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Moderating Effect of Technostress Inhibitors on the Relationship between Technostress Creators and Organisational Commitment

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Abstract

This study aims to examine the moderating effect of technostress inhibitors on the relationship between technostress creators and organisational commitment among academic librarians in the Malaysian public universities. It considers how literacy facilitation, technical support, and involvement facilitation influence the strength of the relationship between technostress creators and organisational commitment. Multiple regression analysis and hierarchical multiple regression analysis were utilised to test the relationship and the moderating effect among the variables. The findings revealed that collectively, technostress creators significantly explained 13.1 percent of the variance in organisational commitment. Techno-overload and techno-uncertainty were found to have significant positive relationship with organisational commitment. As for the moderating effect, both literacy facilitation and involvement facilitation did not act as moderator in the relationship between technostress creators and organisational commitment. Nevertheless, technical support was found to moderate the relationship between techno-overload and organisational commitment. All the technostress inhibitors were, however, found to be significant predictors for organisational commitment. This study demonstrates that a certain amount of stress is essential in enhancing employee's commitment towards organisation. Moreover, it reveals that the existence of literacy facilitation, technical support, and involvement facilitation is crucial in boosting organisational commitment of academic librarians in the Malaysian public universities.

Keywords: Technostress creators, literacy involvement, technical support, involvement facilitation, organisational commitment

Abstrak

Kajian ini bertujuan untuk mengkaji kesan penyederhanaan penghalang teknostres ke atas hubungan antara pencipta teknostres dan komitmen organisasi di kalangan pustakawan akademik di universiti awam Malaysia. Ia mengambil kira bagaimana pemudahan keaksaraan, sokongan teknikal dan pemudahan penglibatan mempengaruhi kekuatan hubungan antara pencipta teknostres dan komitmen organisasi. Analisis regresi berganda dan analisis regresi berganda hirarki digunakan untuk menguji hubungan dan kesan penyederhanaan dikalangan kesemua pembolehubah. Hasil kajian menunjukkan, secara keseluruhan, pencipta teknostres menerangkan secara signifikan sebanyak 13.1 peratus varians dalam komitmen organisasi. Keterlebihan-tekno dan ketidakpastian-tekno didapati mempunyai hubungan yang signifikan yang positif dengan komitmen organisasi. Bagi kesan penyederhanaan, kedua-dua pemudahan keaksaraan dan pemudahan penglibatan tidak bertindak sebagai penyederhana dalam hubungan antara pencipta teknostres dan komitmen organisasi. Namun, sokongan teknikal didapati menyederhanakan hubungan antara pencipta teknostres dan komitmen organisasi. Kesemua pembolehubah penghalang teknostres, walau bagaimanapun, merupakan peramal signifikan untuk komitmen organisasi. Kajian ini menunjukkan bahawa stres dalam kadar tertentu adalah perlu bagi menggalakkan komitmen terhadap organisasi. Tambahan pula, ia menunjukkan bahawa kehadiran pemudahan keaksaraan, sokongan teknikal dan pemudahan penglibatan adalah penting dalam meningkatkan komitmen organisasi pustakawan akademik di universiti awam Malaysia.

Keywords: Pencipta teknostres, pemudahan keaksaraan, sokongan teknikal, pemudahan penglibatan, komitmen organisasi

1.0 INTRODUCTION

It is every organization's dream to have committed employees, since they are less likely to resign or be absent, and are more willing to share and make sacrifices for their organisations (Greenberg, 2005). Committed employees were also found to have higher loyalty and lower work stress (Muthuveloo and Rose, 2005), higher performance (Boshoff and Mels, 1994), and are more willing to accept organisational change (Vakola and Nikolau, 2005).

Nonetheless, various factors have been found to influence employees' organizational commitment and one factor that has been under considerable study is work stress. Employees with high level of stress were found to have lower level of organisational commitment (Taris *et al*., 2001; Glazer and Beehr, 2005; Ho *et al*., 2009; Viljoen and Rothmann, 2009). Presently, the current trend of technological revolution is one of the main sources for workplace stress. The feeling of stress caused by technology is known as technostress (Brod, 1984; Davis-Millis, 1998; Kupersmith, 2006).

Due to technological advancement in the organisation, the library is among the organisations that are affected with technostress. Though technology in the library has helped increase the effectiveness of information management, it has also caused an enormous amount of strain on librarians (Bichteler, 1987; Davis-Millis, 1998; Kupersmith, 2006). In general, librarians welcome automation and show positive attitudes towards technological change in the libraries; at the same time, librarians do expressed concern with regards to the negative reprecussions brought about by the technological change (Poole and Denny, 2001; Al-Qallaf, 2006). According to Van Fleet and Wallace (2003), the introduction of technology in the library has caused some librarians to suffer loss of personal identity, have resource challenge, and feel more vulnerable. Moreover, a survey by Kupersmith (2006) revealed that a majority of library staff felt that their level of technostress has increased over the years. In fact, most of them regarded the computer-related stress they experienced are causing serious threat.

Recent research also show that technostress is still a growing phenomenon among the librarians. According to Mahalakshmi and Sornam (2011), one of the factors that significantly influence technostress level experienced by the librarians is the ergonomic factor. Though Asghar (2012) agreed that inappropriate infrastructure do cause technostress among academic librarians, she also outlined that fear of virus, feeling that privacy is being invaded and delicateness of storage media are among other sources of technostress in the libraries. Ahmad (2012) also found that academic librarians in the Malaysian public universities do experience technostress in their workplace. Specifically, they were found to experience high level of uncertainty and feeling of work overloaded due to the usage of technology. In Nigeria, technostress was found to be one of the determinants of job burnout among university librarians (Olalude, 2013).

