

WORKPLACE CULTURE THAT HINDERS AND ASSISTS THE CAREER DEVELOPMENT OF WOMEN IN INFORMATION TECHNOLOGY

ROSE MARY WENTLING

STEVEN THOMAS

This study examines both the positive and negative roles that workplace culture plays in the career development of women in information technology (IT). The literature has described the IT workplace culture as having certain characteristics that are unique to the industry and unique to White male culture. The IT culture has been described as largely White, male dominated, anti-social, individualistic, and competitive. Although many of these workplace culture characteristics were supported by this study, it was the collaborative and teamwork oriented aspect of their workplace environment and working together on projects and building close relationships with colleagues that benefited the study participants the most in their career development. If organizations want to attract and retain talented women into their IT workforce, they must have an understanding of both the positive and negative workplace culture characteristics that affect women's career development in IT.

INTRODUCTION

The U.S. Department of Labor projects that by 2014, not only will over 50% of all U.S. workers be women, but also 50% of the U.S. workforce will be employed by industries that are engaged in producing or using information technology (IT) products and services (U.S. Bureau of Labor Statistics, 2006). There continues to be tremendous growth potential for the application of IT to many domains of business and government (National Center for Women & Information Technology [NCWIT], 2007). This growth potential is demonstrated by the fact that there are now more IT jobs in the United States than ever before, and the fact that the U.S. government forecasts that some IT jobs will be the fastest-growing over the coming decade (U.S. Department of Commerce, 2006; NCWIT, 2007). The employment forecasts by the U.S. Bureau of Labor Statistics for 2004-2014 projection data suggests, growth in IT jobs is anticipated to intensify throughout the United States (2005). There is an escalating demand for technology-based workers and it is estimated that as many as 20 million new high skill/high wage jobs across

the U.S. economy to the year 2020 (Info Tech Employment, 2008).

Information technology is a phenomenon with deep implications for our country's competitiveness, culture, politics, economic well being, and quality of life (Bollier, 2005; NCWIT, 2007). Given that IT pervades our work, education, health, entertainment, and safety, it is essential that women participate in innovating and advancing the IT field (NCWIT, 2007). Women currently hold 56 percent of professional positions in the U.S. workforce. The U.S. Department of Labor Statistics (2004) predicts that women will account for more than half the increase in total labor force growth between 2004

Rose Mary Wentling is Professor, Human Behavior in Engineering, Department of General Engineering, University of Illinois, Champaign, Illinois and Senior Research Scientist for the National Center for Supercomputing Applications, Urbana, Illinois.

Steven Thomas is Organization Development Consultant, Lockheed Martin Corporation, Bethesda, Maryland.

and 2014, and that 3 of the 10 fastest-growing occupations between 2004 and 2014 are computing-related. However, women only hold 27% of professional computing-related positions. There is a vast pool of untapped talent in the United States among women, and this must be addressed in order to ensure our workforce is prepared to meet the employment demands of the future and make positive contributions (Bartol & Aspray, 2006; Halweg, 2002). Appropriate management of a diverse workforce is critical for organizations that seek to improve and maintain their competitive advantage (McLean, 2003; National Science Foundation, 2004; Society of Human Resource Management, 2005).

Despite significant growth in the IT profession in recent years, there remains a gender imbalance. The pipeline shrinkage problem for women in computer science is a well known and documented phenomenon where the ratio of women to men involved in computing shrinks dramatically from early student years to working years (Bartol & Aspray, 2006; Güner & Camp, 2002; Kohlstedt, 2006; Taylor, 2002). A study released by the Information Technology Association of America (ITAA) (2003) found that racial minorities and women have made few inroads into high tech employment. Information technology workers are predominantly White and male (National Research Council, 2001), and women and minorities earn significantly fewer undergraduate degrees in computer science and engineering than their representation in the U.S. population (ITAA, 2003). In 2004, 29% of computer scientists were female, 4% were female and African American, 2% were female and Asian, and 1% were female and Hispanic (U.S. Bureau of Labor Statistics, 2006). In 2006, 59% of undergraduate degree recipients were women, while only 21% of computing and information sciences undergraduate degree recipients were women. In addition, only 14% of computer science undergraduate degree recipients at major research universities were women, and only 1.1% of undergraduate women choose IT-related disciplines as compared to 3.3% of male undergraduates (National Center for Education Statistics [NCES], 2006).

While there are some women achieving success in the IT field, they appear to be the exceptions rather than the rule (Molina, 2002). Women's participation in computer-related occupations is low overall, and it decreases as women climb the corporate ladder. Women in leadership positions within IT are sparse, comprising 13% of board members and executive officers at the top 100 Fortune 500 IT companies (Catalyst, 2007). There is no question that the ratio of men to women in the high technology fields shows an obvious gender gap. In a world where there are too few skilled people to fill a large number of positions, we must be able to tap the entire population, both men and women (Lyons & Williams, 2002; NCWIT, 2006).

