

# An Empirical Investigation Of Technostress Due To Technological Factors And Its Impact On Employee Engagement

Arooj Malik<sup>a</sup>, Shuja Ul Islam<sup>b</sup>, Muhammad Aleem<sup>c</sup>, Naveed Tariq<sup>d</sup>

<sup>ab</sup> FAST School of Management, Islamabad, Pakistan

<sup>c</sup> Department of Management Sciences, CECOS University of IT and Emerging Sciences Peshawar, Pakistan.

Corresponding author E-mail: [aleem@cecos.edu.pk](mailto:aleem@cecos.edu.pk)

<sup>d</sup> Department of Management Sciences, Qurtuba University of Science and Information Technology, Peshawar, Pakistan

## Abstract

The digitalization of tasks and work-life dependency on computer interface has enhanced the stress level of employees. Nonetheless, a vast literature is built on the technostress and job outcome relationship yet the effect of contextual factors on technostress as a mediator on employee engagement is still underdeveloped. Drawing upon the transaction theory this study is aimed to test and elucidate a theoretical model predicting the mediating role of technostress on the relationship between contextual factors (technology dependence and pace of change) and employee engagement. A time-lagged survey is conducted from IT professionals (N=207) of software houses of Pakistan. As hypothesized the results revealed that the pace of change positively affects employee engagement. Moreover, for indirect effect, technostress showed mediation of technology dependence with employee engagement. Future research directions and practical implications are also discussed in the end.

**Keywords:** technostress, pace of change, technology dependence, employee engagement.

## 1. Introduction

The disruptive and pervasive nature of IT has changed the business landscape (Abbasi, Sarker & Chiang, 2016) and has provided countless benefits in enhancing the efficiency and effectiveness of the employees with the application and integration of ICTs (Brynjolfsson & Hitt, 2000). The rapid advancement in technology has significantly transformed the organizations by which they have redesigned their business processes, enhanced the automation of resources and built more sophisticated and synergistically driven systems (Schabracq & Cooper, 2000; Melville, Kraemer, & Gurbaxani, 2004; Westerman & Bonnet, 2015). Besides creating a myriad of benefits for businesses, ICTs have also imparted adverse effects in the form of technostress on employees' emotional, physical

and social wellbeing (Hudiburg et al., 1999; Tarafdar, Cooper & Stitch, 2019). These mitigating factors subsequently result in lowering employee engagement and other job outcomes (Crawford, LePine & Rich, 2010; Jung, 2013). While technostress has received huge attention in IT and Stress literature, yet the construct is rarely used as a mediator to predict its impact on employee engagement. According to the State Bank of Pakistan Report, the IT sector in Pakistan is flourishing with total annual revenue estimating US\$3.5 billion and has achieved double-digit growth rate of 19 percent in export earnings for the financial year 2015-2016. With more than 10,000 IT professionals graduating every year and 1500 registered Companies operating in the IT industry, Pakistan's IT sector provides a promising niche in the market (State Bank of

Pakistan, 2018). Moreover, in the software export market, the country's freelance programmers are enjoying a substantial amount of earnings with an estimate of US\$300 million annually (Shah, 2015). Despite the exponential growth in the IT sector, employee engagement is a big challenge especially when professionals constantly connected to the technology are exposed to information overload and frequent changes and other associated complexities of the ICTs. In view of the emerging interactions between stress and technology usage, it is important to understand the antecedent and consequence of technostress at the workplace. A plethora of stress literature highlights the positive and negative outcomes of technostress. Nonetheless, the construct is scarcely adopted as a mediator between contextual factors and employee engagement. Technostress which appears among its users upon interacting with ICTs (Ragu-Nathan et al., 2008) is the reason why individuals face technostress. To understand the mechanism that sheds light on the negative outcomes of technostress there exist a growing body of literature that have examined its adverse effect in the form of increased information overload, role conflict, burnout, tiredness, and low job satisfaction (Tarafdar et al., 2007; Ragu-Nathan et al., 2008; Ayyagari et al., 2011; La Torre et al., 2019). A previous study has highlighted the relationship between computer self-efficacy, technology dependence and technostress (Shu et al., 2011). From the outcome perspective, several studies have confirmed the impact of technostress on decrease in job satisfaction, organizational commitment, performance, and productivity (Ayyagari et al., 2011; Tarafdar et al., 2010). Besides the development in the technostress literature, the mediating mechanism of technostress between contextual factors and employee engagement is still unexplored. Previous studies where technostress is adopted as a mediator the outcomes are limited to job satisfaction (Suh & Lee, 2017) or job performance (Sagnuwan, Ismail & Ahmad, 2013). Nonetheless, the impact on employee engagement from the viewpoints of

technological characteristics via technostress is yet to be explored. This paper is aimed to explore the mediating mechanism of technostress between the contextual factors (technology dependence and pace of change) and employee engagement in IT workers of Pakistan. Furthermore, this study contributes to technostress literature in many ways. First, by investigating the relationship of technology dependence and the pace of change with employee engagement and computer anxiety. While past studies have utilized technology dependence and pace of change in predicting the cause-and-effect relationship of technostress this study extends the findings to employee engagement. Second, the transaction theory of stress is being utilized in the study to explain the mediating mechanism between computer anxiety and technostress induced by technology dependence and frequent changes in ICTs which would help managers to alleviate the factors that limit employee engagement. Moreover, this study fills the gap by addressing the mediating mechanism of technostress between contextual factors and employee engagement which is to our knowledge not inquired before in the literature. Third, there is considerable research evidence predicting employee engagement in the Pakistani banking and manufacturing sector yet to our knowledge this is by far the first research attempt that explores employee engagement and computer anxiety via mediating effect of technostress among Pakistani IT workers by relying on the mitigating factors of technology-induced stress. Lastly, this study is built on the theoretical foundation of transaction theory (Lazarus 1966) which posits that technology characteristics exert demands in the form of stressors that ultimately influence strain among its users.