According to Majchrzak and Cotton (1988), technological change that resulted in role ambiguity and role overload would lead to negative attitude change. Consequently, employees' commitment towards their organisations might be also affected. Tu *et al*. (2001) discovered that role ambiguity and role conflict have direct and negative influence on organisational commitment among information systems managers. In addition, Ragu-Nathan *et al*. (2008) also found that technostress creators decrease job satisfaction which further caused low organisational commitment.

Even though technostress is inevitable in this era of technological revolution, this problem may be alleviated by sufficient training, adequate technical support, and participatory involvement (Poole and Denny, 2001; Tu *et al*., 2005, Al-Qallaf, 2006; Sahin and Coklar, 2009). According to Ragu-Nathan *et al*. (2008), factors that may help lower technostress levels are known as technostress inhibitors. They claimed that the negative outcomes resulted from the application of information technology can be reduced if the organisation provides organisational and technical support, training, and guidance. Involving technology users in the planning and implementation phases of the system is also another way to ease the negative effect of technostress (Brod, 1984). Empirical evidences have also showed that higher level of organisational commitment is attributed to training (Benson and Dundis, 2003; Kamarul and Raida, 2003; Barkhuizen and Rothmann, 2008), open communication and knowledge sharing (Meyer and Allen, 1997; Zain *et al*., 2009), and support from organisation (Eisenberger *et al*., 2001; Meyer *et al.*, 2002; Wang and Shu, 2008; Noblet *et al.*, 2009; Pannacio and Vandenberghe, 2009). Since technostress inhibitors may minimise the impact of technostress and may enhance organisational commitment, a quasi moderating effect of technostress inhibitors on the relationship between technotress creators and organisational commitment is expected in this study.

2.0 LITERATURE REVIEW

2.1 Technology and Workplace Stress

Ragu-Nathan *et al.* (2008) believed that the characteristics of the information communication technologies are the source of stress for technology end-users. A study by Rosen and Weil (2000) revealed that over a period of three years, a vast majority (80%) of clerical workers, managers, and executives reported that technology has brought additional stress to their lives. The trend of work pressure in Europe in the period of 1996 to 2001 also showed that the level of stress caused by technology kept increasing over the years (Galie, 2005). Systems problem errors, steep learning curve, requirement for more work, and rapid change in technology have been cited as some of the ways how technology has made their work more stressful.

It is also postulated that the introduction of new technology will lead to the feeling of job insecurity which will in turn result in higher degree of anxiety and stress (Veitez *et al*., 2001). Moreover, Rafter (1998) found that, as a result of not welcoming technology in the work place, employees not only suffer from insomnia and losing train of thoughts, but had also shown a decline in productivity. According to Tarafdar *et al*. (2011), the existence of technostress imposed negative effects on technology users, which in turn have an adverse effect on productivity and job satisfaction.

Other empirical evidences also revealed that technostress is higher among professionals who use technology in accomplishing their tasks (Schuldt & Totten, 2008; Agbu and Simeon, 2011; Walz, 2012). More specifically, Ayyagari *et al.* (2011) found that intrusive technology characteristics, which are presenteeism and annonymity, are the dominant predictors of workplace stress. As a result of using technology, most of the respondents believed they suffer from work overload and role ambiguity, the two most dominant stressors revealed in their study.

2.2 Technostress Creators

The impact of technology on workplace stress has led to a new type of stress coined as "technostress" (Brod, 1984). It is described as a modern disease of adaptation which resulted from a person's inability to cope with new computer technology in a healthy manner. Weil and Rosen (1997) looked at technostress as a negative psychological, behavioural, and physiological impact directly or indirectly caused by technology, while Arnetz and Wiholm (1997) viewed technostress as the physiological arousal and mental state observed in some people who rely greatly on computers in their work.

Raitoharju (2005) discovered six ways how information technology created stress in the workplace. These include the change caused by the implementation of technology, pressure for more effective performance, increase in the amount of information (information overload), frequent technological changes, increase demand on technical skills, and reduce social support. Accordingly, Tarafdar *et al*. (2007) identified five components that create technostress (technostress creators) which include: (a) Techno-overload: A situation where technology users are forced to work faster and longer; (b) Techno-invasion: A situation where technology users feel they are constantly connected with work-related affairs; (c) Techno-complexity: A situation where technology users feel their skills are inadequate due to the complexity of the technology; (d) Techno-insecurity: A situation where technology users feel they will lose their job or being replaced by the new technology or by someone who have better technological skills; and (e) Techno-uncertainty: A situation where technology users feel uncertain and unsettled as technology is continuously changing.

According to Isiakpona and Adebayu (2011), slow network is the main cause of technostress among librarians in Covenant University, followed by the change in the library's software and faulty equipment. Nevertheless, physical technical problems were only some of the causes of technostress. Al-Qallaf (2006) revealed that among the causes of technostress include lack of technical support, lack of professional staff, inadequate equipment, insufficient involvement in the decision making process, slow network, technological breakdown, growing user demand and information overload. Nevertheless, too little formal training was ranked as the number one cause of technostress. In fact, several other studies also claimed that insufficient training was the main reason of technology induced stress (Brod, 1984; Bichteler, 1987; Kupersmith, 1998; Al-Fudail and Mellar, 2007).

In addition, common organizational factors found by Clute (1998) to be sources of technostress include lack of participatory management styles, lack of communication, and lack of involvement. According to Kupersmith (1992), library staff experienced technostress when they were not consulted on decisions for automated systems. Furthermore, Poole and Denny (2001) found that although their respondents were generally more positive towards learning and using high-tech automation, they still felt left out in the decision-making process during acquisition and incorporation of technology in their workplace.