Many efforts have been made to recruit and retain more women into IT (Chapple & Saxenian, 2001; Cohoon & Aspray, 2006; MacLachan, 2006; Seymour & Hewitt, 1997; Tapia & Kvasny, 2004). These efforts have been driven mainly by the need for a more highly skilled technical workforce and an awareness of corporations that diversity assists competitiveness (Society of Human Resource Management, 2005). According to Florida and Gates (2001),

Building a vibrant technology-based region requires more than just investing in R&D, supporting entrepreneurship, and generating venture capital. It requires creating lifestyle options that attract talented people, and supporting diversity and low entry barriers to human capital ... Diversity of human capital is a key component of the ability to attract and retain a high technology industry. Talent powers economic growth, and diversity and openness attract talent (p. 7).

The gap of women in the IT fields results in a male-dominated perspective in the development and design of technology. Women bring a different life experience and a different perspective to the innovation process, and diversity in innovation leads to the design of products and services that benefit a broader

range of consumers as well as business organizations.

Women's absence in IT represents a loss of opportunities for corporations and individuals, as well as a loss of talent and creativity for the workforce. Diverse participation encourages creativity, stability, and resilience. Enlisting a broad range of minds and backgrounds in the design of IT yields products and services that benefit society as a whole (NCWIT, 2006). Serious consequences occur not only to women's overall potential, which is not fully realized, but also to the world's economy that might have been shaped differently with more involvement from women in the area of technology. The consequences for the U.S. economy are significant, since the shortage of technology workers may cost as much as 4 billion dollars per year in lost production for the United States (Valuing Diversity, 2005). More than ever before, women have a critical place in replenishing the shortage of IT workers.

Despite the shortage of IT professionals and the benefits of human diversity in the global economy, women are largely underrepresented in the IT workforce (Information Technology Association of America, 2003, 2005). Prior employment research on gender stratification demonstrates that this under representation in IT is a reflection of organizational and social structures, rather than essentialist generalizations about gender group characteristics (Bartol, Williamson, & Langa, 2006; Trauth, Quesenberry, & Morgan, 2004). As a result, it is necessary to understand the characteristics of the IT workplace culture, and in particular, workplace environmental factors that hinder and assist the career development of women in IT. Workplace culture refers to the deep structure of organizations, which is rooted in the values, beliefs, attitudes, practices, norms, customs, and assumptions held by organizational members and that characterize a workplace environment (Denison, 1996; McLean, 2003). IT computing culture has been described as having certain characteristics that are unique to the industry and unique to white male culture. The IT culture is described as largely White, male-dominated, anti-social, individualistic, competitive, all

encompassing and non physical. This culture has the potential to exclude women and minorities if they do not conform (Glastonbury & Lamendola, 1993; Roldan, Soe, & Yakura, 2004; Trauth, Quesenberry, Yeo, 2008; von Hellens, Nielsen, Trauth, 2001; Wajcman, 2006). Lemons and Parzinger (2001) found that poor advancement opportunities for women in IT were due to corporate culture issues and gender socialization. Lemons and Parzinger (2001) stated that "a willingness to accept a diversity of skills is the single factor that can promote women's success" (p. 7).

Prior research on women's perceptions of IT education and work indicate not only considerable uncertainty about what the IT work consists of and what skills are needed to succeed as an IT professional, but also that the IT work environment is perceived as difficult, boring, unattractive, and solitary in nature, requiring little interaction with fellow workers or customers (Ahuja, 2002; Nielsen, von Hellens, & Wong, 2000; von Hellens, Nielsen, & Beekhuyzen, 2004; Weinberger, 2003). Tapia and Kvasny (2004) conducted a literature review and found that women perceive the IT workplace negatively and one lacking the equality they require in a job. They framed the work as difficult, isolated, lacking necessary social interaction, and lacking work-family balance. In addition, they had a common perception that the IT industry is a male and a stereotypical "geek and nerd" domain. In their IT review essay, Soe and Yakura (2008) noted that organizational culture and climate can significantly affect women's participation and employment outcomes. They suggested that the larger percentage of men rather than women being hired and promoted in IT organizations leads to perceptions that the organizational climate is unfriendly towards women. Bartol and Aspray (2006) noted that women perceive the IT workplace environment as male dominated and not welcoming to women. McCracken (2000) reported that women tend to leave a company if they find the male dominated culture dissatisfying.

A study by Wardell, Sawyer, Reagor, and Mitroy (2005) found that women are nearly three times as likely as men to leave the IT workforce.

Their findings showed that although women are able to gain the necessary skills to enter the IT workforce, they are more likely than their male counterparts to leave the IT industry. The literature has identified cultural fit, expectation gaps, mentors, role models, career satisfaction, organizational commitment, role ambiguity, and role conflict as pertinent factors that affect the retention of women in the IT workforce (Bartol, Williamson, & Langa, 2006; Riemenschneider, Armstrong, Allen, & Reid, 2006; Tapia & Kvasny, 2004). Igbaria and Greenhaus (1992) reported that job satisfaction and organizational commitment are the most direct influences on turnover intentions among IT professionals. They stress that high levels of career satisfaction enhance organizational commitment, since employees who are satisfied with their careers perceive greater benefits in retaining membership in their organizations than employees whose careers have been less gratifying. Bartol et al. (2006) found that female IT student graduates have a lower professional commitment than do male IT students. Furthermore, they found that gender and professional experience interact to influence professional commitment, and professional commitment is lowest among female newcomer IT professionals. Job satisfaction has been linked to a higher organizational commitment and lower intentions to leave the organization (Bartol & Martin, 1982). Evidence also indicates that job satisfaction is associated with professional commitment (Bartol et al., 2006; Blau, 2003). Career satisfaction refers to the extent of an individual's affective orientations toward his or her career (Jiang & Klein, 2000). Interest in career satisfaction is intensified by the behavioral outcomes of career satisfaction, such as commitment and intention to leave. Included among the organizational features that increase career satisfaction are advancement opportunities, enjoyable job related tasks, and supportive work environment (Hsu, Chen, Jiang, & Klein, 2003; Igbaria & Greenhaus, 1992; Sumner & Niederman, 2002).

