Women in Information Technology: Its Challenges and Issues

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Abstract

In recent years many countries in the world have adopted policies for greater equality in Information Technology. However worldwide, female enrolment in tertiary level science and technology(S &T)is less than male enrolment and also less than in other subjects (World Education Report,1995).In today's world of e-commerce and distance communication companies depend in technological and computer expertise at all employment levels. Therefore, job in Information Technology and related fields increased dramatically in recent years and this trend is expected to continue well into the futures. Information Technology has been playing in increasingly important role in the development of Nations. Experts believe that this century belongs to the power of knowledge and Information. On one side, the recent developments in Information Technology have drastically reduced the geographical barriers, while on the other side computers have enormously enhanced the capacity to accumulate and access information. The possibilities for information access are infinite. This "information society" has grown in the last one decade in leaps and bound breaking many existing paradigms and creating an image of indispensability in our lives.

Keywords: *Women, Information, Technology, Challenges.*

Introduction

In India various state governments are also investing in IT training and infrastructure demonstrated by Andhra Pradesh. According to the Ministry of IT, "State and Central governments have instigated programs to increase the use of computers in poorer regions". In India States like Uttar Pradesh, Madhya Pradesh, Kerala, Tamilnadu, Rajasthan are prioritizing IT, the poor telecommunications infrastructure is still the major obstacles to bro ader access and application of IT in India

Although women's participation is on the rise in some male-dominated occupational fields (e.g. accounting, medicine, veterinary medicine), the percentage of women in the IT field is actually decline (Arnold& Niederman, 2001, Kaminski & Reilly, 2004, Pierce-Brown, 1998, Wright, 1997). The Information Technology Association of American (ATAA) estimates the U.S. information technology (IT) workforce in the range of 3.6 million workers (messemer,2003),and IT employment is projected to be among the fastest growing, according to Hecker(1999).

Over several decades, a disparity between women and men has persisted in the recruitment and retention of women at all levels of information technology (IT), from girls' experience in schools, to the initial selection women make as undergraduate majors, to the absence of women in the largest corporate and academic positions. But what was once only disturbing has now become a crisis as the proportion of women in IT has dropped from 40%

of the IT workforce in 1986 to about 29 percent at the end of 1999 and is still dropping. For a number of reasons, this would be problem enough, but external events are also forcing the crisis.

The literature suggests that it is no mystery. Women who enter and remain in IT do so extremely trying circumstances, which are almost entirely trying circumstances, which are almost entirely cultural. Given the strides that women are making toward parity in other professional fields, the question really must be phrased; what is wrong with IT that can't attract and hold women? However the same literature fails to distinguish among the micro-climates of IT. Nearly 80% of jobs in IT are in the management information systems departments of non-IT firms, which are very different environments from the frontiers of scientific research, or the climate in start-ups.

A generally shrinking IT workforce in the U.S faces brutal competition from abroad, including global sourcing, and many fear that the entire U.S. IT industry is in peril. It has been proposed that one way to mitigate these problems is to increase the participation of underrepresented groups, such as women. Persuasive evidence is also accumulating that well-managed diverse teams produce better solutions to problems than do homogeneous teams. Here, better solutions would keep U.S. IT at the vanguard. This suggests one more reason for the field to make an effort to attract and retain women. But why do women avoid IT or if they enter the field, sooner or later fall away?

STATISTICS ON WOMEN'S INVOLVEMENT IN INFORMATION TECHNOLOGY IN EDUCATION

Although 37.1% of U.S computer science degrees were awarded to women in 1984, the number has been decreasing over time; from 1989-1990, 29.9% of computer science degrees were awarded to women and from1997-1998, only 26.7% the same degree's recipients were women.

It is worth nothing, however, that the pattern for master's degrees is somewhat different; the number and percentage of degrees earned by women is slowly but steadily increasing to a high of 34% in 2000-2001(NCES,2002)

The National Center for Women & Information Technology reports that of the SAT takers who intend to major in computer and information sciences, the proportion of girls has steadily decreased relative to the proportion of boys, from 20 percent in 2001 to 12 percent 2006. The total number of these students (boys and girls) has also been decreasing since 2001, when it peaked at 73,466.

According to a College Board report, among SAT takers in 2006, slightly more girls than boys reported to having "course work or experience" in computer literacy, word processing internet activity and creating databases/spreadsheets. More boys than girls (59% vs. 41%) reported course work or experience with computer programming.