2.3 Technostress Inhibitors

Although technostress is inevitable due to the characteristics of technology, Ragu-Nathan *et al.* (2008) proposed that the availability of training, technical support, technology users' participation in decision making pertaining to the implementation of the technology will help reduce the effects of technostress. Termed as technostress inhibitors, they labelled these variables as literacy facilitation, technical support provision, and involvement facilitation.

Adekunle *et al.* (2007) found that training and knowledge of information technology allow employees to have better understanding regarding the technology used, and thus reduce technostress. In fact, Tu *et al.* (2005) and Sahin and Coklar (2009) both claimed that high levels of computer literacy resulted in lower levels of technostress. Furthermore, Burke (2008) found that nurse educators who believed that technological training prepared them to incorporate technology in their classrooms had lower level of technostress. Owajeme and Pereware (2011) also argued that the problem of technostress can be solved by providing staff with regular training on ICT.

Al-Qallaf (2006) found that insufficient technical support was the second cause of higher work stress, after inadequate training. He suggested that having timely technical support and collaboration with technical staff would help improve the working environment. Accordingly, findings of Burke (2008) indicated that level of technostress tended to be lower when individuals perceived there was administrative support in their organisation.

Most technostressed employees felt angry when forced to use technology without being consulted (Kupersmith, 1992; Poole and Denny, 2001). The existence of involvement facilitation which allows users to participate during the planning and implementation process of the technology might serve to overcome this problem. By being involved, technology users would be kept informed about the why, how, and the effects of introducing and implementing the new technology in their workplace.

2.4 Workplace Stress And Organisational Commitment

Previous studies have given considerable attention to the relationship between job stress and organisational commitment (Mathieu and Zajac, 1990; Boshoff and Mels, 1994; Tu *et al.*, 2001; Lopopolo, 2002; Meyer *et al.*, 2002; Lee and Jamil, 2003; Vakola and Nikolaou, 2005; Dale and Fox, 2008; Omolara, 2008; Ho *et al*., 2009; Viljoen and Rothmann, 2009). Generally, workplace stress was found to negatively influence organisational commitment. For example Yaghoubi *et al*.'s (2009) found higher work stress has negative effect on nursing managers' organisational commitment in educational hospitals of Isfahan University of Medical Sciences. Furthermore, an investigation on the role of work stress in predicting organisational commitment in railway employees also revealed an inverse relationship between work stress and affective, normative, and overall commitment (Tiwari and Mishra, 2008). Addae and Parboteeah (2008) also found that role conflict and role ambiguity, the two main contributors to work stress, were negatively correlated with affective and normative commitment among public sector employees in St. Lucia.

As far as technostress is concerned, Ahmad *et al*. (2010) hypothesised that there is inverse relationship between technostress creators and organisational commitment. This is based on the concept of socio-technical systems which argue that there should be a joint optimisation of both technical and social factors in the organisation, so that any technical implementation will actually lead to improve quality of working life. In other words, if the implementation of technology creates stress, it will result in poor quality of working life such as increase turnover, higher absenteeism, and lower commitment. As a matter of fact, Tarafdar (2011) did find that among the impact of technostress among professionals are reduced commitment towards organisational goals and values. As a

result, employees may not be able to function well and will become a costly burden to their organisations.

In addition, a study conducted by Ragu-Nathan *et al.* (2008) among information and communication technologies (ICT) end users also revealed that the existence of technostress creators resulted in a decline in job satisfaction among the end users of ICT. Consequently, the decline in job satisfaction led to a decrease in organisational commitment. Nonetheless, Umar *et al*. (2013), who attempted to examine the relationship between organisational commitment, stressors and technostress among employees in Nigerian small scale entreprises, failed to find any significant relationship between stress and technostress constructs with organisational commitment. Small sample size was, however, attributed to the outcome of this study.

Nevertheless, Kofoworola and Alayode (2012) looked at this situation from a different point of view. They believed that stress is actually a result of too much commitment in the work such as working overtime or taking on several task simultaneously. Thus, they suggested that employees prioritise their work to alleviate stress.

2.5 Effect Of Training, Organisational Support, And Involvement On Organisational Commitment

How much an employee is committed to his organisation is influenced by several factors. Barkhuizen and Rothmann's (2008) study confirmed that employees' commitment will decline if they experienced stress due to lack of job autonomy, had insufficient training, equipment, and resources, and if they perceived their jobs as stressful. According to Benson and Dundis (2003), employees become more committed to their organisations when they feel their organisations are willing to spend time, resources, and money to ensure that they are equipped with the relevant skills required.

Significant positive correlations between training variables and overall organisational commitment, affective commitment, continuance commitment, and normative commitment were found by Kamarul and Raida (2003). Additionally, Stup (2006) reported that training is one of the human resource management practices that are able to predict organisational commitment. He found a significant positive correlation between the level of off-the job training with affective commitment whilst adequacy of initial and continuing training, and satisfaction with training were all positively and significantly correlated with both affective and normative commitment.

The claim that organisational support has a positive influence on organisational commitment is evidenced in several studies (Eisenberger *et al*., 2001; Meyer *et al*., 2002; Stinglhamber and Vandenberghe, 2003; Jaramillo *et al*., 2005; Wang and Shu, 2008; Noblet *et al*., 2009). Meyer *et al*. (2002) discovered that perceived organisational support has the strongest positive correlation with affective commitment compared to other work experience variables while Pannacio and Vandenberghe (2009) found that perceived organisational support fostered affective commitment and increase well-being. It is argued that employees felt obligated to assist their organisations in achieving their objectives and become more affectively committed to their organisations when they perceived their organisations are supporting them (Rhoades and Eisenberger, 2002).

