Techno stress in Gender perspective:
An Empirical Investigation

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ABSTRACT

One of the greatest challenges facing information technology (IT) managers is adapting to change. IT managers must cope with frequent changes while implementing new applications within their organizations. There are many indicators that this constant change is a challenge for IT professionals and managers. This paper reveals the gender differences in occupational stress among information technology (IT) personnel in India. Data was collected via a combination of mail surveys and semi-structured interviews. Results of the survey using analysis of variance show that ,female IT personnel reported significantly higher scores on sources of stress originating from "internal factors to the job", "managerial role", "relationships within office", "career and achievement", and "organizational environment", where as no significant gender difference was found for stress originating from "work-home conflict". The information inputted by this study will help and assist employees, especially female IT personnel, in their professional development and achievement and will help to root up the key issues which are generating stress to female personnel so as to strive higher satisfaction level and enhanced profitability.

KEYWORDS

ANOVA	Techno stress
Gender Differences	Information Technology

PREAMBLE

Various types of stress have been defined by researchers in the past. Especially, work related stress is considered as the major reason for being stressful, i.e. 'technostress'. This is a stress caused by the inability to cope with the new computer technology in a healthy manner. Craig Brod (1984) was the first to define technostress in a more formal manner. This study attempts to identify the factors responsible for gender specific technostress in organizations. The empirical study elaborates that to feel pressured to accept and use computers is anxiety.

This anxiety is expressed in many ways: irritability, headaches, nightmares, resistance to learning about the computer or outright rejection of the technology. Sometime, the anxiety turns into technophobia or computer phobia by which employees started to hesitate or avoid the use of technology (Rosen *et al.*, 1987). The early impact of technostress was felt by librarians when most of libraries across the world switched over to implementation of library software for the maintenance of libraries (Lalitha & Pangannaiah, 2006).

The concept of technostress can be understood in terms of Mooers' law which says that an information retrieval system will tend not to be used whenever it is more painful and troublesome for a customer to have information, than for him not to have it (Mooers, 1960). Information technology has revolutionized the working pattern of many organizations. Technostress affects work related culture, differently for males and females and it has brought its own problems to many employees of the organization.

Inspite of several training programs, employees in many organizations are not able to cope up with it and are unable to make themselves comfortable (Lalitha & Pangannaiah, 2006), especially in respect of gender related issues. There are three levels for expressing this technostress, as exhibited by three types of users:

(1)	**Anxious technophobe: exhibits the classic signs of an anxiety reaction when using technology: sweaty palms, heart palpitations, headaches.**
(2)	**Cognitive technophobe: on the surface is calm and relaxed, but internally seethes with negative messages: "Everybody but me knows how to do this!'' or "I'll hit the wrong button and mess this machine up!''**
(3)	**Uncomfortable user: may be slightly anxious or use some negative statements, but generally not in need of one-on-one counseling (Rosen *et al.*, 1987).**

This paper is focused on explaining the relationship in the contemporary business organizations mainly between IT personals and increased usage of information technology (IT) and how these relationships differ across gender. This paper will give insights on all critical factors generating stress and will empirically identify the occupational stress experienced by men and women in the IT profession in India.

This research paper is divided into five sections. Section 1 i.e. the present section gives the conceptual framework of technostress affecting IT personnel in Indian context. Section 2 gives a comprehensive review of existing literature which is the prime tool in identifying the research gap. Section 3 identifies the research objectives, data and methodology used. Section 4 presents the analysis and interpretation of the results and Section 5 entails the summary and conclusions of the research study.

REVIEW OF LITERATURE

The entry of women into traditionally male dominated fields, like, science, technology, engineering, and mathematics (STEM), has created interest among researchers and academicians because of gender differences in work related factors. Males and females are affected differently

by this modern culture (STEM), hence, the programs, policies, issues will be different for them keeping gender mainstreaming into account. These reframing and revisiting of programs which are gender based will us the holistic view of all stress generating factors. We have conclusive evidence about these differences among males and females like, in Jick & Mitz, 1985; Martocchio & O'Leary, 1989; Lee *et al.*, 1995; Fischer, A., 1998; Francis, B., 2000, Benemati & Lederer, 2001 and Straub & Watson, 2001. Studies based on technostress incorporated due to the rapid use of IT/ICTs are as follows: Craig Brod, 1984; Compeau & Higgins, 1995; Clark & Kslin, 1996; Arnetz & Wiholm, 1997; Thong & Yap, 2000 and Sethi *et al.*, 2004). Negatively influences on IT usability, (Burton-Jones & Hubona, 2005, and Ragu-Nathan *et al.,* 2008) which found that technostress is an important fallout of the inevitable use of ICTs in organization and illustrates the bivalent nature of their organizational influence. Some of the previous citations suggest that women lack inherent confidence in their competency to use and operate technical tools and machines (Campbell, 1990) and tend, more so than men, to perceive themselves as not being technologically literate (Geppert, L., 1995; Markert, L., 1981).