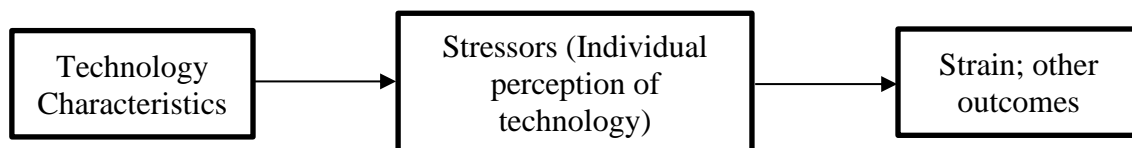
The main objectives of this study are (1) to find out the impact of technology dependence on employee engagement and computer anxiety (2) to find out the impact of pace of change on employee engagement and computer anxiety (3) to investigate the mediating effect of technostress between technology dependence and employee engagement and computer

anxiety. (4) to investigate the mediating effect of technostress between pace of change and employee engagement and computer anxiety.

### 2.1. Transaction theory: a perspective on Technostress

The “Transaction Theory” of stress (Lazarus 1966) of organizational psychology provides the conceptualization of the technostress phenomenon in the IS literature (Bliese, Edward & Sonnentag, 2017; Lee, Son & Kin, 2016; Tarafdar et al., 2019). It is widely employed in IS literature for predicting various technology and stress related job outcomes such as presenteeism, anonymity, work overload, job burnout, job engagement and job satisfaction (Ayyagari et al., 2011; Ragu-Nathan et al., 2008; Srivastava, 2015). The theory explains the concept of stress as a mixture of stimulating conditions and the response of an individual to

it (Ayyagari, 2007). The combination of a demand condition that creates the stress is known as ‘stress creators or stressors and the person reacts to it having negative outcome known as ‘strain’. Stress is known as a transaction which summarizes the relationship between these concepts of stimulating demands and responses. These transactions depend on the effect of the stressors which are the demand caused by the external or internal environment. These demands disturb the balance and affect psychological and physical well-being and consequently demand actions to restore balance (Cooper et al. 2001; Lazarus & Cohen, 1977). On contrary, the internal demands are personal desires or requirements that must be fulfilled by the environment (French, 1974). Stress is caused by the imbalance between resources and demands. Individuals become stressed when pressures or demands exceed their ability to handle stress.



**Fig. 1 Sketch framework of this study- Adopted from (Ayyagari et al., 2011)**

Fig 1 shows the framework of this study about techno stress based on the transaction model. It identifies technology characteristics as the antecedents of stressors which ultimately becomes a source of strain. In this study, technology characteristics i.e., pace of change and technology dependence, which are antecedents of techno stress are observed to examine their impact on employee engagement as strain or outcome.

The extensive utilization of transaction theory in IS literature provides a strong ground for explaining employee engagement in the context of technological characteristics. Reason for this is that the concept of employee engagement as defined by Schaufeli et al (2002) is “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and

absorption” (p.74) and the transaction theory of stress builds on the mechanism that demands from the contextual environment affect the psychological as well as physical wellbeing of the employees which ultimately seek actions to restore the balance (Cooper et al. 2001; Lazarus & Cohen, 1977). Henceforth the major takeaway from the transaction theory of stress is that Stress is the overall transaction process, so when the demands from the technological environment exceed employees’ resources it results in the form of strain which can affect the well-being of individuals and ultimately employee engagement or job performance (Cooper, Dewe, & O’Driscoll, 2001). A viable proposition here is that when the technological characteristics are taxing employees with frequent demands it initiates an imbalance by paving the way for technostress thus leading to strain.

## 2.2. Technological Characteristics and Employee Engagement

In the organizational behavior literature employee engagement has received huge attention (Kahn, 1990; Macey & Schneider, 2008) however the role of technological characteristics in predicting and affecting employee engagement has remained underexplored. In the early literature, engagement is defined as the attachment of members of the organization to their work roles however in the essence of employee engagement, people employ and express themselves physically, cognitively and emotionally during role performances (Kahn, 1990, p.694). It implies that the role performance is derived by being physically attached to work, cognitively attentive and empathically linked to others, to pay attention towards effectiveness, in addition to performance and quality in productivity, it also results in organizational and individual growth.

Following Kahn's (1990) conceptualization of engagement Schaufeli et al (2002) described engagement "as a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (p.74). Their work made a comparison between employee engagement and employee burnout and conceived them as equal yet totally opposite concepts. Saks (2006) provided a detail account of antecedents and consequences of employee engagement and advocated that it is the social exchange model that drives engagement among employees. Today's professionals encounter more pressure, complexity, ambiguity, and more uncertainty than ever before. These changes especially apply to information technology (IT) professionals (Lohman, 2009). Organizations are changing at a rapid pace. Advancements in the society like unpredictable financial growth and continuous technological innovation increase pressure on employees to exhibit ability to change and flexibility (Van den Heuvel et al., 2010). The goal of innovative information technology systems is to make working life easier and support employee

productivity. However, the high pace of change and several efforts of change mostly overlap, adding to the employees' adaptive capacities demands (Herold, Fedor, & Caldwell, 2007). Processes of change have been taken as a stressor regardless of the change content (Korunka et al., 1993). Thus, pace of change has a huge role in affecting employee engagement.