Commitment to the organisation is also claimed to be stronger when employees are allowed to participate in decision making and have the power to perform their task (DeCotiis and Summers, 1987; Meyers and Allen, 1997; Stup, 2006). According to Mathieu and Zajac (1990), an increase in autonomy and job involvement would foster organisational commitment. Nevertheless, Meyer *et al*. (2002) and Karim and Noor (2007) discovered that job involvement had stronger correlation with affective commitment compared to continuance and normative commitment. Consequently, Fornes *et al.* (2008) proposed that work environment that permits employees to be independent and have freedom to schedule their own work and determine procedures would enjoy better individual and organisational commitment.

2.6 Hypotheses

Based on previous studies, it is clearly shown that training, communication, support and involvement, are not only beneficial in reducing the problem of technostress, but are also important in promoting higher level of organisational commitment. Therefore, these factors are posited to have moderating effect on the relationship between technostress creators and organisational commitment. Thus, this study mainly hypothesised that:

H1: The relationship between technostress creators and organisational commitment is stronger when literacy facilitation is high compared to when literacy facilitation is low.
H2: The relationship between technostress creators and organisational commitment is stronger when technical support is high compared to when technical support is low.
H3: The relationship between technostress creators and organisational commitment is stronger when involvement facilitation is high compared to when involvement facilitation is low.

3.0 METHODOLOGY

3.1 Sampling Procedure

The respondents for this study were academic librarians from Malaysian public higher learning institutions. Non-probability sampling was employed based on universities. Only libraries in public higher learning institutions that have been set up more than 10 years were chosen. This is because these libraries are more established, have higher involvement in library automation and have gone through several processes of changes during the implementation of the technology. In this study, librarian was defined according to the librarian service scheme classified by the Jabatan Perkhidmatan Awam Malaysia. Thus, all library personnels from Gred S41 to Gred S54 were included in the sampling frame (Skim Perkhidmatan Pustakawan, 2006). A sampling frame was obtained from the representative of each particular library. Table 1 lists all the the libraries in the chosen Malaysian public higher learning institutions and the number of academic librarians in each library. Since the target population was small and known, the whole target population, which was 282, became the respondents for this study.

Table 1 Number of librarians in respective libraries

	Library	Number
1.	Perpustakaan Sultanah Zanariah, Universiti Teknologi Malaysia	33
2.	Library of International Islamic University Malaysia	35
3.	Perpustakaan Hamzah Sendut, Universiti Sains Malaysia	28
4.	Perpustakaan University Malaya	29

	Library	Number
5.	Perpustakaan Sultanah Bahiyah, Universiti Utara Malaysia	20
6.	Perpustakaan Sultan Abdul Samad, Universiti Putra Malaysia	44
7.	Perpustakaan UKM, Universiti Kebangsaan Malaysia	35
8.	Perpustakaan Universiti Teknologi MARA	31
9.	Perpustakaan Universiti Malaysia Sarawak	13
10.	Perpustakaan Universiti Malaysia Sabah	14
	Total	282

3.2 Research Instrument

This study utilised self-administered survey method. A set of questionnaire, which was divided into two parts, was used as the research instrument. The first part was designed to obtain the respondent's demographic information, which includes gender, age, marital status, highest education completed, length of tenure, department and subunit working in, present job title, and reactions towards technology in general. The second part of the questionnaire was broken down into three sections. In this part, respondents were asked to indicate the extent of their agreement or disagreement to each statement based on a seven-point numerical scale ranging from 1 ("Strongly Disagree") to 7 ("Strongly Agree"). The items in these sections were adapted from existing questionnaires that have been tested for their validity and reliability. To ensure the content validity of these measurements, experts' opinions were sought. A set of questionnaire has been distributed to three academicians whose backgrounds are in the field of management and organisational behaviour and to two librarians. Based on their feedback, some slight modifications were made to the original questionnaires such as restructuring some sentences to make it clearer and substituting the word "workplace" with "library". Nevertheless, since the original questionnaires used seven-point numerical scale, this format was retained in this study. In addition, the original factors of technostress creators and technostress inhibitors were also maintained. For the purpose of this study, the respondents were asked to refer the term technology used throughout the questionnaire to the library automation system applied in their day to day job.

The first section was designed to measure the respondents' level of technostress. Technostress Creators scale developed by Tarafdar *et al*. (2007) was adapted since the constructs used to measure technostress in this instrument was found to resemble closely to stressors used in measuring occupational stress in general (Latack, 1986; Kahn and Byosiere, 1995; Yousef, 2002). This scale comprised of 23 items which were grouped into five factors creating technostress, namely techno-overload, techno-invasion, techno-uncertainty, techno-complexity, and techno-insecurity. The Cronbach's alpha values show that all the technostress creators factors in this study are highly reliable, ranging from 0.84 to 0.91, which are greater than the minimum recommended value of 0.70 (Nunnally, 1978; Hair *et al.*, 1998).

The second section measured the existence of technostress inhibitors in the workplace by adapting the scale developed by Ragu-Nathan *et al*. (2008). This scale contained 14 items which represent three types of technostress inhibitors which are literacy facilitation, involvement facilitation, and technical support. The Cronbach's Alpha values for these variables in this study ranged from 0.79 to 0.93, which are all above the minimum recommended value of 0.70 (Nunnally, 1978; Hair *et al.*, 1998).