Most of the researcher confirmed that female personnel showed more stress than men (Burke & Belcourt, 1974; Davidson & Cooper, 1983; McDonald & Korabik, 1991; Nelson et. al., 1990; Smits *et al.*, 1993; Baroudi & Igbaria, 1995; Igbaria & Baroudi, 1995; Ranson & Reeves, 1996; Moore, 2000; Ahuja, 2002; Perrons, D., 2002; Sumner & Niederman, 2003; Harris & Wilkinson, 2004; Kaminski & Reilly, 2004). Studies which focused on the issue of stress and gender differences are such as, Igbaria & Chakarabrati, 1990; Rosen & Maguire, 1990; Gefen & Straub, 1997; Whitley, 1997; Venkatesh & Morris, 2000; Day & Livingstone, 2003; Matud, M., 2004, and Cameron B. & Butcher-Powell L., 2006 also reveals that female personnel would experience greater technostress as compare to their counterparts. While others insist that there are no differences between the sexes on the issue of technostress (Martocchio & O'Leary 1989, and Hamilton & Fagot, 1988). Whereas a single study showed that female IT professionals had less self perceived occupational stress than men i.e. Tung, 1980.

While there has been a paucity of research on occupational stress among IT personnel, anecdotal evidence in popular IT journals and magazines indicates that IT staff are experiencing rising levels of stress as a result of increasing user demands, advances in technology and growing use of IT in organizations. With the increasing number of women entering the workforce as well as the IT profession, attention on the occupational stress experienced by both men and women in the IT profession is warranted. In India less comprehensive and adequate work is available so as to bridge the gap this study is conducted. This will be a useful contribution especially to the organisations which have a diverse group and would need such type of information to draft-redraft, frame-reframe the strategies which are gender specific.

RESEARCH OBJECTIVES

The aim of this study is to examine if male and female IT personnel in India would differ in the types of occupational stress they experienced. Clearly, if gender differences do exist in occupational stress, there are implications for the design of intervention programmes intended to alleviate the harmful aspects of job stress. It is important for managers and organizations to understand how male and female IT personnel differ in their stress experiences, so that programmes can be tailored to meet their specific needs. Hence, the objective of this paper is to examine whether gender differences in job-related stress exists and to investigate the relationship that to what extant increased IT usage affects differently to the workforce engaged in IT sector.

DATA AND METHODOLOGY

1. DATA

The study of sample consisted of IT personnel in private sector organizations operating in India. This paper is focused on analysing the impact of increased technostress in organization on. To analyze this, questionnaire technique is used, taking inputs from the experts in this field. The interview sessions were also organized to supplement the information which is not elicited by the questionnaire with a further exercise of probing the respondents about their responses on the survey. Hence, the data was collected through a combination of mail surveys and semi-structured interviews. Total 275

questionnaires were distributed and all the responses which were received mainly from IT sector (145 respondents) or others areas (130 respondents). Among 275 participants, 52 per cent are male respondents (N = 143) and 48 per cent are female respondents (N = 132). Mean of age=32.065. The age group is distributed from 15 to 60 years. 58.2 % of the respondents are single (N = 160), while 41.8 % are married (N = 115).

2. METHODOLOGY

Sources of stress were assessed with 61 items adopted from Cooper *et al.*'s (1988) occupational stress indicator (OSI). The psychometric properties of the OSI have been established in previous studies. Items were scored from 1 (strongly agree that it is a source of stress) to 5 (strongly disagree) on a five-point **Likert Scale** response. The OSI consists of six subscales which tap six dimensions of stress: (1) Internal Factors to the job taps sources of stress originating from aspects of the job such as the amount and scope of tasks, number of hours worked and variety in the job. (2) Managerial Role measures how individuals perceive the expectations that others have of them. These expectations pertain to behaviors that managers are expected to exhibit when occupying their positions and performing routine job tasks. (3) Relationships within Office taps stress originating from personal contacts at work such as lack of social support from superiors, and office politics. (4) Career and Achievement is concerned with respondents' perceptions of their career development, promotion prospects and perceived threats of job obsolescence. (5) Work-Home Conflict measures stress originating from difficulties in coordinating family responsibilities with career demands. More specifically, this subscale measures whether non-work (home) stress has negative consequences on the individual's work and whether work demands have a negative impact on home life. (6) Organizational Environment measures stress originating from the bureaucratic nature of the organization, communication problems and morale in the organizations.

