TECHNO STRESS AND ITS IMPACT ON PRODUCTIVITY: AN ECONOMETRIC STUDY

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Abstract

Information and communication Technology is changing by leaps and bounds which embarks in the modern corporate world, and there are consistent developments in information technology (IT) which accentuate the business performance. At the corporate level, information technology has made major changes on production design, management control, decision-making and organizational design and it is everywhere, in many aspects of business and daily life. There is a need for dedicated staff support, training for managers and employees. Modern information technology gives more pressures to employees which also help the IT employees in improving the skills. It has also made employees work under extreme pressure and that affects on their psychic as well as substantial level, because they have to keep up with the advance pace of the new ICTs, employees have to attend various webinars and trainings to meet the higher prospect for productivity which in turn affects the deadlines from existing clients. The researcher found that techno stress has a significant opposite impact on employee productivity. The study concludes that results are evident which verified that there is a reversal influence of IT on the workforce which purposely has interacting with IT innovations regularly on overall productivity. This will provide a major stepping stones for organizations to understand and improve techno stress, thus improving employee productivity.

Keywords: Information Technology, Technostress, Stress, Mental workload

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SECTION 1: INTRODUCTION

Technology has changed with the pace of time since 1988, when the term technostress was pioneered and introduced for the first time by Dr. Craig. The use of information and communication technologies (ICTs) in today's information is determined society is very essential. No meaningful skilful and fiscal growth and development can be proficient without ICT application. Several benefits such as increased productiveness, efficiency, veracity, space economy and reduction in drudgery and routine are derivable from the utilization of ICT. They have identified five factors of technostress, which are:

Techno-overload: It describes the situations where use of mechanics forces people to work more and work faster.

Techno-infiltration: It describes being "always resolved", where the people feel the need to be continuously connected irrespective of place and time.

Techno-complexity: It describes the situations where the complex technologies force people to spend aid in learning and understanding the use of new applications.

Techno-insecurity: It is associated with bearings where people feel afraid about their jobs with other people.

Techno-unacertained: A situation where technology (ICT) users feel uncertain and agitated since technology is continuously changing and need upgrading.

The techno stress problem is more noticeable in information technology (IT) professionals, who at the same time create new technology and are affected by the same. Today, the IT industry is one of the fast moving industries in India and they are facing tremendous competitive pressure in today economy. IT professionals must update themselves from technology perspective as quickly as possible. Due to existing deadlines from the current work, they are forced to update their knowledge and skills in their leisure time.

The most noticeable development in the globalization context has been the Information and Communication Technology (ICT). It seems to have turned the world into a universal village. Endless connectivity, interactive organizations, information sharing and never-ending access, all have become the new ICT drone words. The new trends in the world economy have brought to the fore the question on the force of the LPG approach. The impact is most visible in the context of growing economies, as it perceptively plays down its drawbacks and

accentuate its advantages. One of the recommended positives being the arrival of Information and Conversation Technology (ICT). If, on the one hand, globalization has hasten the onward march of ICT, the growing success in ICT actions has also brought the global neighbourhood closer. ICT, in the proliferation background, is all about global knowledge, access, participation and domination in the information age.

TECHNOSTRESS:

The term technostress was introduced in 1984 by a scientific psychologist, Dr. Craig Brod (1984, p. 16): Technostress is a current disease of adaptation caused by an shortcoming to cope with the new computer technologies in a healthy manner. Although Brod (1984) look at technostress as a disease, other researchers treated it more as an inability to accustom to changes brought by technology. Davis-Milis (1998) analyzed technostress as a condition whereby a person has to acomply to advanced mechanics specifically although there is inadequacy of the equipment, support, or the technology itself. Apart from that, confer to Clark and Kalin (1996), the real interpretation of technostress is "resistance to change". They claimed that technology is not the offender because computer and technologies are just tools and stress is a innate reaction. Thus, they suggested that in order to regulate technostress, it is the change that has to be managed not the technology. Their aspect was supported by Champion (1988) who stated that the knowledge age was all about change, or to be further precise, reply to "techno revolution", not about technical components such as machines, programs, network, or fibre optics.

WHAT CAUSES TECHNOSTRESS?

