# The Influence of Environmental Context on Women in the IT Workforce[1]

### Eileen M. Trauth, Ph.D.
Professor

School of Information Sciences
and Technology

The Pennsylvania State
University

1-814-865-6457 (phone)

1-814-865-6426 (fax)

etrauth@ist.psu.edu

### Jeria L. Quesenberry
Ph.D. Candidate

School of Information Sciences
and Technology

The Pennsylvania State
University

1-814-865-8952 (phone)

1-814-865-6426 (fax)

jquesenberry@ist.psu.edu

### Benjamin Yeo
Ph.D. Candidate

School of Information Sciences
and Technology

The Pennsylvania State
University

1-814-865-8952 (phone)

1-814-865-6426 (fax)

byeo@ist.psu.edu

## ABSTRACT
In an effort to better understand the under representation of women in the IT field, the focus of research has been on the collection and analysis of empirical data. However, there is also a need for appropriate theory to understand and explain that data. Toward this end, Trauth has engaged in a program of research directed at the articulation of an empirically-grounded theory to explain and predict the under representation of women in the IT field. Called The Individual Differences Theory of Gender and IT, this theory argues that the under representation of women in IT is better accounted for by understanding the variation across women than by focusing on ascribed differences between men and women in stereotype. To this end, a set of constructs has been identified, including: *personal data*, *shaping and influencing factors* and *environmental context*. This set of constructs is being used as the interpretive vehicle in a multi-year study of the life histories of women IT professionals. The results, to date, have addressed the personal data, and shaping and influencing factors. The purpose of this paper is to examine the construct: *environmental context*. The results suggest that economic factors such as size of the information economy, household income and cost of living, and cultural factors such as attitudes and values regarding women, women working and women working in IT do exert an influence on the experience of women in the IT workforce. Thus, the data analysis presented in this paper serves to further supports this emerging theory of individual differences of gender and IT and its constructs.

## Categories and Subject Descriptors
H.1 Models and Principles; K.7 The Computing Profession; K.4 Computers and Society

## General Terms
Management, Human Factors, Theory

## Keywords
Diversity, feminism, feminist theory, gender, gender equity, gender issues, gender differences, IT workforce, careers of women in IT, IT profession, IS careers, IS professionals, IT careers, IT professionals, individual differences theory of gender and IT, theory

## 1. INTRODUCTION
In an effort to better understand the under representation of women in the IT field, the focus of research has been on the collection and analysis of empirical data. However, there is also a need for appropriate theory to understand and explain that data. Toward this end, Trauth has engaged in a program of research directed at the articulation of an empirically-grounded theory to explain and predict the under representation of women in the IT field. Called The Individual Differences Theory of Gender and IT, this theory argues that the under representation of women is better explained by examining the variation across women than by focusing on ascribed and, assumed, innate differences between men and women in stereotype [17]. According to this theory, the answer to the question: "Why are there so few women in some parts of the IT field?" can be found through closer examination of women's demographics, personal characteristics, individual experiences and environmental influences.

When applying this theory to research on gender and IT, the focus of attention shifts from assumed, unilateral, fixed and/or

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inherent traits to varying influences experienced by women and a range of individually-configured responses to them. Research to date has resulted in a set of constructs, including: *personal data* (demographics, lifestyle, and workplace), *shaping and influencing factors* (personal characteristics and personal influences) and *environmental context* (cultural attitudes and values, geographic data, economic data, and public policy data) [21]. These constructs have subsequently been used as the interpretive vehicle to analyze the life histories of women IT professionals which are being collected as part of a multi-year field study of women IT professionals. The results, to date, have addressed the personal data, and shaping and influencing factors [12][14]. The purpose of this paper is to examine the construct: *environmental context*.

This paper is structured as follows. First, we provide a brief overview of literature on the influences of environmental context on the development of an IT workforce and relate these findings to gender and IT research. Then we present data from our field study of gender and IT that is directed at understanding differing regional economic and cultural influences on female experiences in the IT workforce. Finally, we present the contribution of this research to both theory and practice.

