

A Multicultural Analysis of Factors Influencing Career Choice for Women in the Information Technology Workforce

Eileen M. Trauth The Pennsylvania State University, USA

Jeria L. Quesenberry, Carnegie Mellon University, USA

Haiyan Huang, The Pennsylvania State University, USA

ABSTRACT

This article presents an analysis of cultural factors influencing the career choices of women in the IT workforce. We employ the individual differences theory of gender and IT as a theoretical lens to analyze a qualitative data set of interviews with 200 women in our different countries. The themes that emerged from this analysis speak to the influence of cultural attitudes about maternity, childcare, parental care and working outside the home on a woman's choice of an IT career. In addition, several additional socio-cultural factors served to add further variation to gendered cultural influences: gendered career norms, social class; economic opportunity, and gender stereotypes about aptitude. These results lend further empirical support to the emergent individual differences theory of gender and IT that endeavors to theorize within-gender variation with respect to issues related to gender and IT. They also point to areas where educational and workplace interventions can be enacted.

Keywords: *cultural differences, diversity, IT personnel, gender, globalization, individual differences theory of gender and IT, qualitative research*

INTRODUCTION

The 21st century is witnessing the emergence of a robust globalized information technology (IT) sector. There are two significant factors

contributing to this global phenomenon. First, countries around the *world* are recognizing the economic benefits that accrue from the development of an IT workforce capable of engaging in

the deployment of computer hardware, software, and information services (Irwin, 2000; Shiva, 1989; Trauth, 2000). Second, sophisticated networking technologies that have made both asynchronous and real-time communications between different regions and countries feasible, have enabled both new ways of working and increased collaboration (Huang & Trauth, 2006). Consequently, the variety of countries who have become equipped *with* a maturing IT sector and a pool of talented IT workers, has significantly increased the diversity of the IT workforce (Trauth, Huang, Morgan, Quesenberry, & Yeo, 2006).

At the same time, there is evidence of social exclusion in the IT sector (e.g., Finquelievich, 2003; Schienstock, 1999; Trauth & Quesenberry, 2006). The focus of this article is on the underrepresentation of women in all segments of the information technology career pipeline, from enrollment in secondary school and university courses, to positions in the IT workforce, to IT management positions (Camp, 2002; Margolis & Fisher, 2002; Teague, 2002; Women and Minorities in Information Technology Forum, 1999). In the United States, for example, women comprise approximately half of the labor force, yet they are underrepresented in the U.S. IT workforce. The Information Technology Association of America's (ITAA) Blue Ribbon Diversity Panel revealed that in 2004 women represented only 32.4% of the U.S. IT workforce, a figure down from 41% in 1996 (ITAA, 2005). The underrepresentation of women is also documented by the gendered response to the dot-com bust. The data show that men were far more likely than women to return to the IT profession as the market recovered. For example, from 2003 to 2004, the unemployment rate of skilled men in the IT field dropped 34.4% while the number of unemployed skilled women dropped only 5.15% (ITAA, 2005).

The number of women working in IT occupations in Canada has also declined over the last decade from 28% in 2001 to 25% in 2003 (Downie, Dryburgh, McMullin, & Ranson, 2004). In addition, women account for only

14% of the IT industry in India (Pande, 2006). *The Workforce Aging in the New Economy* (2004) reported that with regard to Europe, the industry and policy initiatives to attract more women into the profession have not been met with success. For instance, in the UK and Germany, men outnumber women five to one in computing professions; in the Netherlands it is seven to one. Furthermore, in 2001, women accounted for only 23.6% of the Australian IT workforce (Staehr, Byrne, & Bell, 2006). Based on the information compiled by Statistics New Zealand, Hembry and Presley (2006) noted that in New Zealand women accounted for only 11% of systems technician occupations and 16% of application engineer occupations in 2001. In the case of Ireland, in 1998, women accounted for nearly 31% of the Irish IT workforce but this number dropped to 27.5% in 2004 (Organization for Economic Co-operation and Development, 2007). We can conclude that the IT workforce is at the same time diverse and not diverse, depending upon the dimensions of diversity that one considers. The IT workforce is diverse with respect to nationality but not sufficiently diverse *with* respect to gender.

The underrepresentation of women in the IT workforce, coupled with increased cultural diversity emanating from the globalization of the IT sector, highlights a problem both for the practice and the research domains of the IT field. The problem for practice is to develop interventions to increase the underrepresentation of women. The problem for research is to theorize the issue and compile data in such a way that actionable interventions can result. Galpin (2002), for example, explained that the participation of women in the global IT workforce is influenced by complex cultural and societal factors that differ from country to country. As a result, he argued that when considering gender and IT issues it is important to take into account the cultural context. Investigations of the influential factors in gender and IT research need to account for cultural contexts so as to maximize the potential that solutions developed to improve the social inclusion of women in IT will have far-reaching effects. Therefore, in an

effort to contribute to both practice and theory, this article presents an analysis of cultural factors influencing the career choices for women with respect to the IT workforce. Specifically, it investigates (a) the ways in which perceptions of a woman's role that are embedded in the culture of a given society influence IT career choice, and (b) how other societal factors moderate gender influences.

This article is structured in the following way. We begin by reviewing the literature about cultural influences on gender and IT. We then present the theoretical framework that has been employed in a multiyear, multicountry research program that is examining the experiences of women in the IT workforce, followed by the way in which this theoretical framework was used to inform the methodology. Finally, we present the findings from analysis of multiple field studies of women in the IT workforce and the implications of our results for theory and practice.

LITERATURE REVIEW

The underrepresentation of women in the IT workforce has been a major concern of educators, practitioners, and researchers (e.g. Adam, Howcroft, & Richardson, 2002; Arnold & Niederman, 2001). Studies have shown that the underrepresentation of women in IT is a worldwide phenomenon as manifested in enrollment in IT-related disciplines and the number of women employed in the IT workforce (Galpin, 2002; Huyer, 2005; Rosser, 2005; Sanders, 2005). Further, it has been observed (Galpin, 2002) that there is wide variation in participation levels of women in IT with no clear pattern to explain these differences. Schinzel (1999) noted that this indicates a need to take a closer look at cultural influences on gender relations with respect to the IT field. In the following sections we consider the literature that has examined the ways in which cultural influences come into play in research on the topic of gender and the IT workforce. We categorize this literature into three themes: cultural influences within a country, multicultural influences within a country, and cultural influences across countries.

Cultural Influences Within a Country

Frieze, Hazzan, Blum, and Dias (2006) argued that researchers and practitioners need to recognize the importance of cultural issues as these factors have a significant influence on the career options available to women. A wide variety of issues have been investigated regarding why women are underrepresented and how to narrow the IT gender gap within a given country. These studies examine the underlying cultural influences in a given context, and a number of interesting findings have been made regarding the role of family dynamics and how gender identity and stereotypes are shaped by social and political ideology.