## 2.3. Technology Dependence and employee engagement

Higher technology dependence means more personal reliance on computer technology in daily work (McCune, 1999). Computers and internet technology has become an essential segment of our daily life (Hoffman, et al., 2004). Technology dependence is defined as over-reliance on technology to the extent that failure in the system creates productivity loss. Most organizations have automated their business processes to increase the efficiency and effectiveness of business performance. Consequently, employs working with high technology face more difficulty in computer technology, like; technology uncertainty, overload, complexity and so on (Shu et al., 2011). With the increased importance of computers in our daily life, the negative effects on the behavior of individuals towards computer usage are tremendously increasing (Heinssen, Glass, & Knight, 1987; Korunka, 1997). People need time and struggle to understand new software and hardware. Moreover, individuals find new information and communication technologies (ICTs) threatening as they think that computer and technology will ultimately become substitution of humans and their jobs at the workplace (Garland & Noyes, 2008). These negative behavior or emotions become a form of fear, anxiety, and aggression in behavior preventing the individual to make the best use of computers. So, in this way it can be claimed that increased use of computers and over dependency on technology can increase the computer anxiety of individual and affect the

employee engagement at the workplace. This relation can be hypothesized as:

H1: Technology Dependence is negatively related to employee engagement.

H2: Technology Dependence is positively related to computer anxiety.

#### **2.4. Pace of change and employee engagement**

Pace of change is described as the extent to which a person sees changes in technology to be rapid (Weiss & Heide, 1993; Heide & Weiss, 1995). Pace of change is the dynamic characteristic of ICT. This can take place due to existing changes or due to the prevalence of new technologies. Continuous changes in IT create demands for individuals to learn new ways of technologies (Korunka & Vitouch, 1999). Besides the importance of new technology introduction, the continuous technology change is important to understand the stress responses of individuals (Korunka et al., 1997). The technology is changing so rapidly and this change result in frequent and swift development of software versions which becomes precarious in a way that when individual becomes familiar with one software a new version emerges which brings the feeling of uncertainty and anxiety. As a result, the fear of not being able to cope up with modern technologies gets increased (Sami & Pangannaiah, 2006). Rapid technological changes are creating stressful situations for many employees. Some comfortably use technology in the workplace. However, others are not comfortable in using technology (Shepherd, 2004) and they struggle to adapt the technology (Brod, 1984).

Typically, the advancements of new technologies are said to be an important factor for increasing the level of insecurity of job (Johansson, 1989; Korunka et al., 1995). Though, Korunka et al. (1997) propose that to understand the stress response of a person, the advancement in technology, along with the frequent changes in technology are also important. Moreover, Arnetz (1997) claims

about the continuous advancement of new programs and quickly changing business and technical environment to be a cause of high stress. Research proves that technology changes more quickly than the human ability to survive with the change. The speed of technological development allows individuals to spend maximum time to deal with innovation and work (Pascarella, 1997). In a similar manner, Ayyagari (2011) also mentioned that fast pace of change in technology means individuals must devote more time to survive with work and innovation.

Technological advancements have their role in increasing the extent of insecurity of job (Johansson, 1989; Korunka et al., 1995). Continuous change in ICT increases the stress level (Korunka et al., 1997). A technological change requires the attention of individuals to adopt new skills and non-compliance increases the fear of job loss. By the limitation of cognitive resources, individual feels deprived of the new developments. These pressures which are created due to the pace of change in result creates insecurity of job which can become a cause of affecting employee engagement. So, these relationships can be hypothesized as;

H3: Pace of change is negatively related to employee engagement.

H4: Pace of change is positively related to computer anxiety.

#### **2.5. Technostress as mediator**

The term technostress was presented by a clinical psychologist named Craig Brod (1984), where technostress was defined as “a modern disease of adaptation caused by an incapacity to manage with the new computer technologies in a strong way” (p.16). Previous studies suggest the negative relationship between stress and job performance (Burke, 1976; Chilton et al., 2005; Jex, 1998; Welford, 1973). A program developing study revealed that the program developer’s performance is extremely influenced when they face strain (Chilton et al., 2005). Work exhaustion is a vital component of a job as it has a negative impact on different

factors of employee work like having intentions to leave the job, poor productivity, low morale, decreased organizational commitment, and reduced job satisfaction (Nahrgang et al., 2011; Swider & Zimmerman, 2010). In the field of information system research, it has been found that stress creators increase job burnout and work exhaustion as they are a source of creating stress and a need to handle the stressors, which diminish the resources of employees and make them exhausted (Ragu-Nathan et al., 2008). Relying upon the transaction theory of stress it is argued that the relationship between the environmental conditions (pace of change and technology dependence) and employee engagement is mediated by technostress. According to the transaction theory (Lazarus, 1966) stress is a person-to-environment transaction that is experienced when the conditions of the environment start taxing person's abilities and leads to strain. Adopting the same notion in IT context it can be anticipated that environmental conditions like pace of change and technology dependence initiate techno stress. This techno stress engages employees to feel exhausted and low on vigor, dedication and absorption which characterize employee engagement.

The higher possibility of computer usage and lower levels of computer anxiety were generally observed among individuals with younger age, males, and higher education level. These findings are in accordance with the general demographic profiles of older computer-users (Pew Research Internet Project,

2014). Specifically, the reality that old age women were not only less likely to be a computer-user but also face high computer anxiety found that different strategies should be done for older women to make them aware of computer usage. Moreover, training, and educational programs should be arranged to reduce the computer anxiety as well as enhancing their computer skills.

As the technology dependence has increased in the organizations. Specifically, in this new era of technological advancement, it's a challenge for employees to work in the technologically advanced environment and maintain and upgrade their skills and knowledge for using the computer systems. So, the new and untrained employees may feel fear and anxiety about working with new computer technologies (Achim & Al Kassim, 2015).