ANOVA

Data is processed using the most reliable method i.e. **analysis of variance (ANOVA)** and **t-test** (significant level of 0.01 & 0.001), which give us the appropriate results. In statistics, analysis of variance is a collection of statistical models, and their associated procedures, in which the observed variance in a particular variable is partitioned into components attributable to different sources of variation. In its simplest form ANOVA provides a statistical test of whether or not the means of several groups are all equal, and therefore generalizes t-test to more than two groups. Hence, ANOVAs are useful in comparing two, three or more means. Analysis of variance became widely known after being included in Fisher's 1925 book, Statistical Methods for Research Workers. *Assumptions* of ANOVA: The analysis of variance has been studied from several approaches, the most common of which use a linear model that relates the response to the treatments and blocks. Even if statistical model is non-linear, it can be approximated by a linear model for which an analysis of variance may be appropriate. One-way ANOVA is used to test for differences among two or more independent groups (means), e.g. different levels of urea application in a crop. Typically, however, the one-way ANOVA is used to test for differences among at least three groups, since the two-group case can be covered by a t-test. When there are only two means to compare, the t-test and the ANOVA F-test are equivalent; the relation between ANOVA and t is given by $F = t^2$. However, when applied to data from non-randomized experiments or observational studies, model-based analysis lacks the warrant of randomization. For observational data, the derivation of confidence intervals must use subjective models, as emphasized by Fisher, R. (1918). In practice, the estimates of treatment-effects from observational studies generally are often inconsistent. In practice, "statistical models" and observational data are useful for suggesting hypotheses that should be treated very cautiously by the public.

ANALYSIS AND INTERPRETATION

ANOVA was used to test whether gender differences in occupational stress exists. Three covariates – job title, marital status and age controlled. This is to ensure that any significant gender differences found in experienced stress are attributed to gender and not to any of the covariates. Age does not affect computer related stress, as this is opined in the following studies, i.e. Rosen & Maguire (1990) and Hudiberg & Necessary (1996). Results of ANOVA procedures are presented in Table 1 and show that only five sources of stress (Internal Factors to the Job; Managerial Role; Relationship within Office; Career and Achievement;

and Organizational Environment) remained statistically significant after the three covariates were introduced. Gender differences on stress originating from Work-Home Conflict failed to reach statistical significance when the above covariates were introduced; hence, it is excluded from the analysis. This result is rather surprising, since previous studies have revealed that women tend to be more likely to report stress originating from this interface than men and this result is corresponding to a study conducted by Lim V. & Teo T. (1996) which generates the same output that there is no effect on stress by work-home conflict. Age as a covariate is statistically significant for career and achievement, and work-home conflict.

Table 1: Results of ANOVA for Basic Sources of Technostress

Dependent Var./Sources	Gender (Main)	Job Title	Marital Status	Age	(For all)	Error	
	MS & F**	MS & F	MS & F	MS & F	Df	MS	df
Internal Factors to the Job	3.53 & 10.84	0.29 & 0.92	0.05 & 0.12	0.59 & 1.73	1	0.32	296
Managerial Role	3.68 & 8.36	0.06 & 0.11	0.19 & 0.46	0.08 & 0.06	1	0.43	296
Relationship within Office	3.74 & 9.68	0.47 & 1.12	0.34 & 0.83	0.09 & 0.09	1	0.38	296
Career and Achievement	5.61 & 10.39	0.08 & 1.37	0.03 & 0.04	2.87 & 5.28 *	1	0.54	296
Work-Home Conflict	1.64 & 2.53	0.07 & 0.08	1.37 & 2.17	2.86 & 4.37 *	1	0.65	296
Organizational Environment	5.67 & 12.99	0.49 & 1.07	0.95 & 2.15	0.11 & 0.19	1	0.43	296

*P<0.01
**P<0.001

#All Sources are Covariates accept Gender which is a Main Source.

FACTOR BASED ANALYSIS

To examine further gender differences in specific aspects of the job, t-test was also used for male and female IT personnel on various items in each dimension of the OSI. Items on which significant gender differences occur are reported in Table 2.