Several researchers have concluded that family dynamics and the role of parents are an important component of cultural influences on women and their relationship with IT. Medeiros (2005) conducted a study of the decreasing participation of Brazilian women in IT-related activities and occupations. The author explains that women constitute 51% of Brazil's population and the amount of IT-related work is increasing due to outsourcing. Yet, women are still underrepresented in computer-related professions in the country. The author concluded that improving the participation of women in the IT workforce hinges on the family, since parental influence in Brazil plays a significant role in career choice and self-image. Hence, the author argues for increased informal education of parents, which calls attention to the advantages of IT jobs for women.

In contrast, Adams, Bauer, and Baichoo (2003) and Adams, Baichoo, and Bauer (2006) examined the role of cultural factors in Mauritius that have enabled an increasing number of women to study IT. Their results show that from 1990 to 2003 there have been rapid increases in computer science and engineering enrollments in Mauritius. For instance, by 2003, the representation of women was 37% in computer science and engineering, 51% in information systems, and 49% in computer science and multimedia. The percentage of women graduating from computing programs has also increased.

They believe that cultural factors were the major reasons for these increases. Specifically, the authors concluded that the following cultural dynamics were important: families that placed a high value on females having IT careers, a national culture that strongly promotes IT, and the single-sex high school system which allows girls to develop aptitude and interests towards technology in the absence of male peer pressure to conform to gender stereotypes about technology.

Researchers have also concluded that the social and political ideology about gender identity and stereotypes are an important component of cultural influences on women and their relationship with IT. Ecevit, Gunduz-Hosgor, and Tokluoglu (2003) studied professional women who work as system analysts and computer programmers in Turkey. They found that Turkish women hold a higher share of computer-related occupations compared to other male-dominated occupations such as law, medicine, and engineering in the country. In addition, the presence of professional women in computer programming occupations in Turkey is also high compared to the statistics in the United States and The Netherlands. They explored the historical, social, and cultural factors contributing to this phenomenon. These include the emphasis on gender equality, the political ideology of Turkey with its attendant educational policies that support this ideology, and the family's encouragement of its daughters to be educated in science and technology fields. They also investigated various strategies used by professional women to reconcile professional and marital roles. Their conclusion is that it is critical to recognize women's own agency in shaping their own positions and responses to relationships with technology.

Multicultural Influences Within a Country

Researchers have also investigated multicultural influences on gender and IT within a specific societal context. Taken together, these studies show how the diversity of cultural backgrounds

of women in a single country can result in wide variation in their relationships with IT. An example is the way in which geography and social class have been shown to influence women and their relationship with IT. Shen and Ge (2006) investigated technology adoption and IT careers among women in China. Their findings indicate that the number of Chinese female Internet users is increasing, yet the distribution is severely skewed with respect to age, region, and occupation. For instance, in China, the majority of female Internet users is younger in age (ranging from 15-30 years), resides in urban regions, is highly educated, and holds professional occupations. The authors add that while the social status of women is improving and the gender gap is becoming narrower in urban areas, there are still significant issues with respect to improving the participation of women in the IT workforce.

Researchers have also found that race influences women's relationship with IT. Clarke and Teague (1994a, 1994b) analyzed interview data with Asian and Caucasian computer science and engineering students in Australia. The authors found that the Asian female students did not see computing as a male domain; rather, these students experienced direct encouragement from their families to pursue computing-related secondary studies. Clarke and Teague (1994a) pointed out that "*the differences within gender groups are greater than the differences between gender groups*" [italics added] (p. 259).

In a later study, Nielsen, von Hellens, Greenhill, and Pringle (1998) also investigated Asian and Caucasian female students enrolled in IT disciplines in Australia. Their study showed that both Asian and Caucasian females had similar views about the IT professions. However, Asian female students were more inclined to choose IT-related subjects, despite their negative perceptions of IT professions, because of the future prospects of employment opportunities (Nielsen, von Hellens, Greenhill, & Pringle) 1999; Nielsen et al., 1998). The authors argued that this view is influenced by the collectivist characteristic of Asian culture and is based on practical considerations, as compared to the

individualistic "free-choice" decision-making model in most Western cultures.

Researchers have also found that religion and ethnic identity account for variation in cultural influence on women and their relationship with IT. Eidelman and Hazzan (2005, 2006) examined how the Arabic and Jewish cultural backgrounds of different students may shape their relationships with IT differently in Israel. They concluded that the percentage of female high school students who study advanced-level computer science is higher among Arab students than their Jewish counterparts. The authors attributed this difference to cultural and familial differences between Arab and Jewish adolescents (Eidelman & Hazzan, 2005, 2006). Specifically, the authors argued that a collective characteristic of Arab culture is centered on strong family and peer influences that stress high scholastic achievement for social status improvement. On the other hand, the authors found that the influence of parents and friends is lower in the Jewish culture. They stressed that in order to not be inferior in the eyes of their family, "in particular and their society in general, it seems that Arab female students are highly motivated to study computer science since they consider these studies as a way to prove their skills and capabilities" (Eidelman & Hazzan, 2006, p. 1097).

Cultural Influences Across Countries

Several researchers have conducted comparison studies across multiple countries in order to investigate how women's relationship with IT varies by country. The primary intent of this research is to understand the nuances of different socio-cultural influences on gender and IT. For instance, Minguez (2005) found political ideology to have an influence on women's relationship with IT. She compared statistics on computer and Internet use among several European countries and found unequal access to computing technologies based on gender to be more significant in southern European countries, particularly in Spain. Minguez attributed this to the focus of the Franco regime

on perpetuating the traditional family model of a male as primary breadwinner. She concluded that this ideology has, consequently, limited the opportunities for women to participate in the labor market.

Researchers have also found temporal shifts in political ideologies with respect to influences on women and their relationship with IT. Hersh (2000) examined survey data from a research project on the changing position of women in engineering careers in 55 countries from 1960 to 1997. The author stressed that women are still underrepresented in the engineering profession in the majority of countries despite significant increases in their participation over the last two decades. Yet, there are significant differences among the countries and among different institutions within the same country. For example, the author reported that the participation of women in engineering careers in Eastern Europe has increased in recent years. The author explained that this growth was due to dramatic changes in economic development (i.e., the need for more engineers for industrial development) and ideological systems (i.e., the equal roles of men and women in the workplace in communist regions, the availability of child-care facilities, etc.):

Thus, change in images and attitudes was facilitated by the changes in political climate and ideology from 1945 onward. It was probably, at least in part, due to the increasing importance of the development of industry in the state communist period, resulting in the need for more engineers and other technically qualified workers. This will have reinforced the ideological commitment to equalizing the roles of men and women in the workplace (at least at the lower levels). The availability of child-care facilities and the encouragement for women to enter paid employment will also have had an additional effect. (Hersh, 2000, p. 6)

Gender stereotypes related to IT have also been shown to vary by country. For instance, Dumdell, Haag, and Laithwaite (2000) compared computer self-efficacy and gender of

college students in Scotland and Romania. Their findings showed that for within-country comparisons, males were more confident about their computer skills than females in both Scotland and Romania. Yet, for across-country comparisons, both males and females in Romania were more confident about their advanced computer skills than their Scottish counterparts. Likewise, Makrakis and Sawada (1996) studied 773 ninth-grade students in Japan and Sweden in order to measure and compare male and female attitudes towards computers. Their findings show that males in both countries reported higher scores of usefulness, aptitude, and interest in computers. They also found differences in the perception of computers and mathematics among males and females. Japanese students perceived more strongly than Swedish students that computers and mathematics are male domains. Swedish students' gender stereotypes appeared to be less strong than was the case for Japanese students. According to these authors the differences reflect the Japanese cultural norm of "good wife, clever mother," which affects Japanese girls' choice of a gender stereotypical education suitable for a wife and mother. This is the case in spite of the fact that, in principle, there seem to be equal opportunities applied to both genders in Japanese society.