The underrepresentation of women in the IT workforce continues to grow and appears to be compounded by poor retention statistics (Quesenberry, 2006). Researchers and scientists

agree that systematic research efforts are needed to address the gender imbalance and underrepresentation of women in IT. A documented need to study the gender imbalance in this field exists; this topic is both understudied and undertheorized (Cohoon & Aspray, 2006; Camp, 1997; Haynes, 2005; National Science Foundation, 2001; Nelson-Porter, 2004; Trauth, 2002). While the timing for increasing women's participation in IT fields appears propitious, the literature, as shown earlier, indicates that the supply of women in IT is alarmingly low. The research literature (Carayon, Hoonakker, Marchand, & Schwartz, 2003; Quesenberry, 2006; Tapia, 2003; Teague, 2002; Trauth, Quesenberry, & Yeo, 2008; Weinberger, 2003) suggests that workplace culture can significantly affect women's participation and employment outcomes. It seems reasonable to consider that some features of the male-dominated IT workplace culture would impact the career development of women in IT. This study examines the workplace culture that hinders and assists the career development of women in IT.

RESEARCH QUESTIONS

The following research questions guided this study:

1. What is the current workplace culture for women in IT?
2. What workplace culture characteristics have hindered the career development of women in IT?
3. What workplace culture characteristics have assisted the career development of women in IT?
4. How satisfied are women in IT with their career development?

CONCEPTUAL FRAMEWORK

According to Miles and Huberman (1994), a conceptual framework explains the main dimensions to be studied, the key factors or variables, and the presumed relationship among them. The purpose of this study is to examine the workplace culture characteristics that hinder and

assist the career development of women in IT. Given the focus on workplace culture, it was appropriate to use social construction as the conceptual framework for the study. The term social construction was first introduced by Berger and Luckmann (1966) in their book *The Social Construction of Reality*. Central to social construction is the notion that social systems are based on actors who interact over time, eventually developing habitualized norms and roles. As these interactions become institutionalized, meaning becomes embedded in individuals and society. Knowledge and one's conception of, and therefore belief regarding the nature of reality becomes embedded into the institutional fabric and structure of society, and social reality is said to be socially constructed. In brief, a social construction is any institutionalized entity or artifact in a social system invented or constructed by participants in a particular culture or society that exists because people agree to behave as if it exists or follow certain conventional rules (Berger & Luckmann, 1996).

Social construction stands in contrast to essentialism, realism, and naturalist perspectives, emphasizing historical and cultural specificity of knowledge while focusing on interaction and social practices (Burr, 1995; Trauth, Quesenberry, & Yeo, 2008). Overall, social construction has played an important role in the study of technology, IT, and the relationship between gender and technology (Baker & Shapiro, 2003; Morgan, Quesenberry, & Trauth, 2004; Spender, 1997; Trauth, Quesenberry, & Yeo, 2008; Wajcman, 2006; Walby, 2002). Marini (1990) states that the influences of societal factors, rather than biological forces, are the primary constructs that shape individuals and their relationships with technology. As a result, a social construction perspective asserts that there are no universally male or female qualities, but rather emphasizes that within the IT field certain cultural characteristics are gathered on the basis of gender. In this sense, the IT workplace is deemed a male domain (Trauth, Quesenberry, & Yeo, 2008). The social construction conceptual framework used in this study assisted in developing the research questions, guiding the study, and analyzing the data. The conceptual

framework also aided in compartmentalizing or binning the data for purposes of analysis (Merriam, 1998; Miles & Huberman, 1994). The framework was not used for developing or testing theories.

METHODOLOGY

This study utilized a qualitative design to provide a comprehensive understanding of the workplace culture that hinders and assists the career development of women in IT. This study used semi-structured interviews. Interviewing is the most common qualitative method practiced in organizational research (Lee, 1999). The major research method for this study was in-depth, semi-structured telephone interviews with a group of twenty-five women in positions in IT from across the United States. An interview guide was developed to obtain detailed information. This strategy was used because it allows for rich data, thorough responses, probing, and clarification of meanings (Merriam, 1998).

A pilot study was conducted with five women in IT to determine content validity and the appropriateness of the interview guide and study procedures. The women who participated in the pilot study were later included as part of the study. The pilot study results indicated that the interview guide questions were appropriately focused, met the objectives of the study, and could be completed in the time estimated, one to two hours, with an average of one and a half hours. Minor revisions were made to the interview guide based on the results of the pilot study.

