Impact Of Technostress Towards Productivity On Teachers At The Elementary And High School Level

Elaine C Lantang-Engel[1,*] Rina Anindita[2]

[1] Program Studi Magister ManajemenFakultas Ekonomi dan Bisnis, Universitas Esa Unggul
[2] Program Studi Magister ManajemenFakultas Ekonomi dan Bisnis, Universitas Esa Unggul
[*]Corresponding author. Email:elaine.cynthia.e@gmail.com

ABSTRACT

This study aims to analyze the relationship between technostress dimensions: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty toward perceived productivity moderated by technostress inhibitors of teachers at the elementary and high school level. The data analysis method used was Structural Equation Modelling-Partial Least Square (SEM-PLS) using SmartPLS by distributing questionnaires to 224 elementary and high school teachers. The findings of this study supported 4 out of 10 hypotheses proposed. Techno-overload, techno-invasion, techno-complexity, and techno-insecurity each have a significant impact on perceived productivity, while techno-uncertainty has no significant impact on perceived productivity and technostress inhibitors do not moderate the relationship between each dimension of technostress and productivity base on this study.

Keywords: technostress, technostress inhibitors, perceived productivity

1. INTRODUCTION

Information and Communication Technology (ICT) besides having a positive impact also has many negative impacts on human work and life [17]. ICT in the education field has the potential to be useful for students in online learning systems. However, ICT can also put increased pressure on teachers who are often less tech-savvy than their students (Jena, 2015; Hatlevik and Hatlevik, 2018), teachers must constantly adapt to school demands regarding the use of technology in the workplace, exacerbated by rapid changes and advances in ICT. Brod (1984) and Fuglseth and Sørebø (2014) report that a mismatch between schools and teachers can cause technostress resulting from the inability to cope with ICT problems and changes related to ICT use [22]. Technology has become a savior helping organizations and teams to stay connected, conduct meetings, share documents and perform other necessary work tasks and enabling teams to collaborate, operate and communicate virtually through the power of technology. Remote work poses various challenges for the many parties involved. Organizations are increasingly demanding higher work productivity, going beyond the call of duty, and providing performance that exceeds expectations [14]. Several studies have proven the effect of technostress on productivity with different results. Schlachter *et al*. (2018) show that the use of ICT allows tasks to become more portable and accessible remotely, leading to increased performance, increased job satisfaction, and work-family balance [21]. [3] found continuous connectivity with ICT increases the speed of work and thereby increases the productivity and quality of life of individuals. The results of other studies according to [10] stated that the negative impact of technostress can reduce workers' commitment to the organization and its performance (Hwang & Cha, 2018; Karr-Wisniewski & Lu, 2010). Evidence shows that symptoms of technostress in individuals range from fatigue and loss of motivation to inability to concentrate, dissatisfaction at work, and reduced productivity [12] all of which translate into huge monetary costs to the organization. As a result, it is becoming clear that technostress has a tremendous impact on the overall performance and success of the organization so it is necessary to take steps to overcome

it, organizations need to take the problem of technostress seriously. Although technostress is unavoidable due to the characteristics of the technology, [12] suggested that the availability of technostress inhibitors, namely training, technical support, and involvement of technology will help reduce the effects of technostress.

Based on the above considerations, this research is to examine the effect of technostress (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) on productivity and the effect of technostress inhibitors on technostress and perceived productivity.

1.1. HYPOTHESIS DEVELOPMENT

1.1.1. Relationship between Technostress and Perceived Productivity

Many studies point to the negative impact of technostress on workers' productivity, significantly reducing job satisfaction, commitment, innovation, and productivity [17][18][19]. Technostress creators have a negative impact on end-user performance [8]. Chen & Muthitacharoen (2016) show that technostress can significantly impair worker performance when utilizing ICT for work tasks [2]. According to [13], technostress has a consistent negative influence on psychological and behavioral outcomes. Individuals experiencing IT-related stress have lower job satisfaction and lower performance and are more likely to leave their current job [17][19]. On the other hand, several studies have shown the positive impact of technostress on worker productivity, such as Schlachter et al. (2018) that the use of ICT allows tasks to become more portable and can be accessed remotely, which leads to increased worker performance, increased job satisfaction, and work-family balance. [3] found that continuous connectivity with ICT increases the speed of work and thus increases the productivity and quality of life of individuals (Upadhyaya & Vrinda, 2021). [10] explained that while the use of technology can increase productivity to some extent, extreme utilization of technology can produce detrimental effects.