Cultural analysis of the first exposure to computers across China and the UK has also revealed an important difference in the influence on women and their relationship with IT. Li and Kirkup (2007) investigated underlying cultural factors for both similar and different use patterns of the Internet by women in China and the UK. Their results indicate that gender differences in computer ownership may no longer exist for young adults at universities in China and the UK. The authors felt that the situation in China could be attributed to the parental value placed on education and computing skills. The authors felt that in the UK the findings could be attributed to the pervasiveness of the computer. The authors also found that gender differences within the British group were more significant than those within the Chinese group. The authors argued that it might be due to the differences in

first-time computer use. The British women in their study tended to have negative computer experiences in the early stage of computer use. On the other hand, the Chinese women in their study were typically exposed to computers for the first time at school, where the educational setting helps to provide equal opportunities for students of both genders. However, their findings indicate that in spite of the increase of computer ownership, there were significant gender differences in computer and Internet usage in both Chinese and British groups. Men in both countries were more likely to use the computer and the Internet for personal interests such as playing games and joining chat rooms, and they were more confident about their computer skills as well.

Finally, technophobia, or the perceived fear of computers, was found to vary with respect to its relationship to gender and IT. Weiland and Rosen (1995) examined the level of technophobia among first-year university students from 23 countries, including the United States, western and eastern European countries, Israel, and countries in Asia, South America, and Africa. Their results indicated that gender was only mildly correlated with technophobia and appeared in less than one fourth of the countries. In addition, past experiences with computers decreased the appearance of technophobia in the majority of the countries. According to their results, females in Israel and Hungary showed more computer anxiety than males in these two countries, and males in Thailand, Italy and Kenya showed more computer anxiety than females in these three countries. Hence, the authors concluded that "there is no worldwide consensus on who are more technophobic—males or females" (p. 102). Rather, they concluded that the country's cultural characteristics serve as one of the important factors affecting the level of technophobia in that country.

Summary of Cultural Influences Research

Research on cultural influences on career choices for women in the IT workforce can be classified into three categories. One stream of

research focuses on studying the relationships between gender and IT in a particular national context and revealing the underlying cultural influences (e.g., Adams et al., 2003, 2006; Ecevit et al., 2003; Medeiros, 2005). Another stream of research situates multicultural influences on gender and IT within a specific societal context while studying how the diverse cultural backgrounds of different women may influence their relationships with IT (e.g., Clarke & Teague, 1994a, 1994b; Eidelman & Hazzan, 2005, 2006; Nielsen et al., 1998, 1999; Shen & Ge, 2006). The third stream of research consists of comparison studies that investigate how and why women's participation in IT varies across countries (e.g., Durndeh et al., 2000; Hersh, 2000; Li & Kirkup, 2007; Makrakis & Sawada, 1996; Minguez, 2005; Weil & Rosen, 1995).

This extensive body of research provides evidence of two things. First, it shows that cultural factors are highly relevant in the consideration of factors affecting gender and IT. Second, while there are some common themes there is also wide variability across different countries or across different groups within a given country. Thus, the research to date demonstrates that both gender and IT are socially constructed, and historically and culturally shaped (Huang, 2006; Li & Kirkup, 2007; Trauth, Quesenberry & Huang, 2006). At the same time, there is also wide variation in the ways in which culture shapes women and the particular factors at work.

Thus, several issues remain with respect to research on culture, gender, and IT. First, there is a need for additional research that articulates how cultural factors influence the image of gender, the image of technology, and gender relations with respect to technology. Without in-depth understandings of the influential factors from the surrounding socio-cultural contexts, solutions intending to improve the social inclusion of women in IT may only have limited effect and may not be far reaching. Second, while those studies acknowledge the diverse relationships between gender and IT across different countries, there is limited research

recognizing that such diverse relationships also exist within gender groups in the same country. Gender is only a part of an individual's social identity. Taking a human agent as a whole, gender interacts with other social constructs such as race, ethnic background, age, and social class. Both the study by Eidelman and Hazzan (2005, 2006) and the study by Nielsen et al. (1998, 1999) indicated that the cultural influences from one's ethnic and family background are important to shaping one's relationship with IT. Third, it should be realized that these streams of research are mutually informative, particularly with the increasing trends of globalization of the IT industry, offshore outsourcing, and the mobility of the IT professions. Frieze et al. (2006) argued that appropriate local interventions in the microculture may have a large effect. Thus, we can see that the topic of diversity in the IT sector is not simple and that research about this topic cannot be simplistic.

THEORETICAL FRAMEWORK

One common theme that runs through the three streams of research discussed above is that perceptions of women's roles in society and in the IT sector are socio-culturally constructed. Further, we can note from the review of the literature that these perceptions vary across countries. For example, the study by Ecevit et al. (2003) reveals that the emphasis on gender equality and the political ideology of Turkey play important roles in the high percentage of women in the Turkish IT sector. Similarly, Hersh (2000) attributed the increase of women in engineering careers in Eastern Europe to economic, political, and cultural influences, including the need in these countries for more engineers, the equal roles assigned to men and women in the societies, and the availability of childcare facilities in these countries. On the other hand, Minguez's (2005) study illustrates a counter example of Spain, whereby the traditional family model of men as the breadwinners had a negative influence on women's participation in the IT sector. Makrakis and Sawada (1996) provided another example of how the traditional

cultural norm of a woman's role being limited to wife and mother affects the career choices of Japanese females.

Another cultural dimension emphasized across these streams of research is the influence of family on women's career choices. For example, Adams et al. (2003, 2006) pointed out that in addition to the strong national efforts promoting IT in Mauritius, families placing high value on females holding IT careers is another key factor affecting the increasing number of women studying IT. Findings from other studies also support this argument in different cultural contexts: Turkey (Ecevit et al., 2003), Brazil (Medeiros, 2005), and China (Li & Kirkup, 2007). In addition, the studies by Nielsen et al. (1998, 1999) and Eidelman and Hazzan (2005, 2006) show how the different values that families place on IT education and IT careers influence career choice among different women within the same country, even though the socially constructed perception of women's roles in the engineering and IT fields are similar.