The last section was designed to measure the respondent's level of organisational commitment. For the purpose of this study, Meyer and Allen's (1997) Organisational Commitment scale was adapted. A study by Karim and Noor (2006) revealed that Meyer and Allen's (1997) organisational commitment measure is applicable to Malaysian academic librarians. This scale consisted of 18 items measuring affective commitment, continuance commitment, and normative commitment. All the three variables in this study show high reliability measurement (Cronbach's alpha values ranging from 0.82 to 0.92) which exceed the recommended value of 0.70 (Nunnally, 1978; Hair *et al.*, 1998).

3.3 Data Collection Procedure

As many as 282 questionnaires had been distributed to the whole target population. Before the questionnaires were disseminated, the help of a contact person from each library involved in the study was sought. In order to ease the distribution process, a set of questionnaire accompanied by a cover letter which contained an introduction to the researcher, explanation of the study's purpose and aim, and instruction on how to return the questionnaire was put in an envelope addressed to individual librarian in the respective libraries. These questionnaires were then mailed to the relevant contact person, who then helped disseminated the questionnaires to the respective librarians.

Each respondent was required to return the completed questionnaire to his/her library's contact person. The contact person was requested to return all the completed questionnaires using the pre-paid envelope supplied by the researcher within two weeks from the time the questionnaires were distributed. A follow-up call was made to the contact persons two weeks after the questionnaires were sent to them to inquire the status of the data collection. The whole data collection process was completed within five weeks.

4.0 RESULTS

Out of 282 sets of questionnaire distributed, 203 responses were received, a return rate of 72.0 percent. However, three sets of questionnaire were found to be incomplete, thus the analysis was conducted based on 200 responses. Before testing the moderating effect of technostress inhibitors on the relationship between technostress creators and organisational commitment, the relationship between technostress creators and organisational commitment had to be measured. This was done by employing multiple regressions analysis, a statistical technique used to analyse the relationship between a single dependent variable and several independent variables. By using multiple regression analysis, it is possible to estimate how much a particular set of independent variables explains the variance in a dependent variable (Hair *et al*., 1998). In this study, organizational commitment was used as a single dependent variable. The sum of all the three constructs of organisational commitment i.e affective commitment, continuance commitment, and normative commitment was used to get the total organisational commitment score. It was found that all the five technostress creators jointly explained 13.1 percent (R^2=0.131) of the variance in organisational commitment. Although the R^2 value seemed to be very low, in social science setting, R^2 of 13.1 percent is considered respectable, as it qualified as a medium effect based on Cohen guidelines (qouted

from Rosenthal and Rosnow, 2008). In addition, the F value (5.826) with a significant value of 0.000 suggested that the regression model for this study is statistically significant (refer Table 2).

Table 2 Relationship between technostress creators and organisational commitment (model summary)

R	R^2	Adjusted R^2	Std. Error of the Estimate	F	df1	df2	Sig.
0.361	0.131	0.108	0.769	5.826	5	194	0.000*

* Significant at p<0.05

Nevertheless, from Table 3, it is clear that only techno-overload and techno-uncertainty were making a statistically significant unique contribution to the equation (p<0.05). Based on the beta coefficient value, it was discovered that techno-uncertainty (B=0.295) made the strongest unique contribution in explaining the variance in organisational commitment. The beta value for techno-overload was slightly lower (0.173), indicating a lesser contribution.

Table 3 Relationship between technostress creators and organisational commitment (coefficients)

		Unstandardised Coefficients		Standardised Coeffiecients		
Model		B	Std. Error	B	**t**	**Sig.**
1	(Constant)	3.623	0.351		10.335	0.000*
	Techno-overload	0.115	0.051	0.173	2.261	0.025*
	Techno-invasion	-0.087	0.049	-0.153	-1.801	0.073
	Techno-uncertainty	0.258	0.061	0.295	4.248	0.000*
	Techno-complexity	-0.027	0.054	-0.041	-0.495	0.621
	Techno-insecurity	0.034	0.059	0.049	0.584	0.560

a. Dependent variable: Organisational Commitment
* Significant at p<0.05

To examine the moderating effect of technostress inhibitors on the relationship between technostress creators and organisational commitment, hierarchical multiple regression analysis was applied. This analysis tests three different models with the aim of determining the presence of moderating effect to the studied relationship. A moderating effect is said to occur when a second independent variable (the moderator variable) changes the form of relationship (strength and direction) between the first independent variable and the dependent variable (Hair *et al*., 1998). There are three equations to be compared in order to identify the presence of moderating effect to the relationship of independent and dependent variables, as represented below:

Equation 1 (Original Model) : $Y = i_1+b_1X+e_1$
Equation 2 (Limited Model) : $Y = i_2+b_2X+c_2Z+e_2$
Equation 3 (Full Model) : $Y = i_3+b_3X+c_3Z+d_1XZ+e_3$

Where:
- Y = dependent variable
- X = independent variable
- Z = moderator
- XZ = the multiplier of independent variable with moderator
- i = constant value for independent variable
- b, c, d = coefficients for independent variable and moderator
- e = regression residual

According to Hair *et* al. (1998), if the changes in R^2 are statistically significant for all three equations, then a significant moderation effect is presence. However, if they are not significant or only one or two equations are significant, the moderator will only act as a predictor to a dependent variable. Based on the result of multiple regression analysis, only techno-overload and techno-uncertainty was found to have significant unique contribution to the variance in organisational commitment (equation 1). Therefore, the moderating effect of technostress inhibitors in this study was examined only on the relationship between techno-overload and organisational commitment and on the relationship between techno-uncertainty and organisational commitment. Thus, this study specifically hypothesised the following:

H1a: The relationship between techno-overload and organisational commitment is stronger when literacy facilitation is high compared to when literacy facilitation is low.