Closely twenty years ago, Lisa Ennis wrote her thesis paper on Technostress and entitled it "Technostress in the Reference Surroundings: A analysis of From her research at the time, she found six specific causes of Techno stress:

• The Rate of advancement of the Technology

• The Lack of Standardization

• The Lack of Training Individuals on the Equipment

• The Reliability of the Technology

• The Increased Task Placed on Each Individual

• The Changing Roles of Librarians

TYPES OF TECHNOSTRESS:

Multitasking Madness:

Multitasking madness refers to the capability of a computer to perform multiple task at once. While this is a great thing for a computer to complete, the human mind was not build to multitask at the same level. Yes, the human mind can shift from one task to the other but it keeps the previous task queued somewhere in the back of the mind. The more tasks we try to multi-task, the less useful we become at performing any tasks. David Meyer, a researcher on multitasking claim, "Folks in a task framework, who are rattle distant on word processors as they simultaneously answer phones and talk to their ally or bosses, are doing switches all the time. Not being able to concentrate for say, ten minutes at a time, may mean it's require a library as much as 20-40% in terms of potential energy".

Burnout:

"Burnout is a aggregate process leading to emotional exhaustion and withdrawal", some people become angry, blowing up at any one who vexed their path. Some resort to blaming any annoyance, large or small, on external factors. Some become quiet, isolated and introverted.

Internet as a Treat:

The evolution of internet and electronic networked resources encouraged the development of new services such as digital studies. However, this might pose a great challenge since the internet was also seen as a threat as it created a lot of ambiguity (Melchionda, 2007). Although there would be some who were optimistic and proactive, there were others who feel vulnerable and resistant since they have no idea how to manage, work in, and survive in this new environment. Some curators feared that they would no longer be needed as library users would be able to use the internet without their help. Some catalogers also felt threatened by those who were more flexible, smarter, and better trained in technologies. The coversion from automation to digitization meant that librarians had to acquire new skills and competencies and be civilized in new technologies, which in turn added a further burden and stress to them (Melchionda, 2007).

Information overload as overload problem:

First, there is the claim that we have an enormous amount of information. Second, there is the claim that this excessive amount has a noteworthy effect on us – namely, it decline our wellbeing. Third, there is the normative suggestion, even though unstated, of undesirability: not much argument is needed to justify, say, the claim that anxiety resulting from having to operate something we have too much of is undesirable from a prudential point of view; for this reason, it is largely, but not exclusively, legitimate in character. This conception of the problem is thus fairly characterized, given the analysis of the concept of overload in the prior section, as an overload problem having to do with information. Moreover, the perception is thick in the sense of having descriptive and normative elements and the regulative elements are, so to speak, rooted from the normative content of the concept of overload.

The objective of this paper is to explain the relationship in the present-day business organizations mainly between IT managers increased usage of information technology (IT).

This research paper is further then divided into five sections:

Section1: It gives the conceptual framework of techno stress affecting IT personnel in Indian context.

Section 2: It gives the comprehensive review of existing literature to identifying the research gap.

Section 3. It identifies the research objectives and the data and methodology.

Section 4: It presents the analysis and interpretation of the results

Section 5: It entails the summary and conclusions of the research study.

SECTION II: REVIEW OF LITERATURE

This section contains the review of existing literature in India and across the globe. There are many studies conducted which are focused on the stress originating by the use of Information technology directly or indirectly, likes, Bloom, 1985; Doronina, 1995; Weil & Rosen, 1994 & 1997. It is obviously proved that the organizational environment plays an important role to enhance techno stress for workforce (Schein, 1971; Murphy,1987; Farina et al., 1991; Hendrix et al., 1995; Sosik& Godshalk, 2000 and Raitoharju, 2005). Various studies conducted that techno stress integrated with the rapid use of ICTs are as follows: Craig Brod,1984; Compeau & Higgins, 1995; Clark & Kslin,1996; Arnetz & Wiholm, 1997; Thong & Yap, 2000 and Sethi et al., 2004).