Thus, the research literature demonstrates the need to understand the nuances of different socio-cultural influences on gender and IT both within a country and across different countries. This recognition, in turn, suggests the need to incorporate this understanding into the development of interventions to improve women's participation in IT that fit with a specific socio-cultural context. Finally, the literature points to the need to conduct theoretically-informed investigations of these nuances. However, what appears to be missing in cultural studies of gender and IT are sufficient gender and IT theories that can help to explain this variation in cultural influences on gender and IT.

In response to this need, Trauth has proposed an individual differences theory of gender and IT (Trauth, 2002; Trauth & Quesenberry, 2006; Trauth, Quesenberry, & Morgan, 2004), which endeavors to characterize the variation in factors that account for women's underrepresentation in IT. These differences exist with respect to the ways women experience and respond to characteristics of IT work, the IT

workplace and societal messages about women and IT. The theory addresses the need for greater nuance in the examination of gender and IT in that it conceptualizes women as individuals, having distinct personalities, experiencing a range of socio-cultural influences, and therefore exhibiting a range of responses to the social construction of IT. More specifically, the theory examines the individual variations across genders as a result of both personal characteristics and environmental influences in order to understand the participation of women in the IT profession. Hence, the individual differences theory of gender and IT focuses on the differences *within* rather than *between* the genders through the understanding of specific influencing factors.

The focus of the individual differences theory of gender and IT on within-gender variation in response to societal-level gender influences regarding IT (Trauth, 2002; Trauth & Howcroft, 2006; Trauth & Quesenberry, 2005, 2006, 2007) is concerned with the question of why some women persist in the IT field in the face of systemic gender biases in both education and the workplace. The premise is that women do vary with respect to the factors that help to explain their underrepresentation in the IT profession. The theory posits that the answer can be found in the combined influence of endogenous and exogenous factors that influence an individual's personal development and subsequent IT career decisions (Trauth et al., 2004). That is, while all females in a particular society may be exposed to similar messages about gender roles and IT, both the interpretation of these messages and the response to them will vary as a result of individual factors. Thus, the individual differences theory of gender and IT searches for the causes of gender underrepresentation by examining the factors that account for the varied ways that individuals internalize and respond to gendered messages. It seeks to understand the sources of individual agency that enable some women to overcome systemic negative influences.

According to this theory, an understanding of individual responses to common societal in-

fluences can be obtained from an understanding of the combination of personal characteristics and environmental influences, hence, the focus on differences within rather than between genders. The theory also views women as individuals who possess different technical talents and inclinations and respond to the social shaping of gender in unique and particular ways. This theory acknowledges that common social shaping messages are conveyed to subgroups in a culture (e.g., to women by age, race, etc.). But at the same time it also takes into account the varied influence of individual background and critical life events that result in a range of responses to those uniform messages (i.e., not all women of a certain age group respond in the same way to commonly received messages).

This theory is comprised of three general constructs that, together, explain women's decisions to enter and remain in the IT field. The *individual identity construct* includes both personal demographic items (e.g., age, race, ethnicity, nationality, socio-economic class, and parenting status) and career items (e.g., industry in which one currently does or will work, IT discipline—computer science, information systems, and information science—one is studying). The *individual influence construct* includes personal characteristics (e.g., educational background, personality traits and abilities) and personal influences (e.g., mentors, role models, experiences with computing, and other significant life experiences). Finally, the *environmental influence construct* includes cultural attitudes and values (e.g., attitudes about IT, about women in IT, about race/ethnicity) related to the geographic area in which one lives, as well as economic and policy influences in that region/country. The individual differences theory of gender and IT posits that, collectively, these constructs account for the differences among women in the ways they relate to the IT field, and societal messages about women and IT.

Research to date, has investigated a number of dimensions of variation among women. Morgan, Quesenberry, and Trauth (2004) developed a framework of the varied responses of women

to male dominated social networks in the IT workplace. Regional and national factors that help to explain the variation in women's participation in the IT workforce were considered in a set of papers (Trauth, Quesenberry, & Yeo, 2000, 2008; Trauth et al., 2006b). Quesenberry and Trauth (2005) examined the ways in which women employ ubiquitous computing technology in order to achieve work-life balance. Quesenberry, Trauth, and Morgan (2006) investigated the different ways in which women accommodated to motherhood and their IT careers. Finally, Quesenberry and Trauth (2007) explored variation in career anchors among women IT professionals.

In this article, the theory is used to illuminate the investigation of cultural influences on gender and IT by facilitating examination of possible connections between cultural factors and the experiences of women in the IT workforce. This theoretical application allows for analysis of women *in a societal context*. The argument for considering women's experiences in a societal context stands in contrast to research which decontextualizes women's experiences by generalizing from a single data set to all women everywhere. Researchers have demonstrated that investigations of gender as a single construct can be problematic (e.g., Llewellyn & Usselman, 2001; Woszczyński, Myers, Beise, & Moody, 2004). As an alternative, this article illustrates the benefit of considering the *relationship* between two constructs such as gender and societal context.

In order to address the need for greater theoretically informed analysis of cultural influences on women in the IT workforce, we consider the following research questions in this article:

RQ1: *What are the ways in which perceptions of a woman's role that are embedded in the culture of a given society influence IT career choice?*

RQ2: *How do other societal factors moderate these influences?*

METHODOLOGY

In order to address these research questions, we examined four data sets of interviews conducted between 1990 and 2006 with women working in the IT workforce in four countries: Australia, New Zealand, Ireland, and the United States. These investigations were all conducted by the first author.'

The data set about women working in Ireland comes from two separate field studies of women in Ireland's IT sector. The first of these data sets came from interviews conducted in 1990 as part of a larger, Fulbright sponsored investigation of the influence of socio-cultural factors--culture, economy, infrastructure, and economy--on the evolution of Ireland's information economy (Trauth, 1999, 2000, 2001). Gender was one among many factors examined in this study.' The questions about gender that were part of the interviews focused on the role of women in Irish society at the time and the subsequent effect on women's potential for participation in the information economy (Trauth, 1995, 2000).

The second Irish data set came from interviews conducted in 2003 as part of a Science Foundation Ireland-funded study of socio-cultural impacts of Ireland's information economy. The purpose of these interviews was to note differences in perceptions about a woman's role in Irish society, participation in the Irish information economy, and the effect of Ireland's new-found economic health on the position of women.

The third data set came from an investigation of women working in IT in Australia and New Zealand that was conducted in 2000 in conjunction with an Australian Research Council funded study--Women and IT (WinIT)--that was being conducted at Griffith University in Brisbane, Australia (Trauth, 2002; Trauth, Nielsen, & von Hellens, 2003). The purpose of these interviews was to investigate the ways in which individual identity and individual influences helped to moderate negative societal messages about women's participation in the IT sector.

The final data set came from a multiyear, National Science Foundation-funded investigation of women in the United States IT workforce (2002-2007). The purpose of these interviews was to collect empirical data in order to develop and test an emergent theory about the role of individual differences in the social shaping of gender and IT. The goal was to better understand the factors that help to account for the underrepresentation of women in the U.S. IT sector.