A sample of 25 women in positions in IT was selected from the National Center for Supercomputing Applications (NCSA) Fortune 500 Industrial Partners list. The Industrial Partners Program list included 35 Fortune 500 companies. These companies were selected for this study because they had women in positions in IT, and they were accessible to the researchers. NCSA is a unit of the University of Illinois at Urbana-Champaign and is dedicated to advancing leading edge technologies in IT and high performance computing and communications in academia and industry. NCSA's mission with the Fortune 500 Industrial Partners is to help them

become more competitive in the global marketplace. In return, the Industrial Partners bring their business leadership and their challenging problems to NCSA and provide money to help solve these problems. A master list of 35 women in IT from the NCSA Industrial Partners Program list was developed with the assistance of the Director of the NCSA Industrial Partners Program. From the master list, a convenience sample of 25 women in IT was randomly selected to participate in the study. Participants were selected based on their willingness to take part in the study. All the women initially contacted agreed to participate in the study. Study participants were assured that the information they provided would be kept strictly confidential, and no comments would be attributed directly to them or their company. Each participant was offered an honorarium of \$200. Only 5 of the 25 participants accepted the honorarium.

Data were analyzed using basic descriptive statistics and a multistep content analysis methodology. To increase the validity of the findings, an interview transcript and summary were prepared and sent to four of the participants, who confirmed that the transcript and interpretation of the data were accurate. This method of checking with participants was used as an additional step to ensure the validity of the data collected. Both researchers independently analyzed the data to check for validity and reliability of the emergent themes, categories, and rankings. The researchers also used a peer examination strategy in which a research associate with expertise in qualitative data analysis was asked for comments as items were coded, categories were defined, and findings were developed (Gall, Borg, & Gall, 1996). The research associate independently reviewed the overarching content themes in addition to the statements taken from the individual interview transcripts to determine the appropriate categorical placement for each. The analyses and ratings from all the researchers matched well.

PROFILES OF STUDY PARTICIPANTS

Twenty-five women in IT, each from a different Fortune 500 company, were interviewed. The women worked in industrial corporations whose annual revenues and assets ranged from \$5.727 billion to \$246.525 billion and \$3.328 billion to \$370.782 billion, respectively. The number of employees in the 25 companies ranged from 17,611 to 1,300,000, with an average of 145,751 employees. The study participants are employed in a variety of industries. The types of industries in which the study participants are employed included: computer and office equipment, 4 (16%); pharmaceuticals, 4 (16%); household and personal products, 3 (12%); aerospace and defense, 2 (8%); chemicals, 2 (8%); general merchandisers, 2 (8%); wholesalers, healthcare, 2 (8%); and others 6 (24%). The companies in which the study participants are employed are located throughout the United States.

The position titles that the study participants held in the IT field ranged from computer analyst to chief information officer. The study participants ranged in age from 26 to 55 years, with an average of 38.3 years. Eighteen (72%) of the study participants were married, and 7 (38%) were single. The ethnic origin of all the study participants includes 23 (92%) White and 2 (8%) African American. Sixteen (64%) of the study participants had children, and 9 (36%) did not have children.

All the participants had earned bachelor's degrees. The participants' major fields of study included: computer science, 6 (24%); engineering, 6 (24%); mathematics, 5 (20%); business (e.g., management, business administration, economics), 5 (20%); music, 2 (8%); psychology, 1 (4%); science, 1 (4%); dance, 1 (4%); and political science, 1 (4%). Of the 25 study participants, 10 (40%) have also earned master's degrees, and 1 (4%) has earned a Ph.D.

RESULTS

The results of this study are summarized in four sections that parallel the research questions: (a)

current workplace culture of women in IT, (b) workplace culture characteristics that have hindered the development of women in IT, (c) workplace culture characteristics that have assisted the development of women in IT, and (d) satisfaction with career development.

RESEARCH QUESTION ONE: CURRENT WORKPLACE CULTURE OF WOMEN IN INFORMATION TECHNOLOGY

The study participants were asked to describe their current workplace culture and environment. Table 1 displays the characteristics that were used by the study participants to describe their current workplace culture and environment. The 10 workplace culture characteristics most frequently mentioned by the participants included the following: male dominated (“good old boy” culture), 20 (80%); results driven culture, 14 (56%); teamwork oriented, 14 (56%), high accountability, 12 (48%); diversity not valued, 10 (40%); very competitive, 10 (40%); challenging, 9 (36%); fast paced, 8 (32%); intellectual, logical thinking, 7 (28%); and problem solving focus, 7 (28%). The findings on Table 1 show that the workplace culture characteristics identified by the study participants have both positive and negative aspects.

RESEARCH QUESTION TWO: WORKPLACE CULTURE CHARACTERISTICS THAT HAVE HINDERED THE DEVELOPMENT OF WOMEN IN INFORMATION TECHNOLOGY

In addition, the study participants were asked what aspects of their workplace culture and environment had hindered their development. The seven workplace culture characteristics that were mentioned by the study participants that hindered their development included: male dominated (good old boy culture), 20 (80%); very competitive, 15 (60%); diversity not valued, 12 (48%); very conservative, 9 (36%); nonconsensus, 5 (20%); exclusive (not all people treated the same, some made to feel like outsiders), 5 (20%); and hostile/threatening, 4 (16%). See Table 2.