## 2. BACKGROUND

Previous research has shown that IT economic development is highly dependent on environmental context factors [1][3][9][13][15][18]. Major urban areas such as Boston, New York and Baltimore/Washington were developed into information economies by drawing upon their stock of cultural, financial, social and educational capital [15]. Likewise, evidence has demonstrated that rural regions have potential to develop information economies, as is the case with Silicon Valley and Ireland [9][18]. These economies contain information sectors that are characterized by activities that engage in recording, processing and/or communicating information. Importantly, the development of these information economies have been shown to be the result of more than just technological infrastructure [1][18]. The development of Silicon Valley is largely attributed to its dominance of flexible labor and labor markets, that is, workers and employers respectively. Flexibility refers to their receptivity to new practices and new market and industrial trends. This flexibility is a main reason for its economic success [1]. The information economy in Ireland was the result of four groups of factors: infrastructure, public policy, economy, and culture [18]. These findings support the argument that the implications of technology should be interpreted within its context and not merely its technological capabilities [13].

Applying the same argument about the importance of environmental context factors, business development, and hence economic development, in Silicon Valley was markedly different from Boston's Route 128[2]. Despite similar agricultural

roots and availability of technology, the regions had different industrial systems. Silicon Valley's decentralized but cooperative industrial system led to its sustained growth, while Route 128's concentration of independent and self-sufficient businesses led to its relative decline [15].

The rise of the network society, and hence the networked economy, involves a transformation of work and employment. Power relations shift with the flow of capital, leading to downsizing, subcontracting and networking of labor. These processes facilitate flexibility and individualization of contractual arrangements in information work. As a whole, there is an increase in self-employment, temporary work, and part-time work, particularly for women [3]. Based on the development of Orange County since World War II, the size of an information economy and hence its development is dependent on the number of information workers [9]. This argument becomes increasingly important as the gender dynamics of information labor change as the information economy develops. It implies the inclusion of more women in the information workforce as compared with the workforce in the industrial era. Thus, it is critical to investigate the experiences of women in information work as their role has an increasing impact on the overall growth and stability of the network economy.

Extending the consideration of the influence of environmental context to the topic of gender in the information economy, leads to the following research questions:

1. Does environmental context influence the experience of women in the IT workforce?

2. If so, how are these factors manifested in the women's experiences?

## 3. METHODOLOGY

The theory guiding this research is the emergent Individual Differences Theory of Gender and IT which looks to the social shaping of gender and IT at the individual level. This theory examines the individual variations among women resulting from a combination of individual characteristics and environmental influences, in order to explain the under representation of women in the IT workforce [17].

Data were collected through open-ended interviews lasting approximately ninety minutes in length in which participants discussed their experiences as IT professionals and insights about gender and IT that they have gained from their experiences and observations. The interviews explored three main areas: 1) the participants' demographic information including educational and work histories; 2) significant socio-cultural, institutional and interpersonal influences on their career or self development; and 3) broader comments or feelings on the topic of gender and IT in America. A detailed coding scheme based upon the individual differences theory has been developed and is used for analysis of the interview data.

The objective of this paper is to explore possible connections between economic and cultural factors of a region and the

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[2] State Route 128 is a highway that forms a circle around the greater Boston metropolitan area. It was near this highway that IT firm originally were located in the 1970's and 1980's. Hence, the high tech region of Boston is often referred to as "Route 128." This region is similar to Silicon Valley, in the sense that

companies have locations in each area that complement, rather then compete, with each other [8].

experience of women in the IT workforce. More specifically, this paper examines the following economic factors for each region: size of the information economy and cost of living. The cultural factors to be examined are: population migration patterns, ties to region, and attitudes towards women and women working (in general and in the IT workforce, in particular).