All four of these studies were interpretive field studies in which the first author conducted face-to-face, open-ended interviews with female IT practitioners and academics. Strategic, convenience sampling techniques were used to facilitate geographical representation of the women in the studies." Women were asked open-ended questions about their educational backgrounds, work experiences and about family and socio-cultural factors that influenced them to become IT professionals. The women were also asked about factors that have either enhanced or inhibited their participation in the IT sector (see Appendix A).

The results of the first Irish study inspired the subsequent gender studies. While gender was one among many socio-cultural factors examined in the first Irish study, gender was the explicit focus of the Australian/New Zealand study. The theoretical insights resulting from that study, in turn, formed the basis of the NSF proposal that enabled the conduct of the U.S. study. The second Irish study was conducted contemporaneously with the U.S. study.

All of the interviews lasted between 60 and 120 minutes in length. A total of 200 interview transcripts were analyzed for this article. Forty-six of these interviews were conducted in Ireland, 3] were conducted in Australia/New Zealand, and 123 were conducted in the United States (see Table 1). The *interviews* were recorded and transcribed in order to facilitate coding and analysis. Transcripts from the first Irish study were coded by the first author. Themes that emerged from the first Irish study, relevant gender literature and the constructs of

the emergent individual differences theory of gender and IT formed the basis for the coding of the Australian/New Zealand data,' the data from the U.S. study and that from the second Irish study. The second Irish study and the U.S. study were coded by all three authors. Generic database software" was used to facilitate computer-based analysis of the data set from the first Irish study. The other three data sets employed the same special purpose qualitative analysis software? for analysis. Analysis of the interview data was also supplemented by participant observation notes about the women and their socio-cultural environment as well as by literature about the culture of the regions/countries in which the data was collected. These notes were compiled by the first author, who lived in each country while the interviews were being conducted there.

FINDINGS

Participants

These women represent considerable variation with respect to demographics and personal characteristics. The women range in age from 21- to 65-years-old with a median age of 41 years." Twenty-six of the women are single, 106 women are married or in a partnered relationship, 11 women are divorced (not remarried), and one woman is widowed (not remarried)." Sixty-six of the women have no children, 20 women have one child, 40 women have two children, and 18 women have three or more children."? The women have followed a range of IT and non-

IT-related educational paths and undergraduate and graduate degrees. The women also represent a diverse background with respect to IT work experience. Collectively, they include roles in academia, information and requirements analysis, systems design and development, quality assurance, systems administration and support, consulting, training, and management.

Considerable cultural variation exists in this combined dataset. First, cultural differences are represented by virtue of the four countries in which the participants were living. Second, the participants in each of these countries come from a range of racial and ethnic backgrounds including Asian (China, Korea, Japan, Taiwan, Vietnam, India); Pacific Islander (Fiji, Australia, New Zealand); Caribbean (Jamaica, Trinidad, St. Thomas, Puerto Rico); Hispanic/Latino; Middle Eastern (Lebanon, Egypt); Eastern European (Poland, Bosnia and Herzegovina); Western European (France, Germany, Italy, Ireland, U.K.) (See Table 2). As a result, these women embody a rich variety of cultural influences that are manifested in a variety of ways in their professional lives.

To demonstrate how cultural influences on gender and IT are manifested in the lives of female IT practitioners and academics, we explored the perceptions of women's role in society that are embedded in a culture and how this influences career choice. In doing so, we investigated the following themes: maternity, child care, perceptions of women working outside of the home, and parental care responsibilities. During this analysis, a number of additional themes about cultural influences

Table 1. Interviews by country a/residence

Country		
Australia/New Zealand	2000	31
Ireland	1990	25
Ireland	2003	21
United States	2002-2006	123
Total	1990-2006	200

Table 2. Participant racial/ethnic identity by country of residence

Participant Identity by Country	#
American Participants	173
White American	99
Black American	10
African American	7
Afro-Caribbean	3
Asian American	10
Vietnamese	
Chinese	3
Taiwanese	
Japanese	
Korean	
Indian	3
Hispanic/Latino	2
Middle Eastern	2
Egyptian	
Lebanese	
Australian Participants	51
Australian/Caucasian	12
New Zealand/Caucasian	9
American/Caucasian	
Asian/Australian	4
Indian	
Chinese	
South Korean	
Fiji	
European/Australian	5
Bosnia and Herzegovina/Caucasian	
Irish/Caucasian	
Polish/Caucasian	
United Kingdom/Caucasian	2
Irish Participants (1990)	25
Irish/Caucasian	25
Irish Participants (2003)	21
Irish/Caucasian	21
TOTAL	200

emerged from the data. These themes center around cultural factors influencing career choice determinates among women. Specifically, these were grouped into the following categories: choosing a career you *want* to do vs. what you *can* do, social class influences, economic opportunities, and gender stereotypes about aptitude. These themes are discussed in more detail in the remainder of this section.

Perceptions of Women's Role in Society Influencing IT Career Choice

A prevalent manifestation of cultural influence on the experiences of women in the IT workforce relates to maternity and motherhood. One aspect in particular highlights the temporal nature of cultural influences and how societal messages evolve over time. During the data collection in the first Irish study a common theme expressed by the participants was that women, in particular mothers, should not work outside the home. As Patricia explained, "This is a very traditional society.... It is still frowned upon for a mother to work."

Likewise, Siobhann explained that in the 1980s, a marriage tax in Ireland made it very difficult for married women to work, because they did not have a personal tax-free allowance:

[The Irish tax rates were very high and the laws] added together the husband and wife's salaries and taxed them as one. So, the husband got all the tax free allowances and the wives would not get any. [As a result] every hourly salary is taxed at the high rate. (Siobhann)

A decade later, the sentiment in the 2003 interviews changed, and many of the Irish women that were interviewed felt the position of women in their country has improved. For instance, Norah felt that the position of women is "definitely better," and there are more opportunities for women, particularly in the sciences. Dymphna explained that working women are no longer viewed as taking a job away from a man who is supporting a family. She felt this was mainly because people have learned

that dual-income couples are necessary in the new economic reality of increased costs and mortgages. Although, the position of women has improved, barriers to their participation in the IT workforce still remain however. For example, Iaobh recognizes that it is more difficult for women to climb the corporate ladder of success: "I think [climbing the corporate ladder] depends on children. I think that is one thing that can hold some women back.... But I think that is changing; men are getting more involved" (Iaobh).