The researcher found that technostress is an important consequences of the expected use of ICTs in organization and illustrates the bivalent nature of their organizational influence (Lloyd & Gressard, 1984; Igbaria & Prasuraman,1989; Brosnan, 1998; Desai & Richards, 1998; Bryan, Ajay & Simon, 2002; Ragu-Nathan et al.,2002; Finn & Korukonda, 2003; Burton-Jones &Hubona, 2005. Many researchers focused on gender issue and confirmed that female personnel showed more stress than men (Burke & Belcourt, 1974; Davidson& Cooper, 1983; Nelson et al., 1990; Rosen & Maguire, 1990; Smits et al., 1993; Shaw, 1994; Ranson & Reeves, 1996; Gefen & Straub, 1997; Whitley, 1997; Moore, 2000; Venkatesh & Morris, 2000; Ahuja, 2002; Perrons, D., 2002; Day & Livingstone, 2003; Harris & Wilkinson, 2004; Matud, M., 2004, and Cameron B. & Butcher-Powell L.,2006). 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. Some past literature define the concept of stress as a continuous and dynamic process which affects employees psychologically, (Shirom, 1988; Newton, 1989; Dewe, 1991; Hart, Wearing & Headey, 1993; Hart and Wearing, 1995) which are mostly focused on individual intensity in place of organizational aspects, while, several other are considered organizational phase (Wilkins & Ouchi, 1983; Denison & Mishra, 1995; Ma & Bao, 1999Hannakaisa et al., 2000; and Wang et al., 2008). In this paper, Questionnaire technique is used to get an apparent picture about the usual proceedings of the personnel which is also an approved and much used technique for the analytical surveys (Robertsonet al., 1990; Cooper & Williams, 1991; Rees & Cooper, 1992; Bogg & Cooper, 1995; Lim & Teo, 1996; Cameron & Butcher-Powell, 2006 and Rajput & Gupta, 2011). After reviewing the literature, we can define techno stress as a reflection of one's discomposure, fear, tenseness and anxiety when one is learning and using computer technology directly or indirectly, that ultimately ends in psychological and emotional repulsion and prevents one from further learning or using computer technology and hence, this leads to major fallouts because of technology, which affects the productivity adversely and to study this is the main focus of this paper.

RESEARCH OBJECTIVES

The main objective of this paper is to observe the work-related stress on IT employees and its impact on their productivity.

Hypotheses can be formulated are as follows:

Ho: There exist of negative relationship among the level of centralization and level of innovation on techno-stress.

H1: There exist of High level of centralization and innovation are directly related to level of the Techno stress.

Ho: There is no impact of innovation and automation in organization on employee Techno stress and no effect on employees' productivity.

H2: The organizational environment of innovation increases the level of employee

SECTION 111: DATA AND METHODOLOGY

The research paper is focused on analysing the impact of increased techno-stress among the employees of IT organizations and its impact on productivity. To understand this relationship a structured questionnaire was formulate. The data was collected through a combination of mail surveys and semi-structured interviews. Total 600 correct responded questionnaires were used for the analysis. Among 600 participants, 60 per cent are male respondents (N = 360) and 40 per cent are female respondents (N = 240) which is coded by 2 and 1 respectively. Out of total 18.2% respondents are from supervisor or top management level, and the rest 81.8% are other qualified staff. Age is corresponding in three groups, 194 are below 25 years of age, 361 are from25 to 45, and the rest 65 are older than 45. The staff which is selected from educational background ,categorized in four categories, such as, 1: 5% (39) have done high school, 2: 45% (271) have completed 4 years college, 3: 20% (116) cleared graduation and 4: rest 30% (174) have done other courses. The adequacy test of the sample size is done by Kaiser-Meyer-Olkin (KMO) and Bartlett's Test. Reliability test is done by Cronbach Alpha. Validity test was done by factor analysis.

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) to 5 (strongly disagree) on a five-point Likert Scale response. Williams (1996) analyzed the data from over 20,000 participants working in over 100 different organizations to evaluate the scale structure and reliability to test the psychometric properties of the OSI on a huge diverse sample and see if the instrument could be improved. The OSI consists of five subscales which tap five dimensions of stress: (1) Techno-overload, (2) Techno-invasion, (3) Techno-complexity, (4)

Techno-insecurity and (5) Techno-uncertainty. Tarafdar et al. (2007) further developed and validated a techno stress measurement scale based on US data. The scale defined five components of techno stress that describe typical situations where the use of computer technology can potentially create techno stress.

The five components are:

(1) Techno overload: the ICTs pushes employees to work faster;

(2) Techno-invasion: the pervasive ICTs invades personal life;

(3) Techno-complexity: the complexity of new ICTs makes employees feel incompetent.