INTERNAL FACTORS TO THE JOB

Significantly higher scores on three questionnaire items relating to internal factors related to the job were reported for female IT personnel. These items are: “Pay Scale”; “Rapid advance in Technology” and “Variety of work”. Results of t-tests on these items are shown in Table 2. Survey n interview data revealed by t-test exhibit that women are more likely than men to cite inadequate pay as a source of job stress with respect to “Pay Scale”. This result is not surprising since if we see the equivalence of the job positions, the pay scales earned by females is far less as compare male IT personnel. Our survey results correspond with a study conducted on IT personnel in Singapore, Tan M. & Igbaria M. (1994) which found that on average, female IT personnel are paid $400 less than their male colleagues. Similar picture is seen in qualitative data also, which revealed that there is a constant fear in female IT personnel that they might fall behind in rapid technological advancements which proves to be a major source of stress among them. As more and more advances are there in technology, there is an increase in constant pressures, work demands, fear of male domination as far as knowledge and competence is concerned amongst female IT personals. This is perceived as a major source of stress to a greater extant than male IT personals. Female IT personnel also felt that there is not much variety in their jobs. Whereas, in case of their counterparts, they are offered more challenging and non-routine tasks which is a major factor contributing to their stress level. Some empirical studies confirmed this fact that women who occupied traditionally male jobs tended to report less

confidence in their ability to excel in their jobs compared with their male colleagues (Hollenbeck *et al.*, 1987). By virtue of this, supervisors become biased in their opinion and reconfirm the fact that female IT personnel are less knowledgeable and competent than their male counterparts.

MANAGERIAL ROLE

Female IT personnel scored significantly higher on "Potential of Taking Risk", "Fear of doing Mistake" and "Available/Visible for Organization" which is exhibited in Table 2. Female IT personnel were more likely to show less potential of taking risk as compare to their male counterparts and were more concerned about making mistakes in their jobs. In fact, several female IT personnel quoted "fear of doing mistakes" as stressful as confirmed by qualitative data too. Superiors take female IT personals granted for assigning them additional tasks in the organization and consider them always available/visible for organization all the time, which proves to be significant factor contributing towards stress in case of female personals. Negative responses are expressed by IT users towards enhanced IT innovations/ information technologies, because of the fear of doing some wrong actions while using computer by pressing a wrong key or other gazettes due to the indistinctness (Heinssen *et al.*, 1987; Gaudron & Vignoli, 2002, and Compeau *et al.*, 1999).

RELATIONSHIP WITHIN OFFICE

Significantly higher scores are revealed on this sub-scale of OSI: "Social Interactions", "To handle Office Politics" and "Superiors' Support" in case of women shown in table 2. Our interviews with female IT personnel reported a considerable amount of stress originating from interactions at the work place and handling with the office politics which is generally more pronounced and extensive in modern organizations. It also affects male IT personals but relatively female IT personals are more stressed as there are often excluded from different networks in the organizations. They are excluded in the IT profession as there has been a male domination traditionally and women entered this field late. So they are not a core part of "old boys" networks. These findings of our study are consistence with the results of the studies i.e. Nelson *et al.*, 1990 and Lim V. & Teo T. (1996). There is a high level of stress on account of lack of support and encouragement by their superiors in case of females which is completely reverse in case of males. The results of our study are in consistence with Loscosso & Spitze (1990) which reported that men have higher levels of support from their superiors.

CAREER AND ACHIEVEMENT

Female IT personals reported on account of career and achievement related factors, significantly higher scores on stress, i.e., "Under-Valued and Less Opportunities" and "Dominance for Male Personnel", shown in table 2. To supplement the empirical results the interviews were conducted in which it was found that female IT personnel even complained that they have limited access to training and upgrading opportunities. It leads to forming of a perception by female that they are under-valued, less important, leading to in frustration and stress. They also felt that they have to prove themselves on each step of the functioning of the organization; it is a major cause to feel them less efficient as compare to their male counterparts. All employees in the organization strive for admiration, support and encouragement from superiors which helped them advance in their careers with an exception in case of females, which need little degree of support structure. In IT industry there is a less parity of males and females experts and in major cases role models and careers mentors are not as readily available for female IT personnel, as compare to their male collogues. This may lead women to recognize the lack of opportunities in their workplace and eventually they have to adjust their aspiration levels downward to match the career paths or jobs that appear to be available to them (Freedman & Phillips, 1988). Perrons, D. (2002) opined that for male IT professionals, many factors within the workplace (dominant numbers of males, male-oriented metaphors in training material, and gender statistics at the executive level) already contribute to a sense of belonging within an IT organization.