Another theme about motherhood and careers that was raised by women in our studies relates to how communist or centrally planned societies shape their views of women working outside of the home. For example, Anita, who is from Bosnia and Herzegovina, explained that communist and socialist ideologies, as opposed to capitalist ideologies, typically have a different view of female employment. She felt that the former Soviet Union and other communist countries had very little gender segregation in high-paying careers because of an importance placed on gender equality issues. Likewise, Charlene, an Australian woman who grew up in communist Poland, felt that communist and socialist ideologies were more open to women working because of pure economics. She felt this paradigm was a result of a "different society structure," where both women and men had careers and shared domestic responsibilities:

I feel, coming from a communist country, [was raised in a little bit different way than girls are raised [in capitalist western cultures]. There was more expectation on us to get to any field we wanted, and gender was not really an issue. And because of economical reasons, our mothers had to work. As such, they were also our breadwinners as much as our fathers. I guess, there was a bigger awareness or let's say, acceptance of women [working]. (Charlene)

Many women also spoke about the role of government-provided child care and maternity leave. Brianna, an Irish woman, felt that the Irish national policies on maternal and paternal leave

are extremely beneficial for working mothers. By taking a short amount of paid leave from work, mothers and/or fathers are able to spend quality time with newborn children, but are not punished when returning to the workforce. Likewise, Iaobh and Dearbhla, also Irish women, believed that there has been an increase in the acceptability of mothers working outside of the home in Ireland in recent years.

A theme raised by many participants was the influence of family dynamics on their careers. These women spoke about how their families influenced their perceptions of the acceptability of women working outside of the home. For instance, Jada, an Indian woman working in America, explained that her parents always encouraged her to have a career outside of the home:

The message you got from your mother and father was always that you were going to have a career and get to go to college? (Interviewer)

Oh, absolutely, yeah. And one of the things, the key things, that I tell people when I am talking about my influences, is that for us college was not optional. It was a/ways expected. (Jada)

At the same time, other participants spoke about how their cultures were more family centered than work centered. For instance, Rose, who is Japanese American, explained that her parents' traditional values dictated that she became a stay-at-home mother:

The Japanese culture in particular does not put a lot of emphasis on women, in particular, going out of the household. There was a lot of emphasis on the Japanese women staying home and taking care of the children and as well taking on certain kinds of duties like finances and keeping certain traditions alive. (Rose)

Rose went on to explain that being raised in America gave her a hybrid view of the role of women: a traditional Japanese view mixed with an assimilated American view. Another Asian American woman, Samantha, also felt her

cultural impressions about the role of women working outside of the home are influenced by her Korean traditional background and her assimilated American upbringing.

The women, particularly those who spoke about female family responsibilities, also revealed a number of options available to them to help balance work and family. For example, Karen, an Indian woman working in America, explained that:

Traditionally in an Indian environment, when the girl is pregnant, when she is in her third trimester, she would go to her mom's place and have the baby there. And come back after the baby is a few months older. It is a very traditional thing to do, because the mom's side of the family offers a lot more support. (Karen)

Mitul, an Australian woman originally from India, explained that in India the grandparents typically care for a child while the parents are at work. Otherwise, child-care facilities are available, although this option can be costly. Furthermore, as observed by the third author of this article who is Chinese, it is not uncommon for Chinese women studying or working in America to send their newborn babies to China to be raised by the grandparents during the initial stages of infancy.

With respect to work-life balance, several Asian women spoke about the expectations to care for their parents and in-laws as they get older. For instance, Carol, a Chinese American woman, explained that in China domestic responsibilities include taking care of your children, and "taking care of your parents and your husband's parents." When asked if this perception differed from that of her American coworkers, she responded as follows: "I think [a] difference is that probably they do not have to take care of their parents. That is the big difference I can see" (Carol).

The women also noted that pleasing parents and in-laws factored into the choice of career and lifestyle. Several Asian women spoke about the expectations that their parents and in-laws would be involved in decision making about

whom to marry, where to work, and when to have children. Karen explained that it would have been impossible to marry her husband if his parents would not have been supportive. Mitul considered herself to be lucky because her parents and her in-laws did not object to her working once she had a child. She added that if they had objected it would have been a difficult situation, and she "probably would not have gone against their wishes."

Socio-Cultural Moderators Influencing IT Career Choice

One theme that repeatedly surfaced in the interviews was the difference in career-choice decision factors. Women in the U.S. study felt the American societal message of career choice centers on what you *want to be*. Yet, in other countries the societal message of career choice centers on what you *can be* or what you *should be*. For instance, Cynthia, an Australian woman from China, explained that in China the decision to enter a certain career depends more on strong academic marks than a particular interest in the subject. She explained that she did not have an interest in the IT field per se but was encouraged to pursue a career in the field because she performed well on university entrance exams. Karen explained that she wanted to pursue a career in the humanities but was discouraged because she earned very strong grades in school. When asked if she was oriented toward sciences, she replied

Yes, although, that is not where my passion lies. It was more because I was compelled to take sciences in India. Humanities and arts were not considered something that smart kids would do. Although I was more interested in literature and the arts, my mom wanted me to go into engineering, although I wanted to do journalism. (Karen)

Rosalie, who grew up in Taiwan, also felt that pursuing a career in the IT field would be prestigious for her parents. She explained that she was the youngest daughter, so she had

a lot of freedom in her career decisions, but she wanted to make her parents proud of her career decision by entering an esteemed field. Mitul echoed these sentiments. She explained that in India she was a "topper," a high-scoring student on exams:

I was really intelligent. I was a topper. So that is why [people said I would become a doctor]. ... I had good marks, [but not enough to go into medicine]. ... I didn't want to give up. I wanted to be a professional. (Mitul)

Mitul added that, in India, exam scores only determine what a woman can be, but social class determines what a woman should be. She explained that in the highest social class, the expectation is that women will not work, in contrast to women in middle or lower classes who are expected to work. As a result, Mitul felt it might be easier for Indian women from the middle class to enter the IT workforce than those from the upper class.

Another career choice theme that was expressed by a few women from Ireland and China centers on the idea of "clean" work. Some women explained that traditional factory or agrarian careers required a large amount of physical labor in which workers were expected to get their hands dirty. The emergence of information work has brought a shift in the nature of work. A career in the IT workforce is generally considered "clean," since an employee does not interact directly with dirt or factory machinery. For example, Deirdre explained that when choosing a career, her Irish school counselor and her father persuaded her to select an IT career because you do not "get dirty." In addition, Carol, a Chinese American, explained that her parents encouraged her to pursue an IT career, because she could work in an office on a computer rather than being exposed to harsh conditions out-of-doors, as is the case with some careers. Likewise, Sibyl, who grew up in China, first became interested in an IT career because of her experience in financial accounting, which she believes is perceived as an "ideal profession for girls in China."

Yang, an Australian woman from South Korea, and Sue, an Australian Caucasian, offered insights into how the differences in societal messages about career choice can be manifested. They believe women in Australian technology courses at their universities are typically Asian, because they are preparing for high-paying careers in their home countries. Since IT careers are in demand in many nearby countries (Malaysia, Thailand, Singapore, Indonesia, the Philippines) a larger number of the students come to Australia to seek an IT education.