## 4. FINDINGS

Fifty-seven female IT practitioners were interviewed between October 2002 and October 2004. Eighteen of these interviews were conducted in Massachusetts, twenty-five were conducted in North Carolina and fourteen were conducted in Pennsylvania (as shown in Table 1). These women represent a wide range of ages, backgrounds, levels of management responsibility, and degrees of technical specialization. The women represent a wide range of ages from twenty-one to sixty with the average age being forty-four. The racial make-up of the women includes Caucasians, African Americans, Asian Americans, Hispanics/Latinas and women from Middle Eastern descent. The women have a range of degrees including bachelor's degrees, master's degrees and Ph.D.s. The degree concentrations range from IT fields such as information science, computer science, engineering and information systems programs to psychology, nursing, communication, math, and liberal arts. Furthermore, the current job titles include program/project manager, software architect, quality assurance engineers, IT administrators, system and web developers, and small IT business owners. The interview data is also supplemented by participant observation data and by documentary data about gender and the IT sector in the regions involved in the study. The purpose of the research reported here is to develop the socio-cultural context within which the interview data can be situated.

**Table 1 Interview Category**

| Category | # of Interviewees |
|---|---|
| Massachusetts | 18 |
| North Carolina | 25 |
| Pennsylvania | 14 |
| **Total** | **57** |

What emerged from the participant interviews are several themes about environmental context and women in the IT workforce. The following sections discuss environmental context themes from the three regions in the study: Boston, Massachusetts; Charlotte and the Research Triangle Park area of North Carolina; and central Pennsylvania.

## 4.1 Massachusetts Environmental Context

Boston is the state capital and largest city in Massachusetts. Moreover, Boston is the largest city in New England and is commonly referred to as the business and cultural center of the region.

### 4.1.1 Economic Influences

The Boston area is one of the wealthiest regions in the U.S. with a large and thriving IT economy. Several major universities, such as MIT and Harvard, and high-tech

companies, such as EMC Corporation and Akamai, are located in the Boston area and contribute to the local economy. The information sector in this region grew steadily and boomed in 2001 with the employment of approximately 79,900 IT workers or approximately 4.0 percent of the overall labor force in the area. However, in 2003, the information sector began to decline with the employment of approximately 64,100 IT workers or 3.4 percent of the overall labor force (as shown in Table 2) [24].

**Table 2 IT Sector Size by Environmental Context**
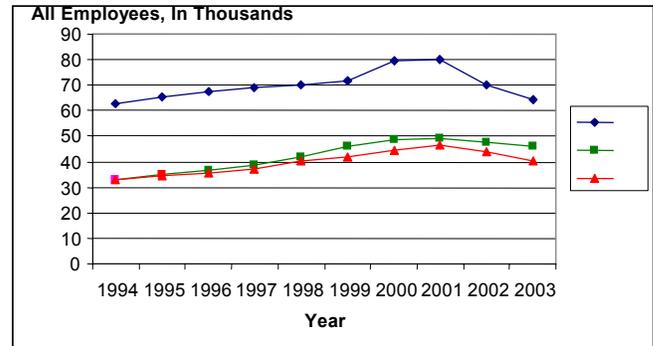


[24]

In 2000, the national median value of owner-occupied housing units was $119,600 and 66.2% of the population owned a home. Yet, the median household incomes are much higher in Boston than other areas of the U.S. In 2000, the median value of owner-occupied housing units in the Boston area (Boston, Cambridge, Gloucester, Lynn and Waltham) was $226,003 and approximately 59 percent of the city population owned a home. Furthermore, in 1999, the national median household income was $41,994 and the per capita money income was $21,587. During the same time period the median household income in the Boston area was $55,183 [4][7].

### 4.1.2 Cultural Influences

A noteworthy aspect of cultural context in Boston is the racial and ethnic diversity of its population. The population of approximately 589,141 people is comprised of a range of races and can be broken down to: 50 percent Caucasian, 25 percent African American, 8 percent Asian American, and 14 percent Hispanic/Latino [22]. These statistics were represented in the interviews with women in this study. A number of participants noted the value placed on diversity and the open mindedness in the Boston region. As a result, many women felt it was easier to be a female IT worker in Boston than it would be in other geographical areas. Debbie, a twenty-eight year old technical support engineer explained:

*"My perception [is that] it is definitely easier to be a woman in IT [in Boston] than it might be in other parts of the country. I have been thinking of moving [and] when I think about where I would go it is very limited. ... [These places must have equitable] opportunities in IT. These are places where it does not matter what you are. They just want somebody who is good at what they do. ... There are so many places I would run screaming from. ... At various points my parents have said, "You should come back*