According to [17], the factors that cause technostress can be grouped into 5 components, namely techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty.

Techno-overload where technology forces technology users to work faster and for longer hours due to increased work demands as a result of using technology. Techno-overload affects productivity. This is in line with research from [15] who explained that techno-overload affects productivity. From several studies and explanations above, it can be hypothesized as follows:
H1a. Techno-overload has a significant effect on productivity.

Techno-invasion where technology forces technology users to always be connected with work matters related to the use of technology even outside of work hours so that it disrupts personal life. Techno-invasion affects productivity. This is in line with research from [15] who explained that techno-invasion affects productivity. From several studies and explanations above, it can be hypothesized as follows:
H1b. Techno-invasion has a significant effect on productivity.

Techno-complexity is where technology users feel that their technological capabilities are inadequate so that their time is consumed because they have to try hard to learn and understand the various features of technology that is increasingly complex and or rapidly changing. Techno-complexity affects productivity. This is in line with research from Fauscette and Perry, 2014; Luchtvaartfeiten.nl, 2015 that technological complexity can be detrimental [1]. From several studies and explanations above, it can be hypothesized as follows:
H1c. Techno-complexity has a significant effect on productivity.

Techno-insecurity where technology users are worried about losing their jobs or being replaced by new technology or someone with better technological skills. Techno-insecurity affects productivity. This is in line with research conducted by Vieitez et al. (2001) that job insecurity and perceptions of technology are interrelated [3] where technology is seen as a threat that creates fear of losing a job. Gater (1998) showed that women are twice as likely to experience stress and anxiety as men [20]. From several studies and explanations above, it can be hypothesized as follows:
H1d. Techno-insecurity has a significant effect on productivity.

Techno-uncertainty is where changes and updates to technology that too often cause uncertainty for technology users. Techno-uncertainty affects productivity. This is in line with [1] who reports that although technology is a major factor in economic growth, its changes contain uncertainties and ramifications. From the research and explanation above it can be hypothesized as follows:
H1e. Techno-uncertainty has a significant effect on productivity.

1.1.1.2 The relationship between Technostress Inhibitors as a moderator between Technostress and Productivity

[13] explained that technostress inhibitors are factors that reduce the impact of technostress on workers, either directly or indirectly. [12] and [18] identify technostress inhibitors as an organizational mechanism for reducing technostress, including organizational mechanisms such as the provision of technical support, literacy facilitation, and engagement facilitation. [19] that technostress inhibitors reduce techno-stressors and increase job satisfaction, organizational commitment, innovation, and productivity as well as reduce role conflict and work overload. Tu et al. (2005) and Şahin & Çoklar (2009) both stated that a high level of computer literacy resulted in a

lower level of technostress. Owajeme & Pereware (2011) also argues that technostress problems can be solved by providing regular training on ICT.

In this study, the relationship between technostress inhibitors and technostress will be examined per each dimension of technostress, so that the hypothesis can be as follows:

H2a. Technostress inhibitors significantly moderate the relationship between techno-overload and productivity.
H2b. Technostress inhibitors significantly moderate the relationship between techno-invasion and productivity.
H2c. Technostress inhibitors significantly moderate the relationship between techno-complexity and productivity.
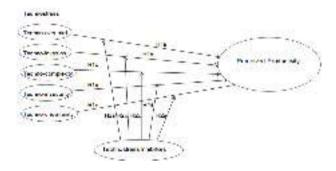

Fig.1. Conceptual Framework of the Research

H2d. Technostress inhibitors significantly moderate the relationship between techno-insecurity and productivity.
H2e. Technostress inhibitors significantly moderate the relationship between techno-uncertainty and productivity.