A final theme noted by a number of women related to the varying messages about gender aptitude stereotypes surrounding IT. In some cultures the societal stereotype is that women are not well-suited for technical work. Yet, in other cultures the stereotype is the opposite. This conflicting depiction of women's relationship with IT was frequently discussed in the interviews. For instance, Linda, an American woman from India, explained that she was never "blocked" when she pursued IT as a field of study. In addition, Carol explained that in China it is not viewed as inappropriate for women to work in IT as she feels it is in the United States. Likewise, Haiyan, also a Chinese American, explained that women in her school in Hong Kong were encouraged by teachers to pursue studies in math and science. She also explained that this attitude was consistent among teachers in China, Hong Kong, and Taiwan, although other cultural differences often exist among them. In addition, Cynthia spoke at great length about the differences between Chinese and Australian perceptions of women doing technical work:

I think more women in China study engineering than [in Australia]. In China, our country says a woman and a man are equal. There is no [stereotype that IT] is men's work. (Cynthia)

The conflicting stereotypes about aptitude are further complicated by cultural messages about gender, race, and class. Some of the women felt that gender was not the primary distinguishing factor in stereotypes in their

countries. Rather, race and class demographics were typically the primary targets of stereotypes. For example, Allison, an American woman from Jamaica, explained that negative stereotypes in Jamaica are not focused on gender. She explains that because the country is so diverse, "the issue is not race and gender, it is status and money." As a result, she has a difficult time reconciling race or gender discrimination she faces in the United States. In addition, Candace, an Australian woman from Fiji, explained that gender is not the primary factor in societal stereotypes. She explained that ethnic background such as European, Fijian, or Indian is the primary distinguishing factor in Fiji:

To be honest, nobody really cared that much about male-female [differences], because the main focus was between Fiji and Indian culture [differences]. That was the huge cultural dichotomy that existed ... Everything else kind of paled in comparison to that. (Candace)

Lu, a Vietnamese American, spoke about how the gender stereotypes are compounded by ethnic stereotypes in the United States. She explained that she likes math, and hence many people associate her with the stereotype that Asians are good at math:

The majority of [my family and Asian American friends] are good at math and we excel at math and science. I think that it is kind of funny. I mean I know some people who do not fit in that stereotype whatsoever-the studious, hard working science oriented person. But I think that almost all of my family fits in that so it just kind of makes me laugh when I think about it. (Lu)

Another aspect of gender aptitude stereotypes centers on the interpretation of the term *geek*. Carol explained the differences in America and China with respect to women being geeks. She feels that in the United States it is generally considered insulting to refer to females as geeks. As a result, a number of young girls she has met do not want the negative label associated

with an interest in IT and chose not to pursue IT careers. Yet in China, Carol adds, it "is just the opposite," since referring to a female as a geek is a positive comment and, in many ways, a compliment. ,

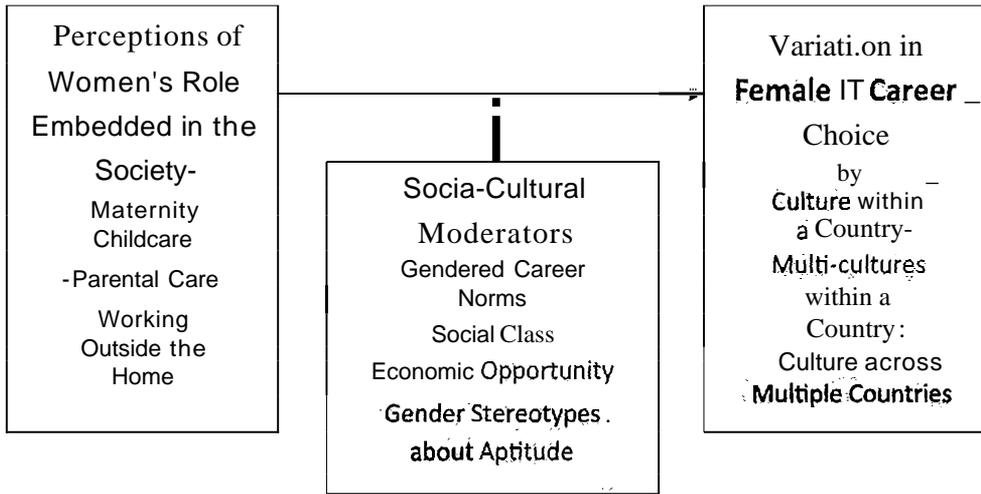
DISCUSSION

In this article we present the results of our investigation of cultural influences on women in the IT field that was conducted in order to empirically address our research questions. These results show the importance of including a cultural perspective in gender and IT research. We present evidence of different cultural influences on women in the IT field that are related to differences in nationality and ethnicity. Further, we classified the manifestation of these cultural influences into two themes found in prior literature about perceptions of women's role in society that are embedded in its culture and socio-cultural moderators (Ecevit et al., 2003; Eidelman & Hazzan, 2005, 2006; Hersh, 2000; Nielsen et al 1998, 1999): perceptions of women's role *that are embedded in the culture* of a society influencing IT career choice, and socio-cultural moderators influencing IT career choice.

With regard to perceptions of women's role that are embedded in a society, themes about maternity, child care, parental care, and women working outside of the home emerged from the data. With regard to socio-cultural moderators, themes about gendered career norms, social class, economic opportunity, and gender stereotypes about aptitude emerged from the data. Our analysis demonstrates how these themes influence variation in female IT career choice by culture within a country, by cultural differences within a country and by culture across multiple countries. (This analysis is depicted in Figure 1).

Our analysis shows that while themes related to parenting, family, and economics might be evident in studies of women in each societal context, the *ways* in which these themes are experienced by the women vary across cultures. That is, not all women **experience** economic or parenthood issues in the same ways. Finally, the

Figure 1. A model of cultural factors influencing career choices for women in the IT workforce



results of this research have clear implications for the theoretical underpinnings of gender and IT research. The evidence of varying cultural influences on women in the IT labor force and varying responses by women to common experiences such as parenthood, suggest the need for deeper examination of factors affecting women's recruitment into and retention in the IT field.

We explored these themes for several reasons. First, the themes build on prior work with the individual differences theory of gender and IT by investigating the influence of environmental context on women in the choice of IT careers (e.g., Trauth et al., 2008). In doing so, we explored historical and current economic and cultural factors present in the environmental context. Second, the themes, when holistically examined, represent a range of diverse influences such as the effect of political, economic, and geographical context on gendered messages in the culture; family dynamics and expectations on career choice; and differences in support structures on career enactment. Finally, these themes demonstrate the importance of considering cultural factors when conducting gender and IT research inasmuch as they appear to significantly influence women's choice about an IT career. Doing so will become increasingly

important as the IT field continues to globalize and the cultural diversity of the domestic IT workforce continues to grow.

The findings presented in this study make a contribution to both research and practice. With respect to research, our analysis points to areas of cultural influence that warrant further academic study. In addition, our findings make a contribution to theory by lending further empirical support for the theoretical insights offered by the individual differences theory of gender and IT. This theory challenges essentialist assumptions that do not consider context when concluding that the reasons for the underrepresentation of women can be found within women themselves. That is, this theory challenges the assumption that women either are not interested in or not capable of achieving in the IT field. At the same time, evidence that different cultures exert different influences on women also adds nuance to the social construction of "female roles" and "gendering of IT" as they relate to the choice of a career in the IT field. We believe this theoretical lens addresses the knowledge gap about underrepresentation in the IT field by offering a means of better understanding and articulating the varied influences on women's career choices, brought about in part from cultural factors.