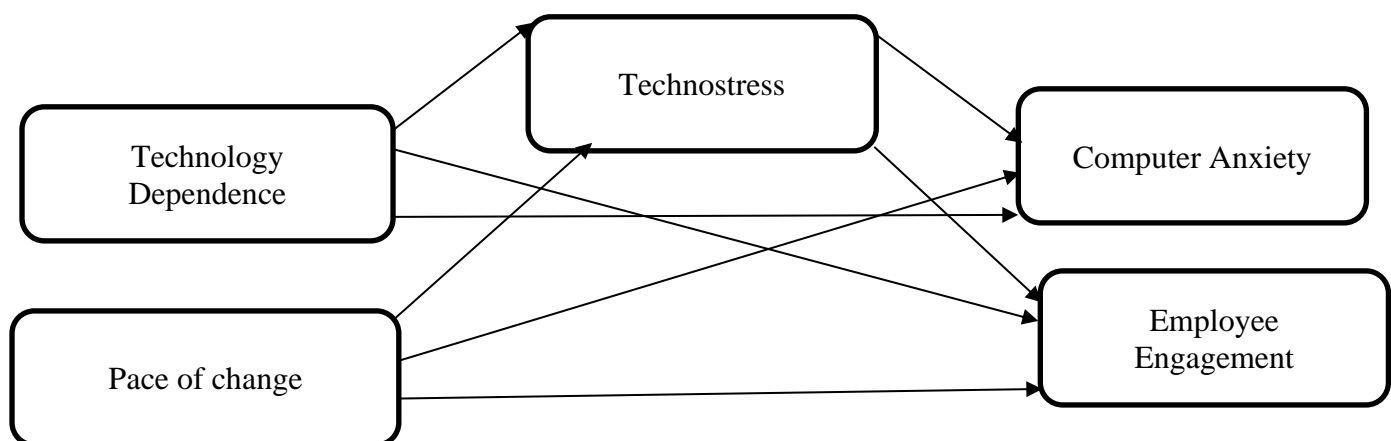
H5: Technostress mediates the relationship between technology dependence and employee engagement.

H6: Technostress mediates the relationship between pace of change and employee engagement.

H7: Technostress mediates the relationship between technology dependence and computer anxiety.

H8: Technostress mediates the relationship between pace of change and computer anxiety. The theoretical framework on the hypothesized relationships is drawn in Fig. 2.2.

**Fig. 2.2 Theoretical Framework**



### 3. Methodology

To conduct this study, the method used for the data collection was quantitative. The survey method was used for which a questionnaire was designed. Unit of analysis was individual consisting of employees from software houses. This research has followed the time lag method in which data were collected in three-time intervals T1, T2 and T3. By measuring independent variables, technology dependence and pace of change in T1 comprised of 11 items, the mediating variable technostress in T2 consisting of 23 items and dependent variables: computer anxiety and employee engagement in T3 consisting of 38 items. The reason for choosing the time lag method is to reduce the issue of common method biases (Podsakoff et al., 2003). According to researchers, cross-sectional data creates common method biases issues in which there is a chance of measurement errors which can affect the results of the study. So, time lag data is more appropriate technique to resolve the common method bias issue.

#### 3.1 Sample and population

Data was collected from both male and female employees of software houses of Pakistan. Software houses were selected because they have more use of computer and technology work. 300 questionnaires were distributed out of which 250 responses were received and 207 were true responses that were recorded. The respondents in T1 remained same till T3 so a log file was maintained for making employee record for future correspondence. As it was necessary to have same respondents of time 1 till time 3, so several responses were also drop out.

##### 3.1.1. Technology Dependence

Technology dependence was measured by 7 items scales of McCune (1999) and Hoffman et al. (2004). Which is measured on a 7-point Likert scale ranging from 1=strongly agree; 7=strongly disagree).

##### 3.1.2. Pace of change

Pace of change was measured by 4 items developed by (Heide & Weiss 1995; Weiss & Heide 1993) which will be measured on a 7-point Likert scale ranges (1 = strongly disagree; 7 = strongly agree).

##### 3.1.3. Technostress

23 items of technostress were measured on a five-point Likert scale covering the five components of technostress consisting of 5 items of techno overload, 4 items of techno invasion, 5 items of techno complexity, 5 items of techno insecurity, and 4 items of techno uncertainty anchored with 1 = “strongly disagree” and 5 = “strongly agree.” Given by Tarafdar et al. (2007).

##### 3.1.4. Employee engagement

16 items scale of employee engagement was measured on a 7-point Likert scale given by Schaufeli et al., (2006) ranges (1 = strongly disagree; 7 = strongly agree).

##### 3.1.5. Computer anxiety

9 items Computer Attitude Scale by (Lloyd & Gressard, 1984) was used for this study to measure computer anxiety on a 5-point Likert scale having scale ranges from 1 = “strongly disagree” to 5 = “strongly agree.”

### 4. Analysis and results

#### 4.1. Means, Standard Deviations, Coefficient Alphas, and Intercorrelations among Variables

First, descriptive analysis was conducted showing means, standard deviations, reliabilities and correlations among variables. These analyses were conducted by using the SPSS software (version 23.0). Table 4.1 shows that majority of respondents were male having age group of 29 years old with the education level of bachelors. In correlations, pace of change shows significant correlation with technology dependence ( $r=.445$ ,  $p<.01$ ).

Technostress shows negative correlation with technology dependence ( $r=-.095$ ,  $p= n.s$ ) and positive correlation with pace of change ( $r=.119$ ,  $p=n.s$ ). Computer anxiety shows negatively significant correlation with technology dependence ( $r=-.393$ ,  $p<.01$ ) and with pace of change ( $r=-.250$ ,  $p<.01$ ) and positively significant with technostress ( $r=.239$ ,  $p<.01$ ). Moreover, Employee engagement shows a positive significant relation with technology dependence ( $r=.213$ ,  $p<.01$ ), with the pace of change ( $r=.229$ ,  $p<.01$ ) and negatively significant relation with computer

anxiety ( $r=-.287$ ,  $p<.01$ ) and positive relation with technostress ( $r=.056$ ,  $p=n.s$ ).