ORGANIZATIONAL ENVIRONMENT

Significantly higher scores on three questionnaire items relating to organizational environment, such as, "Independence and Opportunities to Male", "To Deal with Delicate Situations" and "Increased Gender Discrimination", shown in table 2. Stress reactions are resulted in case of female IT

personnel, on account of more independence and opportunities to male personnel. Men are usually found commonly in jobs with higher autonomy, self-direction and freedom from close supervision was confirmed by many studies (Hollenbeck *et al.*, 1987 and Cameron B. & Butcher-Powell L., 2006). The reason for this why men prefer to seek such jobs, could be the possible nature of men who have more preference of autonomy and independence by virtue of which male IT personnel are likely to report less stress and they take this as an opportunity to work independently. Reverse reporting is addressed by female saying that there is always gender discrimination because of which they are granted less opportunities and challenges, less visibility, less financial assistance and inadequate resources to work , less supportive relationships with their supervisors (Igbaria & Wormley, 1992). While both male and female IT personnel cited this as a source of stress, female IT personnel complained that, under delicate or ambiguous situations, end users would often view them as being less competent than male IT personnel and would be reluctant to accept their recommendations regarding systems design which shows the shadowed role of females. All theses factors generates considerable amount of stress environment. So it is not astounding that female IT personnel reported significantly higher scores on stress arising from the organizational environment relatively to male IT personnel.

Table 2: Results of t-test on Individual Stress Topics B/w Male & Female IT Employees

Stress Topics	Mean (Male)	Mean (Female)	t-value	Significance
Internal Factors to the Job				
Pay Scale	3.42	3.71	-2.08	0.04
Rapid advance in Technology	3.61	3.95	-2.57	0.01
Variety of work	3.28	3.83	-4.02	0
Managerial Role				
Potential of Taking Risk	3.44	3.84	-2.72	0.01
Fear of doing Mistake	3.68	4.06	-3.23	0
Available/Visible for Organization	3.19	3.47	-2.18	0.03
Relationship within Office				
Social Interactions	3.15	3.52	-2.82	0.01
To handle Office Politics	3.14	3.41	-2.25	0.03
Superiors' Support	3.47	3.84	-2.81	0.01
Career and Achievement				
Under-Valued and Less Opportunities	3.52	3.94	-2.87	0.01
Dominance for Male Personnel	3.75	4.06	-2.49	0.02
Organizational Environment				
Independence and Opportunities to Male	3.65	4.06	-3.01	0
To Deal with Delicate Situations	3.68	3.94	-2.05	0.04
Increased Gender Discrimination	3.44	3.86	-3.024	0

CONCLUSION

The paper reveals gender differences in occupational stress among IT personnel in India. Results of ANOVA show that in five of the OSI dimensions, namely: internal factors to the job; managerial role; relationships within office; career and achievement; and organizational environment gender differences are there but in work-home conflict variable no gender difference is found for stress origination. Our results are consistent with the study conducted by Davidson & Cooper's (1983), which suggest that generation of stress among females is mainly because of discrimination factors which originate from corporate policies, work culture and male dominance. Another factor which contributes towards stress generation amongst female IT personnel is lack of confidence and fear of committing mistakes are mainly because of lack of

knowledge and skills in performing work. Such evidence has strong implications for management in terms of providing exhaustive training to female IT personnel to augment their skills and build up their confidence so that they able to handle with their job demands.

The scores on stress stemming from "to handle office politics", for female employees were higher than their male counterparts and the main reason which contributed to this is marginalization of women from the organizational political networks (Nelson *et al.*, 1990). To cope and to avoid this situation, the managers should guarantee that female IT personnel are well equipped with interpersonal skill to enable them to cope with office politics. The results show that female IT personnel, on stress originating from inadequate support from their superior and others at work, scored significantly higher than their male colleagues which was earlier male dominates. An assiduous effort is needed to ensure that female staff receives the support and guidance from their superiors as this is crucial for them to go ahead in her profession. Because of gender discrimination in organization that female IT personnel may constrain access to career opportunities for them and many hamper their career ambitions (Lim V. & Teo T., 1996). Same Sex Role Models and career mentor for female IT workforce is needed ensuring that male and female are both very important resource in organization and steps should be taken to assist employees, especially female IT personnel, in their professional development and career achievement. The significant insights are achieved by this empirical exploration which could be helpful for the management of IT industry.

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