*[home]." "In your dreams," I would think. It just would not be comfortable" [Debbie].*

Several women also shared stories of how employers are proactive in creating a diverse IT workforce. These companies search for employees with a wide range of backgrounds, attitudes and demographics in order to bring diverse people and mindsets to the workplace. Many participants also explained how employers value and devote significant amounts of corporate resources to diversity training. Irene, a fifty-seven year old project manager explained:

*"I think [the Boston area] attracts both men and women who are working for large companies. ... In a large company you get such a diverse group of people. You get international people that come into the United States and in particular Boston. We have racial diversity... Gender is just another type of diversity that you have in a large company in a large city. ... We have diversity sessions that we have to go to every year. I really do believe that the company I was working for felt it was an important thing" [Irene].*

Several women in the study felt that Boston is less hostile to women than other regions. Sol, a forty year old senior IT manager, explained that it is a "much more liberal environment." However, even those women who said they did not personally experience hostility in the workplace did acknowledge that discrimination still exists. The women spoke about the difficulties associated with being a female in the IT workplace and succeeding in their careers. Many women shared stories of the challenges associated with moving into management positions and the need to rely upon characteristics -- such as assertiveness -- that are often socially defined as masculine. Janet, a fifty year old marketing manager explained:

*"When I first started in the IT industry I did not really find that there was a gender difference. At least, it was not noticeable from my vantage point. ... It was not as noticeable to me until I got into a manager position where I started noticing where gender kind of played [a role]" [Janet].*

In 2000, females account for 52.6 percent of Boston's population and 31.5 percent of these women are in the labor force, whereas males make up 47.4 percent of the population and 32.1 of the labor force [22]. This contrasts with 2001 national workforce participation rates of 46.6 percent female and 53.4 percent male [23]. Thus, women constitute a large percentage of the labor force in the Boston region. Many women in this study raised themes related to the high number of females in the labor force. These women felt that being a female in Boston's IT workforce was not uncommon and therefore was not a central factor in workplace issues. Rather, these women felt that another demographic characteristic that they possessed, such as racial, ethnic and sexual orientation differences was more prevalent when workplace diversity issues arose. For example, Sol felt that her sexual orientation was more of a central issue than her gender with regard to workplace tensions:

*I think if I was a very traditional, feminine, heterosexual Latina, married with kids and all sorts of things, the reactions would be very different. I 'read' [i.e. am recognized] as lesbian, I do not 'read' as a straight woman. [I cannot separate my sexual orientation from my identity] ... And I think that made [my coworkers] extremely uncomfortable" [Sol].*

## 4.2 North Carolina Environmental Context

North Carolina is undergoing a major transition from an economy based on agriculture and manufacturing to an economy based on IT and knowledge-intensive occupations. Two regions vital to this transition are Charlotte and the Research Triangle Park area. Charlotte is North Carolina's largest and most populated city. The Research Triangle Park is located between Durham, Chapel Hill and Raleigh and was opened in 1959 as a cooperative research center created by three North Carolina universities—Duke University, the University of North Carolina at Chapel Hill, and North Carolina State University. The park is a unique 100 mile radius complex for corporations engaged in institutional, governmental, and industrial research and employs over 45,000 people working for more than 100 companies and organizations.

### 4.2.1 Economic Influences

The information sector in North Carolina grew rapidly and boomed in 2001 with the employment of approximately 49,100 IT workers or approximately 3.6 percent of the overall labor force in the area. However, in 2003, the information sector began to decline with the employment of approximately 46,300 IT workers or approximately 3.4 percent of the overall labor force in the area (as shown in Table 2) [24].

In 1999, the median household income in Charlotte was $46,975 and $42,304 in the Research Triangle Park area[3]. In 2000, the median value of owner-occupied housing units in Charlotte was $134,300 and approximately 57.5 percent of the city population owned a home. The median value of owner-occupied housing units in the Research Triangle Park area was $170,400 and approximately 47.8 percent of the area population owned a home [4].

