and the IT sector in the regions involved in the study. The purpose of these activities is to further detail the socio-cultural context within which the interview data is situated.

The interviews last approximately ninety minutes in length and participants discussed experiences and insights into their development as IT professionals. Interview items were derived from prior IT gender research (Trauth, 1995, 2002). The interviews were tape recorded and subsequently transcribed for analysis by the authors. A coding scheme used for data analysis was derived from the emergent theory of individual differences (Trauth, 2002). Based upon the empirical data used to develop the coding scheme, three broad categories of data are being collected including personal data, shaping & influencing factors, and environmental context. These categories assist in the interpretation of the individual and environmental factors that are influencing American women regarding their decisions about an IT career, in their professional development, and in their career progression as IT professionals. The interview transcripts, coding scheme and coding are stored in a computer-analyzable form using NUD*IST N6 qualitative analysis software.

As previously mentioned, the underpinning of the NSF study, and subsequently this paper, is the emergence of an empirically-ground theory titled the individual differences theory (Trauth, 2002). The individual differences theory examines the social shaping of gender and IT at an individual level of analysis. In addition, the theory investigates the variations among women that result from the combination of individual characteristics and environmental influences. In the primary work detailing the individual differences theory, Trauth (2002) analyzes the IT gender gap and provides an alternative to essentialist and social construction theories of the under representation of women in the IT workforce. Essentialist explanations of the under representation of women focus on the differences in the biological/psychological traits ascribed to the sexes. Social constructionist literature characterizes information technology as being socially shaped as a male domain. Trauth argues for an alternative theory to explain the relationship of gender and the IT workforce based on the influences and experiences of individual women in the field. The theory of individual differences highlights commonalities and similarities among women and men as individuals as well as the diversity among members of each gender in respect to IT skills and desire to be involved in the IT sector. This theory argues that women both experience and respond to a variety of socio-cultural factors that influence their inclination to participate in the IT workforce in very individual ways. The individual differences theory has been the underlying theory that guides this paper. More specifically, the individual differences theory

has been applied to investigate the various ways in which women cope and respond to social networks. Thus, in this paper, the following research questions are addressed:

1. Does an "Old Boy's Network" exist in the IT workforce?
2. If so, how are women affected by this network? What are the consequences of possible exclusion from this network?

FINDINGS

By interpreting the data from this study through the lens of individual differences, we have discovered that women in the IT workforce recognize the network and respond in a variety of ways to the existence of this network. Although the women in this study are diverse in their backgrounds, we did determine some common responses to this situation. We have categorized their responses in the Social Networking Framework (Table 1).

The "Old Boy's Network" in IT is alive and well

The women in our study gave evidence of the existence of an "Old Boy's Network." Many of the women gave examples that described a visible informal network that was composed of only males. The range of experiences that the women in this study described regarding the network was varied. Of the 44 women interviewed, 11 specifically made statements about the "Boy's Club." In some interviews, the network was described as a purely social interaction among men. Other participants portrayed the network to be an empowered force that provided a barrier to and devalued the contributions of women. In addition, some women expressed the view that the network was similar to a secret society, where only the chosen are inducted in. One of the participants, Sandra, described the existence of a "Boy's Club" in her workplace where the men go to lunch together often and women are generally not invited. In addition, Florence described women not having access to the resources of the "Old Boy's Network," which provided guidance in navigating and understanding the workplace. These two experiences provide evidence that the network affects both external and internal working relationships.

The Social Networking Framework

This social networking framework categorizes the different responses that we interpreted from women in our study about their chosen responses to the network. The framework acknowledges three types of social networks within the IT workforce. The three types of networks are open, closed and alternative. The categories in the framework include: the proactive insider, the proactive outsider, the reactive insider, and the reactive outsider. The term "insider" refers to those who are in some way integrated into and accepted by the social network. The "outsider" is one who has chosen not to join the network or who is excluded from the network. The purpose of the framework is to explain how different women are affected by the network and to characterize women's responses to the situation.