2. DATA COLLECTION AND ANALYSIS

The population used in this study are elementary and high school teachers who work regularly under one group of education institutions who have experienced online working remotely during the period 2019 - 2022 and work in Jakarta, Tangerang, and Bekasi. The total population and samples are 224 respondents. This study used a survey method for the data collection by distributing online questionnaires using GoogleForms. Likert scale was employed for the measurements, with a scale of 1 – 5 (1 = strongly disagree and 5 = strongly agree). The measurement of 5 (five) independent variables derived from technostress creator (techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty) using a total of 23 statement items adapted from [17]. Productivity variables were measured using 4 statement items adapted from Torkzadeh & Doll (1999). Using [12], which consists of 13 statement items, measured technostress inhibitors as the moderating variable. Based on the pre-test data processing results for the 5 (five) dimensions of technostress variable from a total of 23 statements, all statements were valid and reliable, and all statements for productivity and technostress inhibitors variables were valid and reliable where the KMO MSA values were > 0.5 and Cronbach's alpha values were > 0.6. Hypothesis test using the Structural Equation Modeling (SEM) with SmartPLS 3.0 programs. The decision of the hypothesis in the study is based on a significance value of 0.05 and compares the t statistic and t table. The reliability test uses Cronbach's Alpha measurement with values of > 0.6. The Validity value refers to the factor loading of 0.7 and the value of Average Variance Extracted (AVE) meets the requirements, which is 0.5, as well as the discriminant validity value > 0.6 [5].

3. RESULT

The research results of 224 respondents were obtained from teachers at the elementary and high school level, based on the data obtained as shown in Table I, the majority of respondents were women, namely 147 respondents (66%). The majority of respondents were dominated by generation X, namely 111 people (50%), and also generation Y, as many as 108 people (48%). From the level of frequency of using online methods, the majority of respondents often (minimum 3 days a week) even use online methods every day with a total of 200 respondents (89%).

After testing the reliability and validity of the constructs and variables which all are valid and reliable, and the R square result in Table II showed a strong prediction of all independent variables towards the dependent variable, the hypothesis test is being processed and the result is as shown in Table III.

TABLE I.   DEMOGRAPHY

Demographics	Classification	Number of Respondents	Percentage (%)
Gender	Male	77	34,375
	Female	147	65,625
	Total	**224**	**100**
Year of Birth	1949 - 1964	4	1,79
	1965 - 1980	111	49,55
	1981 - 2001	108	48,21
	> 2001	1	0,45
	Total	**224**	**100**
Year of Service	< 1 year	9	4,02
	1 - 3 years	46	20,54
	3 - 5 years	26	11,61
	> 5 years	143	63,84
	Total	**224**	**100**
Working Online	Seldom (1-2 days a week)	24	10,71
	Often (3-4 days a week)	104	46,43
	Everyday (5-7 days a week)	96	42,86
	Total	**224**	**100**
Scope of Responsibility	Elementary Level	92	41,07
	Junior High School Level	68	30,36
	Senior High School Level	27	12,05
	Vocational School Level	37	16,52
	Total	**224**	**100**

Source : Processed Data, 2022

TABLE II. R SQUARE

Dependent Variable	R Square	R Square Adjusted
PRO	0,908	0,904

TABLE III. HYPOTHESIS TEST

	Hypothesis	T Statistic	P Values	Result
H1a	Techno-overload has a significant impact towards productivity.	4.182	0.000	Supporting
H1b	Techno-invasion has a significant impact towards productivity.	2.671	0.008	Supporting
H1c	Techno-complexity has a significant impact towards productivity.	3.16	0.002	Supporting
H1d	Techno-insecurity has a significant impact towards productivity.	3.671	0.000	Supporting
H1e	Techno-uncertainty has significant impact towards productivity.	1.293	0.197	Not supporting
H2a	Techno-inhibitors significantly moderate the relationship between techno-overload and productivity.	0.633	0.527	Not supporting
H2b	Techno-inhibitors significantly moderate the relationship between techno-invasion and productivity.	0.702	0.483	Not supporting
H2c	Techno-inhibitors significantly moderate the relationship between techno-complexity and productivity.	0.606	0.545	Not supporting
H2d	Techno-inhibitors significantly moderate the relationship between techno-insecurity and productivity.	1.385	0.167	Not supporting
H2e	Techno-inhibitors significantly moderate the relationship between techno-uncertainty and productivity.	0.275	0.784	Not supporting