The participants who cited the male-dominated (good old boy culture) aspect of their workplace culture indicated that the good old boy network made it difficult for them to feel accepted. Many times they felt like outsiders, and this feeling sometimes had an impact on their self-confidence. They felt that getting accepted and becoming part of the good old boy’s network was difficult to do. They also noted that not being part of this network often created inhibitors to career opportunities. Often this exclusion had a detrimental impact on their self-confidence. Several of the participants reported intimidation by male colleagues as having a negative impact on their career development. They reported instances where derogatory comments and intimidation were used by men to obtain work assignments or special projects. These women felt

Table 1. Workplace Culture Characteristics of Study Participants’ Current Companies (n= 25)

Characteristic	f	%
Male dominated (good old boy culture)	18	72
Results driven culture	14	56
Teamwork oriented	14	56
High accountability	12	48
Diversity not valued	10	40
Very Competitive	10	40
Challenging	9	36
Fast-paced	8	32
Intellectual, logical thinking	7	28
Problem solving focus	7	28
Entrepreneurial	6	24
Very conservative	6	24
Recognize excellence/contributions	6	24
Employee/people oriented	6	24
Customer oriented	5	20
Exclusive (not all people treated the same, some made to feel like outsiders)	5	20
Open communication	5	20
Hostile/threatening	4	16
Non-consensus	4	16
Collegial	4	16
High integrity	3	12
Collaborative	3	12
Supportive/caring	3	12
Non-conflict environment	1	4
Low on risk taking	1	4
Empowering	1	4
Bureaucratic	1	4

Table 2. Workplace Culture Characteristics that Hindered Study Participants' Development

Characteristic	f	%
Male dominated (good old boy culture)	16	64
Very competitive	15	60
Diversity not valued	12	4
Very conservative	9	36
Non-consensus decision-making	5	20
Exclusive (not all people treated the same, some made to feel like outsiders)	5	20
Hostile/threatening	4	16

NOTE. Multiple responses were accepted.

extremely threatened and devalued in these environments and moved quickly to leave such hostile surroundings. One study participant said,

This company that I worked for just had a very threatening work environment for the women that worked there. I had so many incidents that were just outrageous, almost every month something ridiculous would happen. It was a really tough place for me to work at as a woman, and fortunately another company recruited me and I was able to find another position and leave that company.

The participants also indicated that female role models and mentors were difficult to find in the IT field because it is mostly male dominated. They felt that having female role models to look up to and having the opportunity to talk and share experiences was important for building self-confidence. These participants were often made to feel like outsiders or were intimidated by male colleagues, which hindered their career development. Another study participant explained:

There have been several times when I have had male colleagues come up to me and say in a spiteful way that they want my job or that they are going to take my project away from me. This type of thing has happened to me throughout my entire

career and I know that other women have had similar experiences. Most of the time I don't let it bother me, but sometimes it bothers me and I feel very uncomfortable and it can be very hurtful.

The study participants also indicated that the large number of males in the organization made it difficult for females in the organization, especially those with family, to get sympathy for their particular challenges. They also reported that intimidation by male colleagues sometimes created problems and friction that hindered them.

The participants who identified a very competitive environment as hindering their development indicated that there were few high level positions available, and many talented or competent people within the organization who wanted these positions, which sometimes made it difficult for them to get promoted in a timely manner.

The study participants who indicated that diversity was not valued in their workplace environment stated that their companies' culture valued similarities and sameness. Many times this created difficulties and hindered their career development because their personalities and values did not match this type of culture.

The participants who identified nonconsensus decision making in the workplace as hindering their development indicated that organizational decisions that affected them, for example, work schedules, equipment purchases, and research and development policies, were often made without a clear structure or consensus approach. Their input was not often requested. They were frequently excluded in the decision making process, and those making the decisions were not aware of their needs. Nonconsensus decision making sometimes resulted in their not knowing when a decision had actually been reached.

RESEARCH QUESTION THREE: WORKPLACE CULTURE CHARACTERISTICS THAT HAVE ASSISTED THE DEVELOPMENT OF WOMEN IN INFORMATION TECHNOLOGY

The study participants were also asked what aspects of their workplace culture and

Table 3. Workplace Culture Characteristics that Assisted Study Participants' Development (n= 25)

Characteristic	f	%
Teamwork oriented	14	56
Results driven culture	13	52
High accountability	10	40
Challenging	9	36
Employee/people oriented	6	24
Open communication	5	20
Collegial	4	16
Supportive/caring	3	12
Collaborative	3	12

NOTE. Multiple responses were accepted.

environment have helped them to succeed. Table 3 shows the workplace culture characteristics that were mentioned by the study participants that helped them to succeed. The nine work environment and culture characteristics most frequently mentioned by the participants included the following: teamwork-oriented, 14 (56%); results driven culture, 13 (52%); high accountability, 10 (40%); challenging, 9 (36%); employee or people oriented, 6 (24%); open communication, 5 (20%); collegial, 4 (16%); supportive or caring, 3 (12%); and collaborative, 3 (12%).

The participants who cited the collaborative and teamwork-oriented aspect of their workplace culture and environment indicated that working together on projects and building close relationships with colleagues benefited them the most in their career development. One study participant commented, "The fact that we are very collaborative and team focused means that you don't compete with people that you work with for promotions. As a result, you end up helping each other succeed."