This work also makes a contribution to practice. The problem for practice relates to IT employers) policy makers, and IT educators. First, IT workforce employers need to develop interventions to increase the underrepresentation of women that focus on recruitment and retention. One important implication of our findings is that these interventions must take into account the varied cultural influences on women. Thus, for example, child-care provisions may not be sufficient in some countries; elder-care or telecommuting provisions may be needed as well. In addition, multinational corporations may need to consider whether their human resource policies are consistent with cultural pressures on women in a particular country. It is also critical to recognize women's own agency in shaping their own positions and responses to cultural factors and their subsequent relationships with technology. As the women in this study have shown, a "one size fits all" approach can be problematic,

Second, public policy can serve to enhance or hinder the recruitment of women into and their retention in the IT field in very practical ways. Our findings suggest the need to (re)visit maternity, child-care, and elder-care policies. As pointed out in the first Irish study, tax laws provided a disincentive for some women to participate in the labor force. Policymakers interested in redressing the gender imbalance in the IT fields of their countries can look to the role that work leave, tax, antidiscrimination, and other such policies might be playing in either enhancing or inhibiting women's participation.

Finally, precollege educators play a crucial role in increasing the underrepresentation of females in the IT field. Employers and IT educators need to work in collaboration with primary and secondary educational institutions to conduct outreach programs for students and their parents. By providing a *face* of the IT worker to whom these young women and their parents can relate, we may be able to change both the image and the composition of the IT profession.

CONCLUSION

For those engaged in IT workforce research, it is important to reexamine the discourse regarding diversification of the IT workforce in a critical and broad sense: what diversity means and how to address diversification issues from multiple integrated perspectives. Trauth et al. (2006a) argue that we should take a comprehensive view of diversity that builds upon the notion of "diversity as difference," and include in our consideration not only demographic differences, but also socio-cultural and individual differences. Other researchers have also pointed out that the IT gender gap is not an isolated phenomenon and stress the need to address the gender issues in conjunction with other issues such as class, race, ethnicity, and so on (Kvasny, 2003; Naryayan, 1998).

The results presented in this article contribute to the growing body of IT workforce research literature that is focused on gender and the IT workforce. It does so by examining cultural variation in gender and IT issues. The analysis of two themes (perceptions of women's role in society and socio-cultural moderators) reveals a wide range of influences on women's choice of an IT career based upon nationality and ethnicity. These results reinforce the need to move away from theoretical lenses that reinforce monolithic analyses of gender and IT and that assume a common experience for all women. Instead, we argue for the need to move toward more robust and nuanced analyses that take into account the wide variation of both influences on women in the IT field and women's varied responses to them.

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ENDNOTES

The Japanese cultural norm of "Ryosai Kenbo" (translated to "good wife, clever mother") can be traced back to the late 1800s during the Meiji reign. It is still influential today for Japanese girls from all social classes to pursue an education that is suitable for a good wife and clever mother.

The second and third authors were involved in the data analysis for the United States and the second Irish studies.

For a complete set of factors examined in this larger study see Trauth (2000, pp. 387-390).

In the case of the two Irish studies and the Australian/New Zealand study women throughout

the country were interviewed. In the case of the American study the geographical representation was limited to three states: Massachusetts, North Carolina, and Pennsylvania. This was done because of the size of the American population in contrast to that of Ireland, Australia, and New Zealand. Limiting the geographical representation, thus, facilitated more focused socio-cultural analysis. (See, for example, Trauth et al., 2008.)

The Australian/New Zealand transcripts were coded by the first and second authors.

A retrieval system based on Foxpro was developed.

QSR N6.

Age data was not collected for all participants in the original Ireland and Australian studies. Hence, the age statistics do not include information for 25 Irish women and 10 women from the Australian/New Zealand study.

Relationship status was not collected for all participants in the original Ireland and Australian/New Zealand studies. Hence, the relationship statistics do not include information for 25 Irish women and 31 Australian/New Zealand women.

¹⁰ Motherhood status was not collected for all participants in the original Ireland and Australian/New Zealand studies. Hence, the motherhood statistics do not include information for 25 Irish women and 31 Australian/New Zealand women.

APPENDIX A: INTERVIEW TOPICS

First Irish Study (1990)

Demographic background (country of origin, country of residence at time of interview)
Personal background (educational background, IT work experience)
Experiences as a woman working in the IT field in Ireland

Australian/New Zealand Study (2000)

Demographic background (country of origin, country of residence at time of interview)
Personal background (educational background, IT work experience)
Experiences as a woman working in the IT field in Australia or New Zealand

US and Second Irish Study (2002-2006, 2003)

Demographic background (age, race/ethnicity, country of origin, country of residence at time of interview)

Personal background (relationship status, parenthood status, educational background, IT work experience)

Experiences as a woman working in the IT field in the U.S. or Ireland

Note: While for the two earlier studies the question about experiences as an IT professional in the country was asked in a very open-ended fashion, for these two studies the questions were more directive. That is, participants were specifically asked to discuss significant influences on career progression such as people and experiences in their lives. Nevertheless, women in each study were asked to relate their experiences as an IT professional to the societal and cultural context in which they lived, studied, and worked. Thus there was consistency in the data that were collected and used in this article.

Eileen M Trauth is associate dean and professor of information sciences and technology at The Pennsylvania State University. Her research is concerned with societal, cultural and organizational influences on information technology and the information technology professions with a special focus on the role of diversity within the field. As a Fulbright Scholar in Ireland. Dr. Trauth undertook a multi-year investigation of socio-cultural influences on the emergence of Ireland's information economy. She has also analyzed cultural, economic, infrastructure and public policy influences on the development of information technology occupational clusters in the U.S. Dr. Trauth has investigated gender under representation in the information technology professions in Australia, New Zealand, Ireland and the United States with grants from the National Science Foundation and Science Foundation Ireland. In 2008 she held a Fulbright Distinguished chair in gender studies in Australia. She has also published papers and books on qualitative research methods, global informatics, information policy, information management and information systems skills.

Jeria L. Quesenberry is a assistant teaching professor in the information systems program at Carnegie Mellon University. Her doctoral dissertation examined career values and motivations of women in the information technology (IT) workforce and the influence these factors have on their career retention decisions. Her current research interests are directed at investigations of the demands and motivations of IT human capital, and the comparison of how these professionals react to their workplace environment, administrative structures, technologies and policies that accommodate them. She received her PhD from the College of Information Sciences and Technology at the Pennsylvania State University.

Haiyan Huang is a doctoral candidate at the College of Information Sciences and Technology at the Pennsylvania State University. Her research and teaching interests include global information systems development, global IT offshore outsourcing, virtual teams, computer supported cooperative work and learning, knowledge management, knowledge economy, and global IT workforce development. She has published journal articles, book chapters and conference papers in these areas. Her doctoral dissertation is focused at studying how cultural issues influence globally distributed information systems development and how to effectively manage these issues.