(4) Techno-insecurity: the job security of employees threatened by fast changing ICTs; and

(5) Techno uncertainty: the constant changes, upgrades and bug fixes in ICT hardware and software impose stress on the end-users.

FACTOR ANALYSIS

Factor analysis is a statistical method to depict variability among observed variables in terms of a potentially lower number of unobserved variables called factors. In other words, it is possible, for example, that variations in three or four observed variables mainly reflect the variations in fewer such unobserved variables. Factor analysis searches for such joint variations in response to unobserved latent variables. The observed variables are modeled as linear combinations of the potential factors, plus "error" terms. The information gained about the interdependencies between observed variables can be used later to reduce the set of variables in a dataset. Factor analysis originated in psychometrics, and is used in behavioral sciences, social sciences, marketing, product management, operations research, and other applied sciences that deal with large quantities of data. In this paper, Gender, age and Educational level are few factors which are categorized in the basis of Centralization and Innovation forms the basis of factor analysis. They are found to be satisfactory reliability scores.

Factor analysis is related to principal component analysis (PCA), but the two are not identical. There has been significant controversy in the field over differences between the two techniques (see section on exploratory factor analysis versus principal components analysis) below. Clearly though, PCA is a more basic version of exploratory factor analysis (EFA) that was developed in the early days prior to the advent of high-speed computers. From the point

of view of exploratory analysis, the Eigen values of PCA are inflated component loadings, i.e., contaminated with error variance.

Analysis:

The analysis will isolate the underlying factors that explain the data. Factor analysis is an interdependence technique. The complete set of interdependent relationships is examined. There is no specification of dependent variables, independent variables, or causality. Factor analysis assumes that all the rating data on different attributes can be reduced down to a few important dimensions. This reduction is possible because the attributes are related. The rating given to any one attribute is partially the result of the influence of other attributes. The statistical algorithm deconstructs the rating (called a raw score) into its various components, and reconstructs the partial scores into underlying factor scores. The degree of correlation between the initial raw score and the final factor score is called a factor loading. There are two approaches to factor analysis: "principal component analysis" (the total variance in the data is considered); and "common factor analysis" (the common variance is considered). In this paper "principal component analysis" is used.

SECTION 4: ANALYSIS AND INTERPRITATION

Ho: There exist of negative relationship between level of centralization and level of innovation on techno-stress.

H1: High level of centralization and innovation are directly related to level of Technostress.

Level of innovation and centralization has a positive impact on level of technostress as is evident from table 1 which gives details of descriptive of variables under study i.e. means, standard deviation and correlation. Results reveal an overall significance positive correlation between technostress and the extant of centralization (r = 0.286, p < 0.01) and innovation environment (r = 0.157, p < 0.01) and is in congruence to the review of literature deliberated above like (Zhou, 1996). To find out the impact of centralization and level of innovation in the organization after taking into account the possible effects of control variables, **stepwise multiple regressions** are used to test the hypotheses, the results of which are reported in table 2. It was revealed that the t-value of both the extent of centralization (t = 5.029, p < 0.01) and innovation environment (t = 2.239, p < 0.05) are found to be significant with no co linearity in the regression model which leads us to the rejection of null hypothesis (Ho) and acceptance of alternative hypothesis (H1) i.e. high relationship of centralization and

technostress. Hence, we can say that if employees are forced to learn the new technology over long period of time, there is likelihood for them to suffer from technostress which is evident from their level of dissatisfaction and fatigue. On the other hand, in a more decentralized set-up, employees will be more willing to accept new technology which reduces the level of technostress.

Measures	Mean	SD.	1	2	3	4	5
Gender	0.64	0.018	-	-	-	-	-
Age	1.78	0.026	0.104(***)	-	-	-	-
Educational Level	2.84	0..028	0.120(***)	0.017	-	-	-
Centralization	7.23	0.077	0.006	0.035	-0.116	-	-
Innovations	8.98	0.075	-0.038	-0.033	-0.055	0.241(**)	-
Technostress Level	71.41	0.444	0.037	0.111(**)	-0.004	0.286(**)	0.157(**)

Table 1:Mean,Standard Deviations and Correlation of Measures

* p<0.05, and ** p<0.01; N=600

	Unstandarised coefficient		Standardized Co-efficients		Sig.value	Co linearity Statistics	
Independents	B	S.E	Bet a	T-value		Tolerance	VIF
Gender	0.165	0.948	0.031	0.0697	0.491	0.962	1.047
Age	1.437	0.626	0.094	2.34	0.026	0.980	1.028
Educational Level	0.284	0.598	0.023	0.53	0.640	0.973	1.034
Centralization	1.245	0.207	0.246	6.028*	0,001	0.951	1.058
Innovations	0.516	0.203	0.102	2.438*	0.017	0.957	1.055
Adjusted R	0.091						
F-Value	11.472						

Ho: There is no impact of innovation and automation in organization on employee Techno stress and no effect on employees' productivity.