Many more boys than girls take Advanced Placement (AP) computer Science exams. According to College Board in 2006, 2,594 girls and 12,068 boys took the AP Computer Science A exam, and 517 girls and 4,222 boys took the more advanced AP Computer Science AB exam.

IN WORKFORCE----Women's representation in the computing and information technology workforce has been failing from a peak of 38% in the mid-1980s. From 1993 through 1999, NSF's SESTAT reported the percentage of women working as

computer/information scientists declined slightly from 33.1% to 29.6% percent. While the absolute numbers increased from 170,500 to 185,000(NSF,n.d). Recent numbers from the Bureau of Labour statistics (2006) indicate that women comprise 29% of the computing 29% of the computing workforce.

Gender and Career Issues in IT

The gender gap appears to be even wider in the IT area, at all levels of employment. The Information Technology Association of American (ITAA) estimate of women workers the overall IT workforce dropped from 41% to 35% between 1996 and 2002 (D'Agostino, 2003)

According to women at work (2003), a recent research report published by the American Association of University Women (AAUM) Educational Foundation, a national organization that promotes education and equity for women and girls, women account for only 25% professional IT workers.

A recent Survey of IT executives published by e-week suggested that men outnumber women in leadership positions by over six to one (D'Agostino,2003), and only about 11% of the top 500 U.S. technology companies have women corporation officers (Kurtz,2003)

Barriers Facing Women in the IT workforce;--

Only 25% of U.S. IT professionals in 2009 were women, down from 36% in 1991, according to the National Center for women and IT. Further, only 18% of computer and information sciences degrees in 2008 were awarded to women, down from 37% in 1985.(Source; National Center for Women and IT)

The Integration of the India economy with the global economic system from the 1990s created substantial employment opportunities at the high ends of the formal sector. The Information Technology (IT) sector was one of the fastest growing of these sectors. Its share in India's GDP increased from 1.2 percent in 1997-98 to 5.2 percent in 2002-2007. The IT and ITES sector also constitutes the largest organized private sector employer in the country, employing about 12 percent of the workforce in the organized private sector(NASSCOM and Deloitte, 2008)

The entry of women has increased rapidly in recent year-a MERCER-NASSCOM study found that in 2007-2008 alone employment of women increased by 60%, so that by the end of 2008 there were 6.7 million women working in the IT sector.

It was initially believed that the rapid growth of the IT sector would generate less exploitative avenues of employment for women. Further, economic empowerment would strengthen the bargaining power of women within the household and improve their status.

According to the 2001 census, female literacy is 54.16% as against male literacy of 75.85% in India. The enrollment of girls in educational institutions decreases as educational level goes higher. The enrollment of girls in Engineering/Technology/Architecture at the Bachelors level (in 1998) is 57,968 as against 285,137 boys. This imbalance is largely due to socio-economic reasons, and a very large concreted drive is required to remove this imbalance.

Women's education at glance (India)

Literacy rate of women	54.16%
(As against men 75.85%)	
Secondary education	38%

Education and law 4%
Education Tertiary students 36%
Women students in natural sciences 30, 4%

(Natural Sciences include the fields of computer science, engineering, math, architecture, town planning, transportation, and communications) (**Source;** Women and IT in India'**. URL**; http://projects.aed.org/techequity/India.htm

The International Labour Organization reports that "telecasters and fax booths have created a quarter of a million jobs in India in the last four years alone, a huge proportion of which have gone to women".

Women in Workforce

Total women in workforce 31%
Women in IT workforce(software sector) 19%
Women Interest users in India 23%
(Source; Women and IT in India)

Challenges and Issues

1- A widespread assumption that hampers women's professional development is that by virtue of being women, they cannot fully participate in work. For example, for women who have families, it's assumed they cannot travel or work irregular hours, though nobody inputs such limits to men's work.
2- In fact, sensitivity to work-life balance is increasingly important to both men and women and has become a generational rather than a gender issue. But all women suffer from this cultural assumption, whether their workplace is the corporation or the university, by being denied advancement, denied line assignments and left out of assignments that require travel and dedication to deadlines.(Catalyst, Kleiner)
3- While it's true that women often shoulder more family responsibilities than men, and for some women, it's a key factor in accepting or rejecting an assignment, the presumption more than the reality tend to limit women's advancement, with their outside responsibilities a foregone conclusion. Moreover, as we have in those 79% of all IT jobs that happen to be at non-IT firms, 24/7 dedication is the exception, not the rule.
4- Some women are stereotype in nature, that women will not give up personal life in the drive to be a notable success. Foremost among these stereotypes is the assumptions that women are better at human skills of "nurturing, emotional expressiveness and communication activities", where as men are better at "instrumental and task-oriented assignments".
5- Some women argue that although long hours are sometimes necessary to meet a deadline, they are more often a status symbol, a sign of machismo considered more important than the "soft work" of keeping a team together.
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7- Tapia and Kvasny say "The IT culture is described as largely white, male-dominated, anti-social, competitive, individualistic, all encompassing and non-physical. This ascetic culture has strong in-group and out-group dualisms in which the needs of disembodied intellect subsume emotional, physical and sensual needs. This dualism translates into expert and non-expert and to male and female behaviors, attitudes, and values".