The study participants who identified the supportive or caring aspect of their workplace culture and environment as helping them succeed indicated that having support from senior management as well as colleagues helped them do so. The participants who cited the employee or people-oriented aspect of their workplace culture indicated that the part of the culture that provided them with training and development programs, resources, mentoring, and challenging work opportunities benefited them the most in their

career development. These participants said that their companies had given them the opportunity to obtain a wide variety of work experiences that had been very valuable to their career development. A study participant said this about her company's workplace environment and culture:

My company provides strong support to its employees. Whether it's a personal or professional challenge, there are a number of people within the organization to help and support you. For example, when I took my assignment in Europe, I knew that if for some reason things didn't work out for me there, my company would provide me with the help I needed or bring me back. They encouraged me to take risks, but I knew they would be there for me if that risk turned out to be unsuccessful [*sic*].

The study participants who identified the results-driven aspect of their workplace culture and environment as helping them succeed indicated that the results-driven culture was good for them because it provided the force they needed to stay challenged and motivated. In addition, the high-accountability aspect of their work environment assisted in their production of high quality work, getting results, being accountable, and in striving to be consistently outstanding in their work.

Several of the participants indicated that their workplace environments relied on open, honest communication and the sharing of knowledge and information in all directions. They further specified that the interactions among employees were based on honesty, mutual respect, and integrity.

RESEARCH QUESTION FOUR: SATISFACTION WITH CAREER DEVELOPMENT

Study participants were asked if they had progressed as rapidly as they thought they should. Eighteen (72%) of the study participants indicated that they had not progressed as rapidly as they thought they should. Seven (28%) of the

Table 4. Reasons Study Participants Gave for Not Progressing as Rapidly as They Think They Should (n= 18)

Reason	f	%
Male-dominated company and/or job area	14	77
Gender discrimination	13	72
Difficulty conforming to company norms	10	55
Company did not encourage, support, or develop women for top level positions	9	50
Treated as an outsider	8	44
Excluded from high-level decision-making within company	8	44
Personal circumstances	7	38
Racism/sexism	5	28
Constraining economy	3	17
Males in company having a high level of discomfort working with females	3	17

NOTE. Multiple responses were accepted.

participants indicated that they had progressed as rapidly as they thought they should. Table 4 shows the various reasons given by the study participants for not progressing as rapidly as they thought they should. The six most frequent reasons given by the participants included the following: male-dominated company and/or job area, 14 (77%); gender discrimination, 13 (72%); difficulty conforming to company norms, 10 (55%); company did not encourage, support, or develop women for top level positions, 9 (50%); treated as an outsider, 8 (44%); and excluded from high level decision making within company, 8 (44%).

One study participant who stated she had not progressed as rapidly as she thought she should had this to say:

When I first became a R&D [research and development] manager, I was the only female R&D manager and when we had our annual meetings, there were 48 men and me. Many times they treated me like an outsider and I often was excluded from high level decision making within the company. Other intangible forms of exclusion were also employed.

Another study participant described her experience:

I was the first African American woman in the history of the company to obtain a director's position, and I am the only Black person out of a 120 member unit, which is mostly White males. There is a very high level of discomfort for those [White] males who work with me. My performance is stellar; however, because I am Black and a female it creates a feeling of discomfort for the males in my workplace.

The participants noted that dealing with politics in the organization hindered their career development. In many instances, the study participants believed they had difficulty conforming to company norms, fitting in, adapting to the organization's culture, and knowing whom to approach for support. Several of the participants encountered problems in determining the organization's informal power structure, primarily because established political systems and networks were composed of men and were sometimes not available to women.

The study participants also indicated that gender discrimination was a major challenge in their careers. Several of the participants believed that because they were women, they had advanced more slowly, were not given promotions that they deserved, had to work harder to prove themselves, were not taken seriously or were treated with less respect, or were banned from international job assignments. One participant said the following about one of her female co-workers:

From the moment she was hired they [male co-workers] did not accept her. They would sort of laugh at her and not give her any credibility or respect for her designs. They couldn't wait to get in there and redesign what she had done because they didn't believe it would work right. They believed because she was a woman she didn't know anything about

engineering and therefore, they felt she could not produce a high quality design that would work right.

Several of the participants described working for bosses who had difficulties dealing with women, or did not believe in the development or advancement of women. The participants indicated that the gender discrimination was often very subtle in form. For example, they were often excluded from meetings to which all male peers were invited, or the women were not invited to play golf. These participants were often unable to participate in valuable informal business discussions. Being excluded and not having access to valuable inside information often hindered advancement opportunities. A study participant shared her encounter with this kind of discrimination:

I didn't take legal action, but I would describe it as a hostile work environment. I had a large group of colleagues, all men, the majority of them based outside of the United States. They had a favorite successor to this gentleman that I replaced, someone who worked on my staff, and they were very loyal to him; he was one of the good old boys. Most of them had wanted him to take the job, and I don't think that I was welcome from the very beginning. They would do all kinds of awful things to me. They were very unhappy that the company had decided to go outside, first of all, much less go outside to bring a woman. And they didn't make it very pleasant for me while I was there.