To check the internal consistency of all items, a reliability analysis was conducted in which all variables showed their Cronbach alpha greater than 0.7 which is cut off value for reliability. Cronbach alpha of technology dependence is ( $\alpha=.715$ ), Pace of change ( $\alpha=.879$ ), Technostress ( $\alpha=.854$ ). Employee engagement ( $\alpha=.884$ ). Five items of computer anxiety were recoded as RD1, RD3, RD4, RD6, and RD8 then it shows the reliability as ( $\alpha=.766$ ). So, these alpha values were satisfactory showing that the reliability is established.

**Table 4.1 Means, Standard Deviations, Coefficient Alphas, and Intercorrelations among Variables**

Variables	Mean	Std. dev	1	2	3	4	5	6	7	8
1. Gender	1.18	.388								
2. Age	29.23	6.44	-.204**							
3. Education	1.34	.507	.093	.130						
4. Tech Dependence	6.11	.647	.003	-.100	-.100	<b>(.715)</b>				
5. Pace of Change	5.36	1.08	-.055	.021	.021	.445**	<b>(.879)</b>			
6. Technostress	2.99	.568	.054	-.051	-.051	-.095	.119	<b>(.854)</b>		
7. Computer Anxiety	2.00	.672	.002	.072	.072	-.393**	-.250**	.239**	<b>(.766)</b>	
8. Employee Engagement	4.98	.921	-.103	-.048	-.048	.213**	.229**	.056	-.287**	<b>(.884)</b>

Note.  $n=207$ ; gender was coded as “1” for male and “2” for female; for education level 1=Bachelors, 2=Masters and 3=PhD. Internal reliability coefficients (alphas) appear in

parentheses along the main diagonal, \* $p < .05$ . \*\*  $p < .01$ .

## 4.2. Descriptive statistics

**Table 4.2 Descriptive Statistics**

<b>No. of respondents</b>	207
Male	81.6%
Female	18.4%
<b>Education</b>	
Bachelors	66.7%
Masters	31.9%
Ph. D	1.4%



### 4.3. Data Normality

For conducting the further analysis first, the data should be normally distributed for which we have check the normality of data by examining the values of skewness and kurtosis of the data. The acceptable range for skewness is (+/-1 to +/-2). On the other hand, the

acceptable range for kurtosis value is (+/-1 to +/-2) (George & Mallery, 2011). Table 4.3 shows the values of skewness and kurtosis with minimum and maximum values along with standard errors. All the values lie in acceptable range which means the data is normally distributed.

**Table 4.3 Results of Skewness and Kurtosis**

Variables	Minimum	Maximum	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Tech Dependence	3.86	7.00	-.848	.169	.714	.337
Pace of Change	1.50	7.00	-.861	.169	1.037	.337
Technostress	1.43	4.57	.058	.169	.075	.337
Computer Anxiety	1.00	3.78	.385	.169	-.477	.337
Employee Eng	2.19	7.00	-.552	.169	.033	.337

### 4.4. Structural Model Estimation

The indirect effects of some factors are statistically significant, showing the presence of a mediation effect (Cheung & Lau, 2008; Iacobucci, 2012). In Table 4.4, loadings of all the items were checked in which all loadings were higher than 0.6 which is the threshold suggested by Hair et al., (2013). So, the

loadings of all the items are satisfactory by meeting the threshold criteria. Moreover, the reliabilities of all the items are also mentioned in the table the composite reliability scores (CR) were all higher than 0.7 so the reliability of all the items was established.

**Table 4.4: Factor Loadings for all variable**

6571	<b>Construct</b>	<b>Items</b>	<b>Loadings</b>	Journal of Positive School Psychology			<b>Composite Reliability</b>
	Technology Dependence	A1_Tech_Dep	.600				0.715
		A3_Tech_Dep	.752				
		A4_Tech_Dep	.600				
	Pace of Change	B1_Pace	.792				0.879
		B2_Pace	.900				
		B3_Pace	.788				
		B4_Pace	.732				
	Technostress	C1_TS	.622				0.854
		C2_TS	.781				
		C3_TS	.756				
		C4_TS	.628				
		C5_TS	.617				
		C6_TS	.616				
		C7_TS	.657				
		C8_TS	.805				
		C9_TS	.664				
		C10_TS	.740				
		C11_TS	.703				
		C14_TS	.626				
		C15_TS	.758				
		C17_TS	.722				
		C18_TS	.607				
		C22_TS	1.027				
	Computer Anxiety	D2_CA	.635				0.766
		D5_CA	.795				
		D7_CA	.701				
		R_D8	.600				
		D9_CA	.819				
	Employee Engagement	E3_EE	.725				0.884
		E4_EE	.600				
		E5_EE	.772				
		E7_EE	.730				
		E8_EE	.703				
		E9_EE	.925				
		E10_EE	.818				
		E11_EE	.752				
		E12_EE	.670				
		E13_EE	.615				
		E14_EE	.605				
		E15_EE	.624				

**Table 4.4: Results of structural equation modelling**

<b>Model</b>	<b>Chi square(<math>\chi^2</math>)</b>	<b><math>\chi^2/df</math></b>	<b>CFI</b>	<b>GFI</b>	<b>NFI</b>	<b>RMSEA</b>
All items load on respective factors.	1341.199	1.674	.851	.770	.701	.057

#### 4.4.1. Results of hypotheses for a direct effect

**Table 4.5: Results of hypotheses for a direct effect**

Hypotheses	Relationships	Beta value	p-value	Decision
H1	Technology dependence →Employee engagement	.058	.595	Not Supported
H2	Technology dependence →Computer anxiety	-.222	.012	Supported
H3	Pace of change →Employee engagement	.221	.025	Supported
H4	Pace of change →Computer anxiety	-.112	.116	Not Supported

Table 4.5 presents the results of the hypotheses testing for direct effect. As shown in table 4.5, hypothesis 1 was rejected having a relationship of technology dependence and employee engagement as the results shows insignificant values ( $\beta=.058$ , n.s). Hypothesis 2 was supported having a negative relationship of technology dependence and computer anxiety ( $\beta= -.222$ ,  $p<.012$ ). Hypothesis 3 was also supported predicting the positive relationship of pace of change and employee engagement ( $\beta=.221$ ,  $p<.025$ ). Hypothesis 4 was rejected having a negative relationship of pace of change and computer anxiety ( $\beta= -.112$ , n.s.)