8- An alternative theory proposed by Trauth, Quesenbery and Morgan, suggests that the under-representation of women in IT is neither owing to "essentialism"(women just aren't suited for technological work) nor to social construction(women can do it but are hampered by social expectations).

Instead they propose a theory of individual differences that "women as individuals experience a range of different socio-cultural influences which shape their inclinations to participate in the IT profession in a variety of individual ways. Further, women respond in a range of individual ways to the social shaping of gender and IT work. Thus the individual differences perspective inhabits the middle ground between the essentialist and the social constructivist explanations of the under-representation of women in the IT profession.

8-Women earn lower performance rating in assumed male skills (instrumental and task-oriented assignments), leading to fewer promotions and lower pay. Their skills at "soft" tasks are undervalued because those skills are "natural" for women and thus don't count as an achievement.

Paradoxically, adequate performance by men in women's presumed skills (nurturing, emotional expressiveness and communication is considered exceptional, leading to better rating, faster promotions and higher pay for them. Managers who hold unexamined stereotypical expectations will possibly grade their women employees as "less able" despite objective evidence to the contrary.

9-In IT, style trumps substance. A journal of Applied psychology report concludes that women are less willing to monitor their own self-image than men are. "Men are better at creating and managing impressions" the University of Pennsylvania Psychologists claim, based on a meta-analysis of 136 independent studies dating back to the 1970s and involving a total of 23,191 respondents across all 136 studies, and published in 2002.

10-Many women don't find the culture they want to work or live in, and they migrate to other parts of the company, or even to other fields, where their engineering skills are highly valued.

11-"people issues drive women out of the technology", says Katherine Holloway, a director of university relations. Men resent women in the field and do little to make them feel comfortable. If there's a momentary change now with younger generations, women will soon face another reality.

12-Women working in IT are seen as having less favorable chances of promotion than men have (Igbaria &Baroudi). A report of the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development (CAWMSET) stated: "The commission recognizes that gender stereotypes are still pervasive in professional life. For women….these problems are

manifested inadequate work family life accommodation, unequal pay scales and advancement….."

13- Lack of genuine adoption across cultures is profound and the results are that women continue to leave. A September, 2004 study by Deloitte & Touche LLP, showed that six out of ten women in high-tech jobs, citing the glass ceiling, say they would choose another profession if they were starting a career today. Because of competition and legal issues, gaining access to internal corporate and academic institution studies is difficult.

14-- In many cases, work continues over night. This is a major problem for women workers because of social disapproval, objection from families, domestic responsibilities and security-related issues involved in returning late at night (Upadhya, 2006, Mitten,1995). As a result, women workers typically work shorter hours than men (Rothbieck et al, 2001).

15-The majority of studies argue that the IT sector- for all the branding of IT companies as a "global workplace"- have been unable to isolate itself from the social backdrop. As, a result, relationship at work in this sector continue to be shaped by the conflicting and asymmetrical gender relationships that prevail in Indian Society, so that women remain downtrodden and lack freedom of choice(Mitter & Rowbotham, 1995)

16-Women workers are often reluctant to accept on-site(Particularly off-shore) assignments and travel aboard(Ramsay & Mccorduck, 2005). An all-India survey found that 63% of women workers did not accept off-shore assignments (COD, 2004)

17-Women have limited access to the informal knowledge networks important for upward mobility (Upadhya, 2007). This is not only because women worker have to return home early, but also owing to men workers feeling uneasy socially interacting with their women colleagues (COD, 2004)

18-Pregnancy and the responsibility of child caring impose major limitations on the carrier growth of women workers, particularly as they are rated even during this leave period. This leads to many women workers postponing marriage and having children. A significant proportion of women workers also leave, being unable to bear the pressure (COD, 2004, Upadhya, 2007)

19-Sexual Harassment- The late nights also expose women workers to the risk of sexual harassment. While the media has highlighted the brutal rape and murder of women employees by drivers, such incident are also rare.