Study participants were asked how satisfied they were with their careers. The following scale was used: (1) very satisfied, (2) satisfied, (3) neither satisfied nor dissatisfied, (4) dissatisfied, (5) very dissatisfied. Twenty-one (84%) of the participants indicated being very satisfied, 3 (12%) indicated being satisfied, and 1 (4%) indicated being dissatisfied. Table 5 shows the various reasons given by the study participants for

being satisfied with their careers. The six most frequent reasons given by the participants for being satisfied and liking their careers included: constantly learning new things, 14 (58%); continuously being challenged, 13 (54%); continuously changing, 12 (50%); making valuable contributions to business and society, 11 (46%); having control over change and getting things accomplished, 10 (42%); and having the opportunity to work in many different areas of business, 10 (42%). One study participant described her satisfaction with her career saying:

IT is an exciting field that is changing all the time. It's constantly changing how people work and live, and it allows you to connect with people you never thought you could connect with. It breaks down regional, country and language barriers. I love technology because it has a positive impact on business, communities and the world in general.

Table 5. Reasons Study Participants Gave for Being Satisfied and Liking Their Careers (n= 24)

Reason	f	%
Constantly learning new things	14	58
Continuously being challenged	13	54
Continuously changing	12	50
Make valuable contributions to business and society	11	46
Have control over change and getting things accomplished	10	42
Opportunity to work in many different areas of business	10	42
Intellectually stimulating	9	38
Continuously growing and advancing	8	33
Financially rewarding	8	33
Assist in the professional development and growth of people	8	33
Part of the company's decision-making process	7	29
Work with very talented people	6	25
Have great opportunities to use my expertise	6	25
Powerful, prestigious, influential position	5	21
Positive recognition/exposure	5	21
Make a difference in others' lives	4	17
Exciting/interesting/fun work	2	8
Great work environment	2	8

NOTE. Multiple responses were accepted.

Another study participant stated:

I have a prestigious and influential position within my company. I have many opportunities to work with some very talented people and make major contributions within my company and society in general. In addition, my position allows me to live very well financially.

Still another study participant said:

The company I work for, the talented people I work with, and the information technology field makes my current job very interesting and exciting. The top management of the company recognizes that IT plays a key role in helping the company be successful. In addition, the fact that the IT field is constantly changing and can actually make the world a better place makes it fascinating.

Additionally, another participant declared:

I enjoy working with all the different processes, organizations and departments in the company. Information technology touches every individual from the individuals using the PCs to get their job done to the bigger applications that we provide to automate major corporate processes. It's exciting and a great opportunity to be able to make IT operations come together and more efficient.

The study participant who said she was dissatisfied with her career stated she was not satisfied with her career due to lack of recognition, opportunity, and timely career advancement.

DISCUSSION

There were workplace culture and environment factors that played a negative role in the career

development of the women in this study. The male-dominated good old boy culture aspect of their workplace culture and environment made it difficult for them to feel accepted. Many times they felt like outsiders, and sometimes this feeling had an impact on their self-confidence. Study participants also indicated that the large number of males in the organization made it difficult for the females, especially those with families, to get sympathy for their particular challenges. They reported being excluded from high level decision making and not being encouraged, supported, or developed for top level positions. Furthermore, they reported that intimidation by male colleagues sometimes created problems and friction that hindered them. Several previous studies have found the IT workplace environment as male dominated and not welcoming to women (Bartol & Aspray, 2006; Riemenschneider et al., 2006; von Hellens, Nielsen, & Trauth, 2001; Woodfield, 2002). According to Tapia and Kvasny (2004), within the traditional male-dominated IT culture a strong value is placed on individualism, which impedes the creation of mentoring networks and a supportive environment for female IT employees. In addition, they stated that White males have traditionally held the highest ranking and the most privileged positions in IT, and they find it difficult to relate to their female employees. There is evidence in the literature that women have been the object of gender discrimination, which could translate into fewer rewards, fewer resources, and fewer opportunities (Kanter, 1993; Wentling, 1997). Gender discrimination may result in fewer promotions, but could also lower feelings of acceptance and limit chances to obtain social support from superiors and peers (Ilgen & Youtz, 1996; Wentling, 2003). Melymuka (2002) further states:

The roots of gender discrimination are built into a plethora of work practices, cultural norms, and images that appear unbiased, such as definitions of competence and commitment and leadership. People don't even notice them, let alone question them. But they create a subtle pattern of disadvantage that blocks all women (p. 53).

From the literature and the results of this study, it seems that gender differences embedded in the IT workplace culture negatively affect the career development of women.