Besides the relationship of these hypotheses, other possible relations among variables have also been tested such as the relationship of technology dependence and technostress, having significant but negative relationship ( $\beta= -.330$ ,  $p<.009$ ). The relationship of pace of change and technostress was not insignificant ( $\beta=.052$ , n.s.). The relationship between technostress and employee engagement was significant ( $\beta= -.198$ ,  $p<.062$ ). Moreover, the positive relationship of technostress and computer anxiety ( $\beta=.624$ ,  $p<.001$ ) was highly significant.

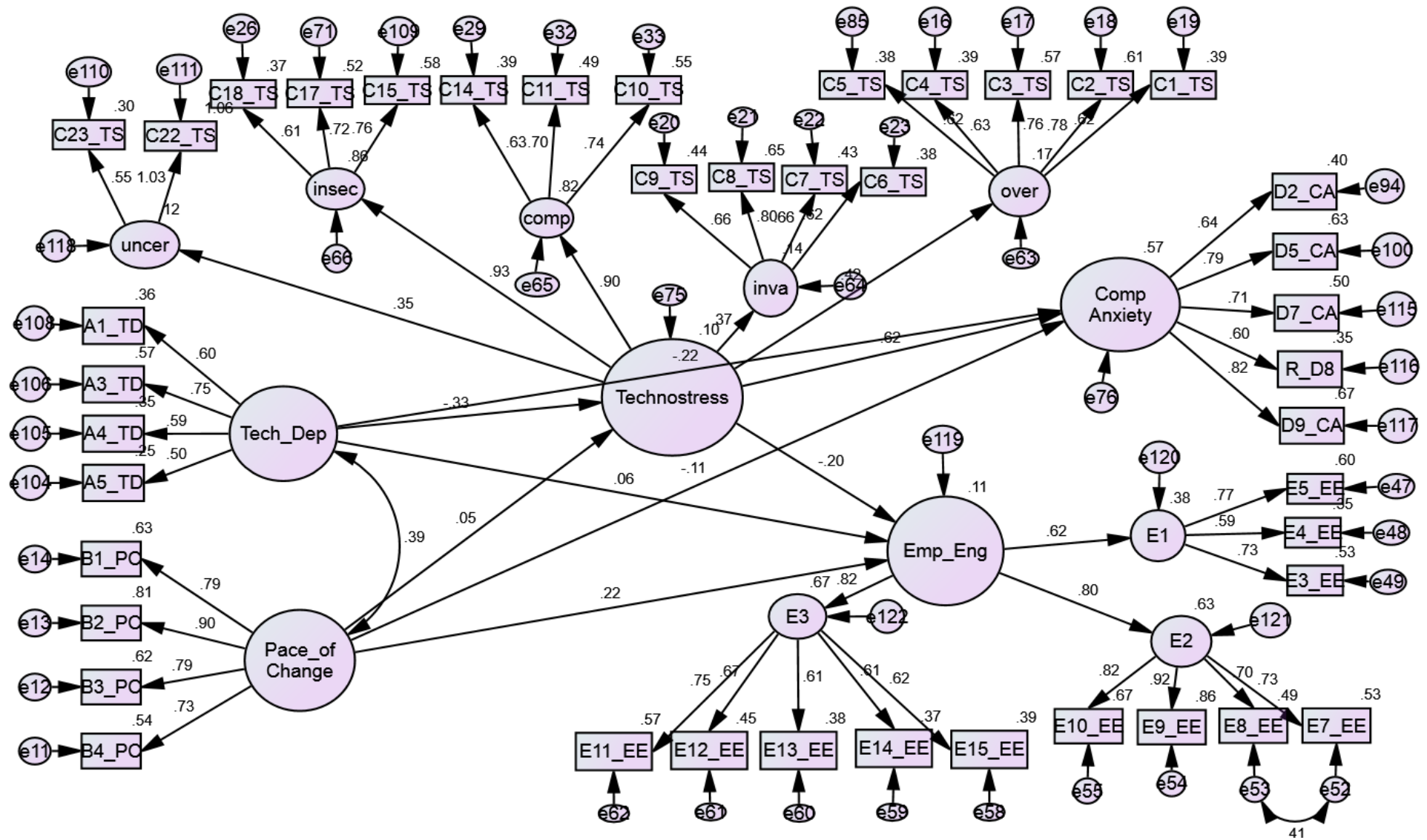
#### 4.4.2. Results of hypotheses for Indirect effect

To test the mediation effects for hypotheses H5, H6, H7, and H8, the Preacher and Hayes (2004; 2008) method of bootstrapping the indirect effect is applied. The bootstrapping analysis for H5 showed that the indirect effect  $\beta= .065$  was significant with a p-value of .043. Also, as indicated by Preacher and Hayes (2008) the indirect effect .065, 90% Boot CI: [LB = .014, UB = .175] does not straddle a 0 in between indicating there is mediation, as shown in Table 4.6. Thus, we can conclude that technostress fully mediated the effect of technology dependence on employee engagement, indicating that H5 was supported. Hypothesis 6 shows the partial mediation having the mediational effect of technostress on technology dependence and computer anxiety  $\beta=-.206$ , 90% Boot CI: [LB= -.368, UB= -.109]. Hypothesis 7 was rejected as there was no mediational effect of technostress on pace of change and employee engagement  $\beta= -.101$ , 90% Boot CI: [LB= -.080, UB= .014]. Hypothesis 8 was also rejected because there was no mediation of technostress on pace of change and computer anxiety  $\beta= .033$ , 90% Boot CI: [LB= -.081, UB=.158]. Fig 4.3 below shows the structural equation modeling having the whole model in the structural diagram along with their factor loadings to check the indirect effect of mediation.