### 4.2.2 Cultural Influences

Recruiting IT talent to North Carolina tends to be easy because of the area's reputation for an outstanding quality of life. While most IT salaries in North Carolina are comparable to those in other regions, they typically support a higher standard of living compared with other areas. As a result, the population of Charlotte doubled between 1970 and 2000; making it the second fastest growing city in the U.S. with a population of 389,000. In addition, people from all over the country and around the world have relocated to Charlotte bringing new ideas and customs with them. In Charlotte there are over 34,000 Asians (or 8.7 percent of the city population) and 60,000 Latinos (or 15. 4 percent of the city population), which is an increase from 6,700 in 1990 [6]. The women in this study confirmed that a large number of people in Charlotte and the Research Triangle Park area are not originally from North Carolina. Elsie, a forty-seven year old website manager explained that:

*"I was disappointed when I moved [to the Research Triangle Park area] in that there were not more [native North*

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[3] Statistics for the Research Triangle Park area are calculated by averaging statistics from the three local cities of Chapel Hill, Durham, and Raleigh, North Carolina.

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Carolinians]. ... Everyone I meet is from New York, Maryland, [and] Florida" [Elsie].

The move to an information age and the migration of people to North Carolina has occurred alongside the transition from what has been referred to as the "old south" to the "new south" [5][10]. A majority of the participants spoke about this transformation in North Carolina. It appears in many ways that North Carolina is at a crossroads as the economic centers of the state transition from a traditional old south to a more progressive new south culture. Many regional norms, values and attitudes appear to be in a state of flux as the area thrives economically and a new breed of North Carolinian populates the state.

The passing of the old south brings tension to the idea of a true southern belle and southern lady. A southern belle is described as a woman raised in "old-fashion southern values," and is typically associated with a family of social prominence and financial means. A southern belle is a woman with grace, manners and strong family values. Participants in this study repeatedly discussed the concept of a southern belle and how that perception influences their lives and careers as women in the IT workforce in the South. The vast majority of women explained that being a southern belle typically defines a woman's identity. Thus, there is a social expectation that southern women should be polite, well mannered, quiet when necessary, and place the highest importance on domestic roles even at the cost of a career outside of the home. Sharon, a forty-one year old computer science professor, also felt that southern belles are "more soft spoken and laid back." In addition, Julia, a forty-three year old computer consultant, felt that being a true southern belle is "all about taking care of a man or a family." She continued to explain how she was raised in a family of southern belles:

*"My grandmother and [my mother] always thought that I should be very happy to play inside with dolls, which I had and did enjoy to some extent. I should be almost grooming myself for marriage. Everything really in a way, was supposed to go in that direction" [Julia].*

Despite this image, the majority of the women in this study (both native North Carolinians and transplants to the area) do not identify with the label of southern belle. Rather, most of the participants consider themselves to be "New South" women or southern Yankees. The majority of the participants reject the southern belle title because they place an importance on their career in the IT workforce and feel that the two concepts are in conflict. Jeria, a forty-six year old manager of applications development, felt that a woman could have a family and a career, but southern belles, she noted, left the workforce to raise children:

*"You would think over the last ten years most women have careers and are working [but] that is not what I see. The [wives of the] men that work for me and [the women] in my neighborhood [are] all stay at home moms" [Jeria].*

Several participants shared experiences of being treated as inferior or different from men in the IT workplace. For example, Sharon explained:

*"My manager barely said two words to me until his own daughter got engaged and then he would talk to me constantly about what her dress looked like and what kind of flowers she was wearing, and her hair, and blah, blah, blah. I was really offended at the time, because I remember thinking, "This is the only time you can talk to me, and you think I care about your daughter's wedding, I really don't care about your daughter's wedding. I want to know about the project and the assignment." That really upset me at the time. I remember I shared an office with [a] man who talked to me in a baby voice all the time like he was talking to his little girl. ... And that was really difficult to deal with" [Sharon].*

Many women also felt that the regional culture contained an expectation that women act differently and more indirect in their workplace behavior. As a result, these women often felt it was a challenge to be assertive or to advance to higher levels of management. Gina, a fifty-four year old research analyst explained that she hit a glass ceiling in her career as she moved into management positions. She explained how she was passed up for several positions because they "wanted a man." In addition, Ivanna, a forty year old user administrator explained:

*"Women have to work probably 100 times harder and more than a man. You never get the things [that] a man gets. .... You never get promoted equally. ... I had a bad experience for about five years, I worked for [a man whose] feeling was that women should be at home" [Ivanna].*

Despite the stereotype of southern women as southern belles, most women in this study did not identify with the label of southern belle either because of their geographical origins or because of their race. Gina is originally from rural North Carolina, and explained that women from the mountain areas of the state are much different from southern belles. She felt that women from the mountain areas are much more independent and have a strong role outside of the home.

*"[Being a southern belle] was more a social order in the Piedmont and probably the coastal parts of North Carolina. They kind of have more rules, but we [rural North Carolinians] were very far away from that and we knew it too. If everybody didn't work, then you just didn't have anything" [Gina].*

Likewise, African-American participants in this study did not identify with the label of southern belles because of the radically different history of African American's in the South. The idea of a southern belle did not match their own self perceptions.

## 4.3 Pennsylvania Environmental Context

The landscape of central Pennsylvania relative to information technology, economic development and the subsequent strategies for the Commonwealth's future growth is predicated on that fact that two distinct areas of Pennsylvania exist. The first is comprised of the state's two major cities, Pittsburgh in the extreme west and Philadelphia in the extreme east. The second is comprised of all the areas in between. This region is often identified as the "I" in reference to the shape or mapping of this area. Central Pennsylvania extends from the Southern Alleghenies along the Allegheny plateau and includes the cities/boroughs of Johnstown, Bedford, Altoona, State College, Clearfield/Dubois and Harrisburg. While the region does technically extend to the New York border, the north-central region has limited economic connection with the heart of central Pennsylvania and was, therefore, not included in this study.

### 4.3.1 Economic Influences

The information sector in central Pennsylvania has increased much slower than other areas in the U.S. with an employment peak in 2001 at approximately 46,700 IT workers or approximately 2.5 percent of the overall labor force in the area. In 2003, the information sector began a gradual decline with the employment of approximately 40,400 IT workers or approximately 2.3 percent of the overall labor force in the area (as shown in Table 2) [24].

In 1999, the median household income in central Pennsylvania was $25,451[4]. In 2000, the median value of owner-occupied housing units was $89,833 and approximately 43.6 percent of the area population owned a home [4].

### 4.3.2 Cultural Influences

Central Pennsylvania is historically recognized as a railroad center and coal-mining region. The rail industry began significant decline in the 1960s and today accounts for less than 1,000 jobs throughout the entire region. While pockets of mining still exist, this industry is also statistically insignificant. Consequently, central Pennsylvania has been transitioning from a traditional manufacturing and rail center to primarily a business servicing based economy. This transition has been slow and the information sector is just beginning to be seen as a player in the local economy. The women in this study explained that central Pennsylvania has a recent and growing demand for IT workers, but there is a shortage of skilled workers to fill these demands. As a result, many women felt it is easier to find IT work than some other kinds of jobs, so long as they have the necessary skills. Several women explicitly mentioned that their gender did not matter on the IT hiring market – it was technical skills that came first. Sue, a fifty-three year old technology center coordinator shared a view that:

*"A part of me thinks that a male culture in technology is a male culture in technology no matter where you are. ... But I feel like in a larger city I would have more male competition than I do now. I have less competition here" [Sue].*

Yet, despite the lack of gender barriers to career entry, the women in this study shared stories of the difficulties they face as females in the central Pennsylvania IT workforce. Many women felt they are continuously challenged and isolated in the workplace because of their gender. In order to compensate for these feelings, the women attempt to modify their behaviors to become more assertive and aggressive. Sue elaborated that:

*"The only reason [men] even look me in the eye is because I am at the same height. I am left out of conversations sometimes and I still find myself to be the only female in some meetings and having to really assert myself to be in the conversation. ... My sense [at this company] is that I have to assert myself a little bit more. It is not a given [in minds of some people] that I may have this position because I'm good at what I do" [Sue].*

Jean, a fifty-one year old webmaster added that:

*"The males in IT that I have worked with are very reluctant to work with me or share information with me. They may share information among themselves, but they are sometimes reluctant to share information or work in a more cooperative basis similar to what they might do with their male counterparts. I don't know if that's a fluke or what, but I have seen that happen. So in some ways I have felt isolated. And I have heard other women in my job say that." [Jean].*

Several participants also elaborated on how female participation in the IT workforce creates tension with regional cultural attitudes towards women working. The women in the study continuously referenced a regional cultural expectation for women to work and raise a family without filling a job intended for a male primary income earner. A few women shared stories of being passed-up for promotions or raises despite their exceptional work performance. Rather, the promotions and raises were given to male coworkers because they were primary income earners for their families. Jill, a forty-three year old graphic art instructor explained:

*"Not only do you have to be a nurturing person, and take care of your family and raise your children, but you also have to go out there and be a successful business woman and you have to be smart enough to be able to do everything. I think that we [women in central Pennsylvania] have a lot of pressure" [Jill].*

Likewise, Pamela, a twenty-seven year old, UNIX administrator said:

*"[My boss] has definite views in her mind about women's roles, which is really odd considering she's the breadwinner in her family. And she will say, "well, women and men just think differently." ... I have worked [at my company] for five years and I do a darn good job and I am still entry-level. Which really frustrates me while I watch all the men I work with get promoted because "they are family supporters"" [Pamela].*

Central Pennsylvania does not have a critical population mass or business sector to allow for significant growth through cross-business attraction. It also lacks the fluid "interstate" traffic network that both Pittsburgh and Philadelphia afford. At the same time, a serious problem facing central Pennsylvania is the side effects of an aging society. Pennsylvania ranks second in the nation with residents over the age of sixty-five and ranks number one in the loss of young people aged twenty-five to thirty-four. As a result Pennsylvania lacks the vibrant population dynamics that are associated with flourishing economies [2]. Thus, a serious challenge for central Pennsylvania is an aging population and outward migration of young people.

In contrast to the Massachusetts and North Carolina regions in this study, the intransient nature of central Pennsylvania's population appears to create an environmental context in which newcomers feel like outsiders. Participants in the study who are not originally from central Pennsylvania felt like outsiders despite living in the region for several years. These women were attracted to central Pennsylvania because their skill sets were in demand, but continue to experience difficulties adjusting to regional norms, and building social and professional networks. The women spoke frequently about being unable to make friends and of constantly feeling like they did not belong in the workplace or in this culture. Julie, a thirty-eight year old network specialist explained that:

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[4] Statistics for central Pennsylvania are calculated by averaging statistics from the three major cities of Altoona, Harrisburg, and State College, Pennsylvania.

*"A lot of people here, I have noticed, went to elementary school with [the people] they went to high school with [and then] graduated from college with them. They have known them all their lives, so that is kind of a neat perspective. They are pretty much born and raised here and I noticed that it's a very proprietary environment. ... When I first moved here it took a long time for me to be accepted into the culture... because I am an outsider"* [Julie].

# 6. DISCUSSION

Environmental context was explored in this paper in order to test the strength of this construct of the individual differences theory of gender and IT. Specifically, the research presented in this paper explored two questions with respect to the environmental context within which a woman IT professional is situated. The first is whether environmental context exerts an influence on the experience of women in the IT workforce. The particular factors that were considered are economic and cultural influences. As the results show, there is evidence to make a case for different environmental influences emanating from different geographical regions. The second question is how these factors are manifested in the women's experiences?

An intriguing anomaly arose during the analysis of interviews conducted in the Boston region with respect to the women's view of diversity and its value in the workplace. Many of the participants frequently mentioned that they do not feel that being a woman in the IT workforce is a barrier in recruiting or retention efforts. In addition, the woman shared stories of how their employers and the region, in general, place a high value on a diverse workforce and environment. Yet, deeper examination and interpretation of these interviews yielded a noteworthy finding. Although, these women stated, in response to a direct question, that they did not feel that being a woman was a barrier, their stories said otherwise. Rather, the women repeatedly referred to instances in which being a female represented a barrier to be overcome or challenge to be addressed in obtaining or progressing in a career. Perhaps, this anomaly reflects a perception on the part of the participants (from personal experience or diversity training) of a need to *believe* that because of the observable demographic diversity in the region, there are no barriers to women.