Open Network	
Category	**Characteristics**
Proactive Insider	Finds a way into the "Boy's Club". Meshes interests with those of the men.
Reactive Insider	Gravitates to men because of preference or past experience. Already has the same interests as male counterparts.
Reactive Outsider	Does not join any network. Not interested in the network.
Closed Network	
Category	**Characteristics**
Reactive Outsider	Excluded from joining the network.
Alternative Network	
Category	**Characteristics**
Proactive Outsider	Discovers or creates a new network.

**Table 1. Summary of the Social
Networking Framework**

The Open Network

The open network is characterized by an apparent "open door" policy to new members. Though there may be some criteria for joining this network, it is not impenetrable. Those who participate in this network may share some common bond of experience, interest, or likeness. However, those non-members who possess similar interests as those within the network have the opportunity to establish a way into this network. Those external to this type of network have some element of choice in gaining access to the network. Jeria discussed her male work environment where she worked to fit in with men and became their platonic friend. She discussed going out after work with her male colleagues.

The Proactive Insider

The proactive insider category within the open network represents women who make some concentrated effort to join in the Boy's Club. These women make it a point to understand the interests and values of the social network and then either adopt or learn them. Women in this category provided a variety of explanations for why they chose to join in the social network. For example, Sharon took flying lessons to be able to join in lunch conversations with her male colleagues.

The Reactive Insider

The reactive insider category within the open network is compromised of women who already share interests and values with the men in the social network. Some of the women in this category grew up being very close to a male relative or friend. Others may have a preference for the company of males. Yet other women share interests with those within the social network and therefore gravitate more easily to men than those classified as proactive insiders. For example, Dawn discussed preferring to work with a bunch of guys, because she felt like it was just more fun.

The Reactive Outsider

The reactive outsider category within the open network consists of women completely outside of the social network. These women, for a variety of reasons, do not participate in male social networks. Some of the women have family responsibilities that prohibit their participation in after-work outings. Others do not see any value in relationships outside of their professional capacity. These women appear to be making the choice not to participate in the established social network. A participant, Debbie, discusses how she chose not to participate in the network.

> *I've noticed a big difference between men and women. A lot of the guys I know who are in development are really keen on that. They're reading these geeky books for fun and so on. And I don't see that among a lot of women. So it's a bit of a challenge there. My choice has been to not worry about it too much. I'm pretty smart so when I have to do anything I kind of do it then. But I know that that limits me to some extent.* [Debbie]

> *Why do you think that the women don't do what the men do?* [Interviewer]

> *My best guess is that its two fold. It's either not getting that it's important or it's this bit of, this social thing that they get where it's just not what they're interested in doing, it's not fun. And the fact that it's not fun overrides the fact that it can be helpful.* [Debbie]

The Closed Network

The closed network describes a group that discriminates with respect to admission. The members of this social network are not open to including individuals who do not share the commonality that links them together. Often, the criterion for membership in this group is based solely on gender, which means that women are not considered to be eligible to participate. This type of network excludes those unlike the members of the group and often denies their contributions. Jeanette described a closed network.

> *And these little informal titles developed based on the military model, where there's this guy, the boss and these two guys are henchmen. And, um, there's the inner circle, and everybody else is excluded.* [Jeanette]

The Reactive Outsider

The reactive outsider category within the closed network consists of women being intentionally excluded from the network by its members. Women in this category described their experiences of being left out and left behind. Ivanna discussed her experience of being shut out by her male managers.

> *Um, you know, even in server management, the guys just tend to close up. They don't want to share information, let's say for example, something new comes out. The guys huddle together right away and they*

start messing with it and they don't include you. So you're on your own, you're like oh well, whatever. That's how I feel. [Ivanna]

Do they do extracurricular, you know, like outside of work type of things? [Interviewer]

Sure. [Ivanna]

So there's a lot of bonding? [Interviewer]

I'm sure they do. [Ivanna]

You're not included in that? [Interviewer]

Absolutely not. [Ivanna]

The Alternative Network

The alternative network is a new network. The women in this category have experienced elements of either a closed or open network, but have found a way to develop or participate in a network better suited to them. These women appear to see the value in networking and are motivated to interact with and create other network opportunities. Some alternative networks may be based outside of the workplace, but provide networking opportunities nonetheless.   Emily described being involved with a support group for "design" web people outside of the workplace.