**Table 4.6: Results of hypotheses for indirect**

		<b><u>Beta value</u></b>	<b><u>P-value</u></b>	<b><u>LB</u></b>	<b><u>UB</u></b>	
<b>H5</b>	Technology dependence → Technostress → Employee engagement	.065	.043	.014	.175	Full Mediation
<b>H6</b>	Pace of change → Technostress → Employee engagement	-.010	.331	-.080	.014	No Mediation
<b>H7</b>	Technology dependence → Technostress → Computer anxiety	-.206	.003	-.368	-.109	Partial Mediation
<b>H8</b>	Pace of change → Technostress → Computer anxiety	.033	.635	-.081	.158	No Mediation

effect



**Fig 4.3 Structural Equation Modelling**

## 5. Discussion And Conclusion

The first hypothesis was to find out the impact of technology dependence on employee engagement. This relationship was negatively hypothesized. This hypothesis was not supported by the results. Showing that there is no impact of technology dependence on the employee engagement. According to Karr-Wisniewski, 2010 technology dependence is linked to the performance of software and hardware problems that were reported, in high technology organizations employees did not have substitute option to complete their work. So, the influence of technology was positive, and productivity increased when it was available, on the other hand, productivity was decreased when technology was unreliable. In this study, results show that the employee's performance was not affected in technology-dependent organization because they did not face the problem of software and hardware malfunctioning at their workplace as the software houses are high technology-oriented organizations which upgrade their systems frequently so they do not face the hardware and software problem which can decrease the employee engagement. Although, these organizations are highly technology dependent and their work is performed only through the technology and computerization, but their software maintenance and efficient systems do not become a hurdle in their performance.

The second hypothesis was to find out the impact of technology dependence on computer anxiety and this relationship was positively hypothesized. This hypothesis was supported but with a significantly negative relationship with each other. Showing that higher technology dependence results in lower computer anxiety. In today's world, individuals are becoming more dependent on the computer-related task at their workplace. According to Shu, Tu and Wang, 2011, a professional IT individual may have low computer anxiety because of his or her rich knowledge and experience with the hardware and

software. So, if the individual has complete knowledge about how to use computers and technology and has good working experience with computer and technology then he or she can overcome all the hurdles and difficulties associated with computer usage. These individuals will not get frustrated from computer usage and in this way, they will not face the computer anxiety.

As the result shows that higher technology dependence lowers the computer anxiety of individuals. This might be due to the confidence to use the computer at the workplace. Workers having the higher confidence to work with computer technology to accomplish the desired work decrease their computer anxiety. This confidence is helpful to overcome the complexity of technology and insecurity of job (Shu et al., 2011). Those professionals who have used computers for long period, face the less computer anxiety as they are more familiar with changes, upgradation and evolutions related to IS and they are also more familiar that how organization culturally and historically react to IS related changes. Thus, high computer experience lowers the computer anxiety (Tarafdar et.al., 2011). So, the professionals having more computer confidence face less anxiety as they have a strong belief in their abilities to handle the technology related problems.

Adekunle et al. (2007) found that training and knowledge of information technology create more understanding about technology usage and hence reduce the stress. So, training from organizations is playing a big role to reduce the computer anxiety of individuals and these organizations are providing their employees a high level of training and organizational support to accomplish their task.

The third hypothesis was to explore the negative relationship of pace of change and employee engagement. This relationship was supported by the results but in opposite direction showing that with the increased pace of change in technology

the employee engagement will also increase. The continuous advancement of information technology in the workplace requires employees to continuously use and learn the computer applications. So, if the individuals continuously upgrade their knowledge and attend the training sessions, they can overcome their stress level due to technological change. According to Shu et al., 2011, individuals required to attend training to do their job successfully because of rapidly changing in technology which help them to reduce technostress. So, by training and upgradation of knowledge, individuals can perform their job successfully without affecting their computer anxiety and engagement with their work. As Shah, Hassan & Embi, (2012) and O'Driscoll et al., (2010), believed that young, aged people experience less computer related anxiety as compared to old, aged people. And the sample of this study consists of young employees who are more enthusiastic towards technology use and they do not consider it as a technological stress and they enjoy working with technology that is why technology dependency does not affect their performance and do not decrease their employee engagement.

The fourth hypothesis was to explore the relationship of the pace of change and computer anxiety. This relationship was not supported by the results showing that pace of technological change does not affect the computer anxiety of individuals. It might be possible due to the following reasons. In previous studies, it was found that individuals having high computer self-efficacy, computer usage becomes more frequent among them which decreases their computer anxiety (Compeau & Higgins, 1995; Fagan, Neill, & Wooldridge, 2003). Moreover, positive self-efficacy motivates to learn new skills, on the other hand, negative self-efficacy creates resistance in learning new skills and discourages to working with computers (Zhang & Espinoza, 1998). So, according to the findings of this study, it can be possible that the respondents of this

study have high computer self-efficacy that's why they easily adjust with the changes and developments in computer technology and do not become resistant to technological changes.

The fifth hypothesis was made to check the indirect effect through mediation. The hypothesis was to find out the impact of technology dependence on employee engagement by the mediating role of technostress. The result of this hypothesis was significant and support the hypothesis by full mediation. As the results have found the direct negative relationship between technology dependence and technostress which shows that the increase of technology dependence will decrease the technostress which will further affect the employee engagement. According to O'Driscoll et al. 2010, it is believed that young, aged people experience less computer related anxiety as compared to old aged people. As the sample of this study consists of young employees who are more enthusiastic towards technology use and they do not consider it as a technological stress and they enjoy working with technology that is why technology dependency does not affect their performance and do not decrease their employee engagement.