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H2: The organizational environment of innovation increases the level of employee Techno stress and affects employee productivity negatively.

MANOVA followed by a Schaffer's test (for pair-wise comparisons) is conducted to understand the varying level of techno stress across various organizational internal environments. The result of MANOVA indicates that the difference of techno stress is statistically significant under different organizational internal environments taking computer related techno stress as dependent variable and centralization vs. innovation as organizational environment (see table 3). In the contemporary world, to introduce innovations and embedding that in organization culture is inevitable. To have a competitive edge, innovation has become the main strategy of many firms.

The results indicate an inspirational level of techno stress with high levels of innovations, especially when organization rewards an employee with higher level of computer literacy and vice-a-versa, thus, disrupting individual goals, similarly as the study done by Schwartz & Davis, (1981) and Sheridan (1992). Hence, a rational strategy is required on the part of the management to strike a balance between organizational and individual goals with right amount of assistance imparted time and again to all employees which will help in alleviating level of techno stress.

Organisational Environment Techno stress	Low Centralization &Low innovations	Low Centralizations &High innovations	High Centralizations &Low innovations	High Centralizations &high innovations	F-value
Techno-overload	9.68	9.92	10.67	10.59	8.918***
Techno-invasion	24.07	23.99	25.28	25.04	2.453
Techno-complexity	19.37	19.98	21.45	21.68	12.573***
Techno-insecurity	4.25	4.29	4.68	4.88	10.058***
Techno-uncertainty	11.015	12.24	11.26	12.62	12.892***
Techno stress level;	67.74	70.18	72.67	74.58	12.814***

* p<0.05, ** p<0.01 and *** p<0.001; N=600

Quadrant I:		Quadrant II:	
Low innovation	Centralization/low	Low innovation	Centralization/High
Quadrant III:		Quadrant IV:	
High Innovation	Centralization/Low	High innovation	Centralization/High

The above analysis reveals that there are varying perceptions of employees under different organizational internal environments in relation to techno stress. Direct relationship is revealed between level of techno stress and centralization/innovation of organization. Out of five components, i.e. Techno-overload, Techno-invasion, Techno-complexity, Techno-insecurity and Techno uncertainty, there is no significant difference of "techno-invasion" and the rest are found to be significant. Finally, the analytical results authenticate that the levels of employee techno stress are significantly diverse in organizations that belong to the four different configurations of organizational environment shown above (see fig. 1).Organizations in Quadrant I (low centralization/low innovation) generate the lowest level of employee techno stress as minimal technology is used in daily operations. Whereas, organizations in Quadrant IV (high centralization/high innovation) create the highest level of employee techno stress as there is heavy dependence and usage of technology innovations to achieve the competitive edge. This framework of analysis will help the managerial personnel to develop and counter the negative impacts of techno stress.

SECTION V: SUMMARY AND CONCLUSIONS

Techno stress is becoming a new terrible caused by our advancements in this technological age Modern information technology puts hard pressures on individuals' resources by demanding constant refreshing of skills. It is on the increase and can appear as irritability, headaches, mental fatigue, panic, anger and feeling of helplessness. On the other side of the coin, these great inventions can save time, money and help us giving the timely information. This paper investigates the impact of different organizational environment, variables on the level of employee technostress.

Research about technostress in Indian companies is relatively a new concept and can be extended to other culture setting also. Different marketing strategies, under different

ownership types, can be explored on the bases of how employee perceive and respond to technostress. As it is now becoming a high up in work culture for both the system users and IT professionals. Since, it has both positives and negatives, one area of research can be as to how to make new ICTs more lucrative and productive in Indian firms. The results of this study should be useful for IT companies operating in India addressing the issues of technostress from the perspective of organizational behaviour.

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