H1b: The relationship between techno-uncertainty and organisational commitment is stronger when literacy facilitation is high compared to when literacy facilitation is low.

H2a: The relationship between techno-overload and organisational commitment is stronger when technical support is high compared to when technical support is low.

H2b: The relationship between techno-uncertainty and organisational commitment is stronger when technical support is high compared to when technical support is low.

H3a: The relationship between techno-overload and organisational commitment is stronger when involvement facilitation is high compared to when involvement facilitation is low.

H3b: The relationship between techno-uncertainty and organisational commitment is stronger when involvement facilitation is high compared to when involvement facilitation is low.

The hierarchical multiple regression analysis models for this study are as shown in Table 4.

Table 4 Hierarchical multiple regression analysis models

a) Moderating effect of literacy facilitation on the relationship between techno-overload and organisational commitment	Equation 1: $OC = a + b_1TO + e$ Equation 2: $OC = a + b_1TO + b_2LF + e$ Equation 3: $OC = a + b_1TO + b_2LF + b_3TOLF + e$
b) Moderating effect of literacy facilitation on the relationship between techno-uncertainty and organisational commitment	Equation 1: $OC = a + b_1TU + e$ Equation 2: $OC = a + b_1TU + b_2LF + e$ Equation 3: $OC = a + b_1TU + b_2LF + b_3TULF + e$
c) Moderating effect of technical support on the relationship between techno-overload and organisational commitment	Equation 1: $OC = a + b_1TO + e$ Equation 2: $OC = a + b_1TO + b_2TS + e$ Equation 3: $OC = a + b_1TO + b_2TS + b_3TOTS + e$
d) Moderating effect of technical support on the relationship between techno-uncertainty and organisational commitment	Equation 1: $OC = a + b_1TU + e$ Equation 2: $OC = a + b_1TU + b_2TS + e$ Equation 3: $OC = a + b_1TU + b_2TS + b_3TUTS + e$
e) Moderating effect of involvement facilitation on the relationship between techno-overload and organisational commitment	Equation 1: $OC = a + b_1TO + e$ Equation 2: $OC = a + b_1TO + b_2IF + e$ Equation 3: $OC = a + b_1TO + b_2IF + b_3TOIF + e$
f) Moderating effect of involvement facilitation on the relationship between techno-uncertainty and organisational commitment	Equation 1: $OC = a + b_1TU + e$ Equation 2: $OC = a + b_1TU + b_2IF + e$ Equation 3: $OC = a + b_1TU + b_2IF + b_3TUIF + e$

Where:
OC = Organizational commitment; TO = Techno-overload; TU = Techno-uncertainty;
LF = Literacy facilitation; TS = Technical support; IF = Involvement facilitation;
TOLF = Techno-overload x Literacy facilitation; TULF = Techno-uncertainty x Literacy facilitation
TOTS = Techno-overload x Technical support; TUTS = Techno-uncertainty x Technical support
TOIF = Techno-overload x Involvement facilitation;
TUIF = Techno-uncertainty x Involvement facilitation

Table 5 revealed that techno-overload contributed 3.6 percent of the variance in organisational commitment, and was a significant predictor (R^2=0.036, $p<0.05$). With techno-overload still in the equation, literacy facilitation was a significant predictor and significantly explained an additional 17.5 percent of the variance in organisational commitment (R^2=0.211, $p<0.05$). Nonetheless, with both techno-overload and literacy facilitation in the equation, the interaction effect of techno-overload and literacy facilitation did not show any additional contribution to the variance in organisational commitment (R^2=0.211, p=0.730). Thus, hypothesis H1a is rejected. This indicates that literacy facilitation did not significantly moderate the relationship between techno-overload and organisational commitment.

Table 5 Moderating effect of literacy facilitation on the relationship between techno-overload and organisational commitment

	R^2	R^2 Change	F Change	Sig. F Change
Techno-overload (TO)	0.036	0.036	7.291	0.008*
Literacy Facilitation (LF)	0.211	0.175	43.776	0.000*
Interaction effect of TO and LF (TOLF)	0.211	0.000	0.120	0.730

a. Dependent variable: Organisational Commitment
* Significant at $p<0.05$

From Table 6, it can be seen that techno-uncertainty was a significant predictor of organisational commitment ($p<0.05$). In addition, the contribution of techno-uncertainty to the variance in organisational commitment was 9.5 percent ($R^2=0.095$). With techno-uncertainty still in the equation, literacy facilitation contributed an additional 13.6 percent of the variance in organisational commitment, and was a significant predictor ($R^2=0.231$, $p<0.05$). Nevertheless, when the interaction effect of techno-uncertainty and literacy facilitation was introduced to the equation, with techno-uncertainty and literacy facilitation still in the equation, only 0.1 percent increase was detected in the variance of organisational commitment ($p>0.05$). Thus, hypothesis H1b is not accepted. Although literacy facilitation significantly predicted organisational commitment, it did not act as a moderator in the relationship between techno-uncertainty and organisational commitment.

Table 6 Moderating effect of literacy facilitation on the relationship between techno-uncertainty and organisational commitment

	R^2	R^2 Change	F Change	Sig. F Change
Techno-uncertainty (TU)	0.095	0.095	20.808	0.000*
Literacy Facilitation (LF)	0.231	0.136	34.845	0.000*
Interaction effect of TU and LF (TULF)	0.232	0.001	0.282	0.596

a. Dependent variable: Organisational Commitment
* Significant at $p<0.05$

The results presented in Table 7 show that techno-overload significantly explained 3.6 percent of the variance in organisational commitment ($p=0.008$). With techno-overload in the equation, technical support significantly contributed an additional 26.6 percent of the variance in organisational commitment ($R^2=0.302$, $p=0.000$). When the interaction effect of techno-overload and technical support was introduced into the equation, with both techno-overload and technical support still in the equation, the whole model significantly explained 32.2 percent of the variance in organisational commitment ($p=0.018$). Hence, hypothesis H2a is accepted. This illustrates that technical support was not only a significant predictor for organisational commitment but also a significant moderator in the relationship between techno-overload and organisational commitment.