20-Although women account for nearly a third of information technology workers in developing countries, they are concentrated in lower-level jobs and paid smaller salaries than men. For example, many of these women work in call center, data entry, and programming positions-few are project managers.

21- Girl's and women's low enrollment in science and technology education is one of the main obstacles to higher-level employment in information technology.

22- Another hindrance comes from the industry's promotion structures, which tend to fall along gender lines-with women less likely to advance to mid-level and managerial positions, especially in the private sector.

23-In many developing countries, female entrepreneurs increasingly dominate small and micro-enterprises. These women are often aware that increased connectivity, computerization, and communications could enhance their business activities. Yet it is harder for women to support their business with such technology because it is harder for them to secure the capital required to invest in it. Many female entrepreneurs are also losing out on the information and networking opportunities that come from information and communication technology. Women also face barriers to computer literacy.

POSSIBLE FACTORS

1-Lack of Interest--

A study of over 7000 high school students in Vancouver, Canada showed that the degree of interest in the field of computer science for teen girl is comparably lower than that of teenage boys. In 4% of female college freshmen expressed intention to major in computer science in US.

2-Lack of Awareness-

The National Center for Women & IT distributes free resources for increasing awareness of the need for teaching computer science in school, including the "Talking points" card moving beyond computer Literacy; Why should Teach Computer Science?

3- Lack of Availability

Recommendation for broader study, which include distinguishing among the micro-climates of IT and their consequent different requirement; answering the questions of;

1-Whether IT really needs women; or whether women need IT?

2- Whether the problem is peculiar to the field itself?

3-Whether in fact the common wisdom is particularly wise with regards to the barriers women face in the field?

4-What social psychology can contribute?

5-What more women themselves can do?

6-What the successful organizations have to teach?

7-Whether the field should be redefined?

8-Who is the stakeholders?

9-Whether leverage exists with them that has been underutilized in bringing about change; if indeed change is desirable?

Many of the biggest workplace challenges facing women today still revolve around gender;-

1-Why do women still earn less than men holding the same job?

2-Will the glass ceiling ever be reached or for that matter shattered?

3-Is a balance between family and career attainable?

4-What will it take to establish a work environment where gender is a non-issue?

So many factors have dominated the women's workforce for many decades. Over the years, even though women have long yarned to be in the workplace, some of their choices have not come without disappointment.

Suggestions can be taken

1-Expanding employment prospects and supporting female entrepreneurs-

As many female-owned small and micro-enterprisers are finding ways to use information technology. Mobile phones are especially vital for women who do not have fixed work locations. E-mail accounts, personal computers, Internet connections, and website are also extremely useful and highly desired. Most female entrepreneurs are willing to adopt new technologies-but they require adequate support o do so.

2-Increasing educational opportunities-

Education is the most important factor in improving women's ability to take advantage of the opportunities offered by information technology. It helps women acquire education where they were previously unable to do so.

Women often lack access to skills training that would enable them to gain information technology jobs, especially in information technology design and development.

So stronger efforts are needed to develop women's skills-when women have opportunities for high- level technical training, they tend to take advantage of them.

Reservation for women in training programs and developing training programmes for the development of women.

Distance learning, which offers instruction over the Internet, can also increase educational opportunities for women at all levels. Distance learning shows great promise, as it provides flexible access arrangements and study times and offers the potential to reach women in rural areas. Women in all over the world have responded enthusiastically to this approach.

3-Improving Social Services;

Information technology can increase accessibility, transparency and accountability in the delivery of social services. Delivering services at convenient locations can cut travel times; minimize the number of visits to delivery points, shorter the time needed to receive them. In addition, technology-enhanced service delivery including e-government, can reduce corruption. Poor women in developing countries could be among the first to benefit from such changes.

4- Focusing on gender in national technology policies;

Although many national policies for information and communication technology refer to the situations facing rural areas and poor people, most say little or nothing about gender. As a result, gender issues will probably not be taken into account when such policies are implemented. Engendered national policies for information and communication technology can help women by increasing their-

*---access to and use such technology

*---Employment in information technology and related industries.

*--Opportunities to use e-commerce in small and micro-enterprises.

*---Access to health, education and communication services.

*---Political participation and economic empowerment

Engendered technology policies should also consider the dimensions of legal issues and the attitudes of labour unions, as well as constraints on women's mobility, control over productive resources and access to credit.

Policies in areas other than information and communication technology can also be significant. For example, industrial and labour policies affect women's employment in the information technology industry, while education policies can promote women's science and technology education and significantly influence their preparedness to enter the labour market.

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