In North Carolina a tension between the Old South and the New South cultures was strongly in evidence. Nearly all the women interviewed talked about a "southern lady." This typically arose when discussing a conflict between the behaviors necessary for success in the workplace and cultural attitudes and expectations regarding a woman's demeanor. There was clear evidence of tensions arising from the current transition occurring in the Charlotte/ Research Triangle region from values grounded in a traditional, rural society to the values of a modern, post-industrial society with an accompanying population in-migration.

In sharp contrast with the Massachusetts and North Carolina regions in this study, central Pennsylvania is experiencing a different population tension. Whereas Massachusetts' population is largely defined by its demographic diversity and North Carolina's population is largely defined by current in-migration of people from across the country and around the world, central Pennsylvania's population is largely defined by its lack of demographic diversity and the state's overall out-migration of

young people as the state's population continues to age. Like North Carolina, this region's values derive from a traditional, rural economy. But unlike North Carolina, there is no external force pushing for cultural change. Against this backdrop, women feel caught. They are expected to contribute to family income yet they are also expected to maintain the traditional, female role in the family. Whereas they have the skills to obtain the job in IT, their gender comes into conflict with gender role expectations when it comes to the performance of the job.

In addition to cultural factors, two economic factors warrant further examination. One is the cost of living. Whereas in the Boston region the median value of a house ($226,003) is well above the national median ($119,000), in central Pennsylvania it is well below it ($89,833). A question for further consideration is the following: if the cost of living requires two incomes (in a two-adult household), does that influence perceptions about the social acceptability of women having jobs and careers outside the home? A second economic question relates to the industry base in the region. Evidence from a longitudinal study of Ireland's information economy suggests that as the information economy becomes an ever larger segment of the overall economy the societal acceptability of women in it has grown [16][19].

An important caveat to this discussion of environmental influences is that these results are only an initial finding based upon data from three different geographical regions of the United States. Much more extensive testing of this construct would be needed before stronger claims about the generalizability of this construct can be made. The purpose of exploring geographical context in this paper was to consider the ways in which environmental influences might be suggesting influence. These findings can then be examined more thoroughly in subsequent research.

# 7. CONCLUSION

This paper is directed at contributing to discourse about the under representation of women in the IT workforce, in order to inform future research as well as diversity enhancement initiatives in the educational and employment arenas. This is achieved by documenting the nature of economic and cultural influences in the environmental context on female IT practitioners. Evidence from interviews with women IT practitioners in the three regions under study suggests that environmental context does influence the experiences of women in the IT workforce in a variety of ways. Future research will involve an additional round of interviews in each region along with continued collection and analysis of environmental context data. These steps will contribute to the continued environmental context analysis to determine systematic patterns with respect to the type and strength of environmental influencing factors.

Evidence of the influence of environmental context on women's IT work experience supports this construct of the individual differences theory of gender and IT. Evidence of different regions exerting different influences – based on economic and cultural differences – further supports the theoretical claims of differences among women based on different environmental influences on them.

These findings bolster an argument in favor of looking beyond the data at hand, to the women *in context*. As this paper indicates, context might refer to state, province or region. Other work by

Trauth shows that context can also be national context [17][19][20]. The argument for considering women's experiences in context challenges a prevailing tendency to generalize from the data at hand to all women, everywhere. In addition, research has demonstrated that investigating gender as a single construct can be problematic [11][25]. Thus, this research takes a deeper examination by investigating the *interaction* between two constructs: gender and geographical location.

This research has implications for practice as well as theory. It suggests that workplace efforts to enhance gender diversity might benefit from giving consideration to economic and cultural context and pressures on women. It also suggests that men would benefit from developing greater awareness of the values from their particular regional contexts that they bring into the workplace. The consideration of context becomes even more important in nationally distributed or multinational firms which must cope with workers from a variety of regions whose values and traditions might be in conflict with gender diversity goals of the firm.

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