Table 7 Moderating effect of technical support on the relationship between techno-overload and organisational commitment

	R^2	R^2 Change	F Change	Sig. F Change
Techno-overload (TO)	0.036	0.036	7.291	0.008*
Technical Support (TS)	0.302	0.266	75.162	0.000*
Interaction effect of TO and TS (TOTS)	0.322	0.020	5.705	0.018*

a. Dependent variable: Organisational Commitment
* Significant at $p<0.05$

Descriptive statistic recommended by Jose (2008) was adopted to describe graphically how technical support interacts with techno-overload and organisational commitment. Techno-overload and organisational commitment were categorised into three groups that are low, medium and high according to the mean score of technical support. The high group is set to 1 standard deviation above the mean and low group is set to 1 standard deviation below the mean. Table 8 displays the mean score of techno-overload on organisational commitment according to the different levels of technical support.

Table 8 Mean score of techno-overload on organisational commitment according to different level of technical support

		Techno-overload		
		Low	**Medium**	**High**
Organisational Commitment	**High**	5.8	5.79	5.78
	Medium	5.71	5.71	5.71
	Low	5.62	5.63	5.63

Figure 1 further depicts the moderating effect of technical support on the relationship between techno-overload and organisational commitment. The figure demonstrates that when there is high technical support, in situation where techno-overload is high, organisational commitment is higher compared to when there is low technical support. Hence, it can be concluded that the relationship between techno-overload and organisational commitment is stronger when there is high technical support compared to when there is low technical support.

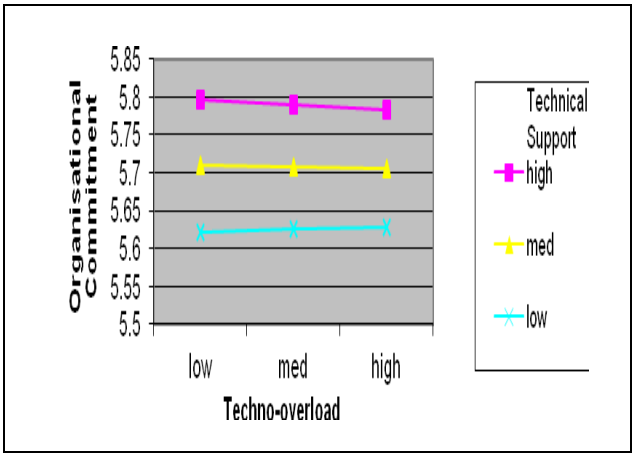

Figure 1 Graph on the moderating effect of technical support on the relationship between techno-overload and organisational commitment

As seen from Table 9, techno-uncertainty contributed as much as 9.5 percent of the variance in organisational commitment (R^2=0.95) and significantly predict organisational commitment (p<0.05). With techno-uncertainty in the equation, the additional factor of technical support significantly increased the variance in the organisational commitment by 30.0 percent (R^2=0.300, p=0.000). However, with both techno-uncertainty and technical support in the equation, the interaction effect of techno-uncertainty and technical support explained an additional of just 0.3 percent of the variance in affective commitment. Therefore, hypothesis H2b is not supported. This means that, although technical support was a significant predictor for organisational commitment, it was not a significant moderator in the relationship between techno-uncertainty and organisational commitment.

Table 9 Moderating effect of technical support on the relationship between techno-uncertainty and organisational commitment

	R^2	R^2 Change	F Change	Sig. F Change
Techno-uncertainty (TU)	0.095	0.095	20.808	0.000*
Technical Support (TS)	0.300	0.205	57.770	0.000*
Interaction effect of TU and TS (TUTS)	0.303	0.003	0.666	0.415

a. Dependent variable: Organisational Commitment
* Significant at p<0.05

The results displayed in Table 10 show that techno-overload was a significant predictor for organisational commitment (p<0.05) and contributed 3.6 percent of the variance in organisational commitment. With techno-overload in the equation, the additional factor of involvement facilitation significantly contributed an additional 17.5 percent of the variance in organisational commitment (R^2=0.211, p=0.000). When the interaction effect of techno-overload and involvement facilitation was added into the equation, however, no additional contribution was made to the variance in organisational commitment (R^2=0.211, p=0.709). Hence, hypothesis H3a is rejected. It is concluded that involvement facilitation was not a significant moderator in the relationship between techno-overload and organisational commitment.

Table 10 Moderating effect of involvement facilitation on the relationship between techno-overload and organisational commitment

	R^2	R^2 Change	F Change	Sig. F Change
Techno-overload (TO)	0.036	0.036	7.291	0.008*
Involvement Facilitation (IF)	0.211	0.175	43.783	0.000*
Interaction effect of TO and IF (TOIF)	0.211	0.000	0.140	0.709

a. Dependent variable: Organisational Commitment
* Significant at p<0.05

Results of the study reveal that techno-uncertainty contributed 9.5 percent of the variance in organisational commitment and was a significant predictor (p<0.05) (see Table 11). When involvement facilitation was added into the equation, the variable significantly contributed an additional 22.2 percent of the variance in organisational commitment (p=0.000). A very small increase in the R^2 value (0.2%), however, was detected when the interaction effect of techno-uncertainty and involvement facilitation was introduced into the equation. Thus, hypothesis H3b is not accepted. It is concluded that, although involvement facilitation significantly predict organisational commitment, it was not a significant moderator in the relationship between techno-uncertainty and organisational commitment.