The Proactive Outsider

The proactive outsider category reflects those women who choose not to join or are rejected by the male social network. However, these women respond by joining or creating another network. Some women in this category recognized the value of networking, but were not interested in adapting their interests to participate in the network. Proactive outsiders may also have values or interests that are in conflict with those of the established network causing them to be excluded. Emily discussed her experiences of being involved with a support group for web design people that was external to her job. In addition, Sue said, "*I really don't pay any attention to my male counterparts; I really try to group up with other women that are at conferences and try to make those connections.*"

DISCUSSION

Our analysis has shown that women respond in a variety of ways to exclusion from the network. The women in this study reacted to the situation through a mechanism of their environment, personality, and responsibilities. The diversity of the responses to the network demonstrates how problematic large generalizations regarding gender will be. By analyzing these interviews using the individual differences theory, we are able to show that all women do not exhibit one common response; instead women interact with networks in different ways based upon a collection of factors. However, regardless of the response of women to the network, the workplace is being affected by their presence. It is also important to note that as the importance of informal networks such as these increases, we will begin to see a distinct power structure emerge. Those who are members of the important network will benefit from greater status and therefore further disadvantage those unable or uninvited to join the network. This situation is likely to further increase the under representation and decrease the retention of women in the IT workforce.

The notion of an open and closed network is also critical to this discussion. As noted in table 2, of the women interviewed, 15 reported being affected by a closed network. In addition, 24 of the women reported being in some form of open network. These results raise a key question. If women are in a position to join these networks, how then are the interactions within the network affecting them? Julia explained her method of fitting in with the men.

> *As soon as they figured it out, they* [the men] *started poking through the restaurant, made my whole entrance of course in order to fit in with the group, you not only had to be a nerd, you had to be able to drink, so I learned how to drink beer for the first time that night, in one breath. It was a guy thing, I was always, again, here was this girl who could drink as well as the guys, the computer nerd, and they thought, oh wow. So, I really just did computers as a social thing, so anytime I didn't understand anything, I had people lining up to explain it to me.* [Julia]

Category	No. of responses
Open Network	24
Proactive Insider	7
Reactive Insider	13
Reactive Outsider - Open	4
Closed Network	15
Reactive Outsider - Closed	15
Alternative Network	5
Proactive Outsider	5

Table 2. Participant Networking Characteristics

In Julia's case the effect appears to be positive. However, Sandra describes an alternative experience. She explained that the one time that she was invited out to lunch the conversation was very degrading. She characterized the experience as one including smoking, drinking, and swearing and basically the conversations were 'guy talk.' One interpretation we can develop is that there are benefits from being on the inside of a network, but there appears to be a cost at which this is realized. Regardless of how a woman is able to get on the inside there will likely be some adjustment necessary to facilitate her continued membership in the network.

CONCLUSIONS AND FUTURE RESEARCH

This paper has addressed the presence of a network in the IT workforce and the effect that its existence has on women in the field. The analysis of the data using the individual differences theory has uncovered evidence that this informal network does impact how women interact and react daily in the IT workforce. The skill of good networking appears to be a requirement for success in any field, but when barriers exist to even the prospect of networking then a problematic situation is created. The women in this study revealed their strategies for maintaining their positions in the workplace. While many women choose to sacrifice their own personal interests to fit in, others are opposed totally to a forced interaction with people with whom they do not share any similarities. Through these different responses, women are expressing their varying ways of coping with a phenomenon that will not likely disappear soon.

It is important to note that the insider and outsider categories are not static. It is very possible that over time or over the course of a career, a woman may move between categories as her environment and career evolve. This paper provides insight into an under studied area of the IT workforce and the under representation of women by exploring how women interact with informal networks in the organization. The contribution of this study is to further articulate the problem of the gender gap in IT by exploring a different dynamic of the workplace. Further research in this area could explore whether being in one social networking category is more beneficial than another in terms of career advancement or personal fulfillment. In addition, the exploration of the movement among categories over time would also provide an interesting look at what influences a woman to be an insider or an outsider.

ACKNOWLEDGMENTS

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