Conversely, the workplace culture and environment played a positive role in the career development of the women in this study. The employee-oriented aspect of their workplace culture and environment that provided them with training and development programs, resources, mentoring, and challenging work opportunities had a positive affect on their career development. In addition, the collaborative and teamwork-oriented aspect of their workplace environment, working together on projects and building close relationships with colleagues, benefited the study participants in their career development. Several studies confirm the important role that workplace culture plays in the development and advancement of women in IT (Bartol & Aspray, 2006; Igarria & Greenhaus, 1992; Igarria & Guimaraes, 1999; Trauth, Quesenberry, & Yeo, 2008; Wardell et al., 2005). Although several authors have proposed organizational practices that enhance effectiveness in organizations and retain talented IT employees (Arnett & Obert, 1995; Dessler, 1999; ITAA, 2003, 2005; Lawler, 1996; Pfeffer & Veiga, 1999), these practices are sometimes narrowly focused and often more likely to relate to male IT workers. For example, Lawler (1996) suggests four organizational processes that may influence work-related attitudes and behaviors, namely, information sharing, empowerment, competence development, and rewards. However, some studies have shown that reward is a complex process that may not be fully understood without taking into account the underlying dimensions of gender, procedural, and recognition aspects (Milkovich, 1998; Sheppard, Lewicki, & Minton, 1992; Sumner & Niederman, 2002). Some literature suggests that work-family conflict, gender discrimination, difficulty with self-esteem, and other personal factors are critical challenges for women in IT in organizations, causing an impact on women's attitudes and work behavior (Bartol & Aspray, 2006; Chiu & Ng, 1999; Frenkel, 1999; Hemenway, 1995).

The majority of the study participants indicated that they have not progressed as rapidly as they think they should have in their careers. Some of the reasons they gave for not progressing as rapidly as they thought they should included working in a male-dominated company or job area, gender discrimination, difficulty conforming to company norms, and being treated as an outsider. Even though the majority of the study participants felt they had not progressed as rapidly as they thought they should in their careers, they were very satisfied with their career development. Hsu, Chen, Jiang, and Klein (2003) state that there is a general agreement that organizations that satisfy employees' work and life needs tend to have higher levels of career satisfaction and lower levels of turnover intent. Furthermore, Igarria, Greenhaus, and Parasuraman (1997) reported that employees whose career anchors, self-perceptions that influence an individual's career choice, are compatible with their jobs have higher career satisfaction levels and lower intentions to leave an organization than those who report incompatible career anchors with their jobs. On the other hand, if there is not a fit between career anchors and workplace environment, then job dissatisfaction and turnover are more likely to result (Jiang & Klein, 2000). The women in this study have satisfying careers in IT and enjoy the work they do. They enjoy constantly learning new things, continuously being challenged, making valuable contributions to business and society, and the opportunity to work in many different areas of business. The women in this study provide a contrast to those identified in a two year research study by the American Association of University Women (AAUW, 2000) that found the vast majority of girls and women had a negative view of IT.

Organizations have the opportunity to play a key role in the career development of women in IT. Organizations can create workplace environments where women have the opportunity to advance, receive equal treatment and access to information and opportunities, remove barriers such as the glass ceiling that might hinder their development, and provide support through role models and mentors in the work environment.

Additionally, the challenge of balancing work and family produces barriers for women in IT. The demands of work coupled with the demands of family can become problematic for some women as they seek creative ways to continue maintaining their family structure and contend with the increasing demands and pressures arising from their work. Initiatives that can be addressed by companies include providing work-life balance programs such as flexible work schedules, daycare centers, and family leave, establishing support or networking groups, determining how to attract more women into IT, removing glass ceiling barriers, providing training and development programs, and providing mentoring programs.

Jepson and Perl (2002) discovered that the implementation of mentoring programs was important for young females and women in IT. Townsend (2002) discusses the pros and cons of mentoring in their research, noting, "It's an opportunity to work closely with and learn from highly talented and committed individuals..." (p. 57). Gabbert and Meeker (2002) emphasize the need for support communities for women in IT as women are becoming more underrepresented in the field. Support communities vary, but their general purpose is to provide support, networking, and recognition to women in the field of computer science and IT, according to Gabbert and Meeker (2002). By providing a nurturing work environment an organization can offset internalized out group status and provide a truly diverse workplace environment that values and benefits from gender differences.

It should be noted that this study is subject to some limitations. The sample was small and the information gathered in this study included no comparison group, so there is no way of knowing how these experiences compare with those of women from different subgroups, such as chief information officer vs. computer analyst, women who left or never entered IT, or of men in IT.

This study extends the women in IT literature and provides valuable insights into their workplace culture. Due to the current skill shortage that the IT industry is facing, along with the diversification of IT occupations, there are excellent opportunities for women to enter the IT

sector. However, if organizations want to attract and retain talented women in their IT workforce, they must have an understanding of the personal and workplace environment factors that affect women's career development in IT. The acceptance of women in IT as permanent and valuable is a necessary first step to unlocking their full potential. Once organizations recognize that women are in the workforce to stay, the value of investing in their development will be self-evident; then it will only be a question of how quickly the obstacles to their growth can be removed in order to further their upward mobility and increase their productivity. Organizations have it in their power to profit from women's motivations and aspirations. They can create a climate where men and women can communicate freely and with ease and reward the aggressiveness and competitiveness in women and men equally. Ultimately, organizations will discover that the time spent on these efforts will be a worthwhile investment. In addition, it is imperative that IT educators at universities build a comprehensive, well-grounded body of research and instruction related to workplace culture and its impact on women's careers in the IT field. University educators have the opportunity to influence both women and men at various stages in their IT careers through their ongoing educational endeavors. Therefore, educators should make it a priority to build a body of knowledge in this area that will assist in providing a solid foundation upon which to base future education and training related to workplace culture in IT. These efforts need to be directed particularly at changing the nature and perceptions of IT from that of a male-dominated one to one-for-all IT workers, with opportunities for everyone to contribute and reach their full potential.

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