Table 11 Moderating effect of involvement facilitation on the relationship between techno-uncertainty and organisational commitment

	R^2	R^2 Change	F Change	Sig. F Change
Techno-uncertainty (TU)	0.095	0.095	20.808	0.000*
Involvement Facilitation (IF)	0.222	0.127	32.100	0.000*
Interaction effect of TU and IF (TIF)	0.224	0.002	0.627	0.429

a. Dependent variable: Organisational Commitment
* Significant at p<0.05

5.0 DISCUSSION

Contrary to popular beliefs that stress is negatively associated with organisational commitment (Taris *et al.*, 2001; Glazer and Beehr, 2005; Ho *et al.*, 2009; Viljoen and Rothmann, 2009), none of the technostress creators was found to be inversely correlated with overall organisational commitment. In fact, the positive beta signs for techno-uncertainty (B=0.295) and techno-overload (B=0.173) from the multiple regression analysis clearly signify that an increase in techno-uncertainty and techno-overload will lead to an increase in organisational commitment. Therefore, this study proves that stress created by the usage of technology may not necessarily lower the level of commitment shown to the organisation. In fact, a certain amount

of technostress is essential in enhancing the level of commitment towards organisation. It is believed that some employees regard heavy workload and tight deadlines as positive challenges that help enhanced their quality of work and job satisfaction (Robbins and Judge, 2007). Consequently, these findings confirmed the theory that stress is not always negative (McVicar, 2003).

This study also shows that the existence of literacy facilitation and involvement facilitation did not significantly change the strength or direction of the association between the techno-overload and techno-uncertainty level and the level of organisational commitment. The results of the study are partly in line with the findings of Ragu-Nathan *et al.* (2008) who found that technical support, literacy facilitation and involvement facilitation did not have moderating effect on the relationship between technostress creators and job satisfaction among IT end users. Nevertheless, even though the relationship between techno-uncertainty and organisational commitment was not moderated by technical support, it was found that the relationship between techno-overload and organisational commitment was moderated by technical support. This demonstrates that the relationship between techno-overload and organisational commitment was stronger when technical support was high compared to when technical support was low.

Additionally, it was found that all the technotress inhibitors were significant predictors for organisational commitment. According to Kamarul and Raida (2003), in order to enhance organisational commitment, organisations should stress training. This is because they found that training has significant positive correlation with organisational commitment among the white collar workers in Malaysia. Benson and Dundis (2003) posited that in today's world where technology is an essential element in the workplace, providing training will result in employee feeling secured, needed, and appreciated, which in turn lead to higher level of commitment. In addition, a study by Zain *et al.* (2009) found that corporate culture which consisted of teamwork, communication, rewards and recognition, and training was significant determinant in influencing organisational commitment. Furthermore, a study done by Al-Hussani (2009) revealed a strong positive correlation between perceived organisational support and nurses' commitment to their organisation which confirmed the result of Noblet *et al.*'s (2009) study that organisational commitment is positively influenced by social support. In addition, several studies in the past have also shown that participation in decision making positively influence organisational commitment (Boshoff and Mels, 1994; DeCotiis and Summers, 1987). Putti *et al.* (1990) argued that commitment can only be expected when people are given a chance to participate since it is only natural that individuals would be more committed if they are given the chance to be involved in issues relating to their well-being.

6.0 CONCLUSION

This study provides some insight regarding technostress and organisational commitment in Malaysia, particularly in the Malaysian public higher learning institutions' libraries. As Malaysia is moving towards becoming a more technology oriented nation, it is important that the academic librarians recognise both the positive and negative outcomes of using technology so that the benefits of technology application would not be overwhelmed by its drawbacks. As some technostress creators have been found to positively influence organisational commitment, this shows that a certain amount of technostress is essential in boosting the academic librarians' sense of commitment to their organisations. Thus, it is important to those managing these libraries not to try to eliminate stress but to encourage eustress (good stress) and at the same time try to hinder eustress from turning into distress (bad stress).

This study also demonstrates that in order to ensure that the technology is used as effectively and efficiently as possible, the Malaysian academic libraries should enhance situational mechanisms that will ease the usage of technology. It is recommended that academic librarians are provided with a lot of information regarding the technology to be used, allowed to participate in the decision making and implementation process, and also given adequate technical support so that their work flow would be less disrupted if any technical problem crop up. As a matter of fact, this study has uncovered that the relationship between techno-overload and organisational commitment is positive and stronger when there is high level of technical support. This evidence denotes that technical support is important in strengthening the association between technostress creators and organisational commitment.

As with any other research, this study is not without any limitation. Firstly, this study only focused on librarians in the Malaysian public higher learning institutions' libraries. Secondly, this study is a correlational study. The application of correlations as evidence of the association between the dimensions of technostress and organisational commitment should not be confused with cause-effect relationship. Lastly, this study is a cross-sectional study. As such, it does not give indication of the sequence of events which make it impossible to infer causality.

Despite these limitations, this study contributes to widening the literature by concentrating on the relationship between technostress and organisational commitment. The findings of this study will not only provide important comprehension, but also will be beneficial in helping organisations manage work place stress, especially the stress created by the usage of technology. Nonetheless, in order to increase the generalisability of the findings, future researchers should replicate the present study by making comparative studies between industries and regions. In addition, it is also recommended that in the future, longitudinal study is employed to allow researchers to track changes and trends in the technostress level, organisational commitment level and the impact of the situational variables on the relationship between technostress and organisational commitment that may occur over time.

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