Existing studies on stress recognizes that stressful environment is not always destructive, and a person can consider the stressful situations as both positive and negative and not just negative (Lazarus 1966, 1995; Le Fevre et al. 2003; and McVicar 2003). The previous literature in this context has suggested the positive behavior towards a stressful situation as eustress, or good stress and the negative behavior of a stressful situation as distress (Le Fevre et al., 2003). In the technology context, eustress and distress have been described as techno eustress and techno distress. According to Tu et al., (2005), techno overload had a positive relationship with the productivity of the employee. So, it is showing that all the employees do not take the technology dependence as a negative factor. As the respondents were employees of software house

where having technology overloaded organizations so technology in this way is making their work more efficient and they are working with more efforts which are increasing their employee engagement at work. According to Califf (2015), nurses appreciate the new technologies development in the hospitals. They like the upgradation and technology dependent software as this technology made their job easier and more efficient without the chances of errors. These upgradation and technology dependent software bring the feelings of EU stressfulness. So, the findings of this study are also consistent with Califf (2015), findings by showing the negative relation of technology dependence with technostress that the employees of software house take the technology dependence as eustress instead of negative stress.

The seventh hypothesis was also the indirect effect of technology dependence on computer anxiety by the mediating role of technostress. This hypothesis showed the partial mediation. According to Shu et al., 2011, a professional IT individual may have low computer anxiety because of his or her rich knowledge and experience with the hardware and software. So, these individuals are overcoming the technology stress due to their vast experience and knowledge about computers. The instructional programmes are also helpful in reducing the computer anxiety (Banks and Havice, 1989; Winkle and Mathews, 1982). Bandura (1989) argues in his study that confidence is an important component in decreasing the anxiety of an individual. He claimed that an individual can overcome the anxiety when he has confidence in his ability to cope with a stressful situation. So, these individuals have confidence in computer and technology usage that's why they do not feel technology stress due to technology dependence in their organization and ultimately, they do not feel computer anxiety.

Transaction theory and Person-Environment fit (P-E fit) theory has been used as a theoretical

grounding. As the "Transaction Theory" of stress explains the concept of stress as a mixture of stimulating conditions and the response of an individual to it. The combination of a demand condition that creates the stress is known as 'stress creators or stressors' and the personal reacts to it having negative outcome known as 'strain'. In this study, the demand conditions are taken as technology characteristics as technology dependence and pace of change. These technology characteristics become a source of stressors which is technostress and individual reaction from these stressors which termed as strain or outcome is taken as employee engagement and computer anxiety. As this study has shown the negative relation between technology dependence and technostress which means that the respondents of this study had fulfilled the environmental demands which do not become a source of stress for them, and they do not feel technostress by technology dependence. P-E fit is described as a balanced relationship among people with their environment (Ayyagari et al. 2011; Edwards 1991). In other words, a high correspondence, or fit, among people with their environment produces positive results, whereas a negative correspondence, or misfit, produces negative ones, such as stress. In this study, pace of change and technology dependence are taken as environment factors. When there is a misfit between individual's knowledge, skills and abilities with the technological environment he/she feels technostress. According to results, we can say that there was a fit between individuals and environment that's why they do not feel technostress by technology dependence. Sixth and Eighth hypotheses were also the indirect effect of the pace of change on employee engagement and computer anxiety by the mediating role of technostress. This relationship showed no mediation for both hypotheses. Besides the importance of new technology introduction, the continuous technology change is important to understand the stress responses of



individuals (Korunka et al., 1997). The continuous advancement of information technology in the workplace requires employees to continuously use and learn the computer applications. So, if the individuals continuously upgrade their knowledge and attend the training sessions, they can overcome their stress level due to technological change. According to Shu et al., 2011, individuals required to attend training to do their job successfully because of rapidly changing in technology which help them to reduce technostress. Adekunle et al. (2007) also found that training and knowledge of information technology create more understanding about technology usage and hence reduce the technostress. A technological change requires the attention of individuals to adopt new skills. Hence, it can be claimed that training and knowledge can overcome the technostress level due to the technological pace of change.

## 6. Limitations & Future directions

This study has made contribution in assessing the impact of technostress on employee engagement and computer anxiety in the software industry. The study has highlighted the negative relationship between the technology dependence and technostress in the software experts as the computer self-efficacy of the software employee is high. Although previous research in IS literature has discussed the issues related to stress in IS professionals, the issues of stress due to ICTs itself has not taken into consideration. This research has identified the factors creating technostress and which in turn predict the strain due to ICTs. This study has made contribution in a way that its finding shows the bright side of technology instead of dark side of technology as the employee engagement and computer anxiety of individuals do not affected by the technology characteristics which are taken as technology dependence and pace of change. As the data were collected from software industry so it shows that employees working in software houses do not

perceive technology as a stress factor. They are trained in a way to handle the technology efficiently and use the technology to improve their work performance instead of becoming frustrated from technology use. They use the technology to increase their work performance as they are interested in upgradation advancement of technology. So, this study has found that employees working in software industry have good IS knowledge and experience through which they overcome the technological stress and do not feel computer anxiety and disengagement at work. Another contribution of the study is that it has highlighted the computer anxiety as a separate concept from the technostress. There are different prospects for future research, firstly extend this study further in the software industry and confirm the interplay between the computer self-efficacy and technological factor and their impact on technostress. Secondly bring more clarity among the interrelated concept related to technostress i.e. technoaddiction, techno anxiety, computerphobia, technophobia, cyberstress, cyberphobia, computer technology hassle. Moreover, a comparison can be made among different sectors to understand that which industry is high in technostress and which industry is low in technostress.

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