4. DISCUSSION

4.1. Techno-overload and Productivity

The results of the study above show a relationship between techno-overload and productivity. Techno-overload as an impact of technology that forces technology users to work faster and for longer hours has the effect of reducing productivity and this is felt by both male and female teachers. They feel that technology is forcing them to work faster and more than they can handle with very tight time schedules, changing their work and teaching habits. The existence of the WFH (work from home) policy might result in teachers having more time to do their assignments because there is no wasted time on going to school as before, so they feel more productive and more assignments can be done.

In terms of gender, techno-overload has a greater effect on male respondents (39.6%) compared to female respondents (30.7%). This is in line with research conducted by Soumya (2021) which explains that men are mostly affected by techno-overload. Unlike the research conducted by [9] which states that techno-overload significantly affects women's productivity or performance. This is probably because women in Indonesia are generally used to doing household chores in addition to teaching assignments so they are used to managing a large workload, compared to men in Indonesia who generally rarely do household chores.

4.2. Techno-invasion and Productivity

Techno-invasion as an impact of technology that forces technology users to always be connected with work matters even beyond work hours interferes with personal life affects reducing the productivity of male and female teachers where their family time is reduced, even during holidays they have to be vigilant with work affairs thus sacrificing their time off and weekends which ultimately disrupts their personal lives. This is in line with previous research from Soumya (2021) which explained that men and women are affected by techno-invasions. The research conducted by [9] stated that techno-invasion significantly affects women's productivity or performance. Teachers, both men and women, feel that being easily connected causes family time to be disrupted.

4.3. Techno-comlexity and Productivity

Techno-complexity where technology users feel that their technological capabilities are inadequate so their time is consumed because they have to try hard to learn and understand the various features of technology. This has an impact on the time and skills of teaching staff where the completion of work or teaching is delayed or constrained because it takes time to learn and master the technology needed to do their assignments. This is in line with research from Fauscette and Perry, 2014; Luchtvaartfeiten.nl, 2015 that technological complexity can be detrimental [1].

4.4. Techno-insecurity and Productivity

Techno-insecurity where technology users are worried about losing their jobs or being replaced by new technology or someone with better technological expertise. The factor of concern is quite high for female teachers based on the results of this study. This is in line with research conducted by Gater (1998) which shows that women are twice as likely to experience stress and anxiety as men (Tolin & Foa, 2006). [3] reported that job insecurity and perceptions of technology are interrelated (Vieitez *et al.* 2001) where technology is seen as a threat that creates fear of losing a job.

4.5. Techno-uncertainty and Productivity

This means that the results of this study indicate that techno-uncertainty, where technological changes and updates that too often cause uncertainty for technology users, does not have a significant effect on productivity. This could be due to the institution conducting socialization of the new technology before the implementation or providing training, guidance, and direction. Research reported by [1] stated that although technology is a major factor in economic growth, its changes contain uncertainties and ramifications. Hung *et al.* (2015) explained that the stress caused by the use of technology affects productivity. The direction of the impact depends on the level of stress experienced. If users experience moderate amounts of stress, it will have a positive effect on their productivity. Excessive technostress has a negative impact.

4.6. The Role of Technostress Inhibitors as a Moderating Variable

The results of this study indicate that technostress inhibitors do not moderate the relationship between 5 (five) dimensions of technostress and the productivity of teachers. It indicates that technostress inhibitors do not strengthen or weaken the dimensions of technostress on productivity.
This is not in line with research from [13] which explained that technostress inhibitors are factors that reduce the impact of technostress on workers, either directly or indirectly. As the research conducted by [12] stated that technostress inhibitors as moderators can significantly limit the effects of technostress. While [18] stated that technostress inhibitors can reduce the negative consequences of technostress creators and increase individual productivity and performance [10].

The results of this study indicate that technostress inhibitors are not a factor that encourages teachers to be able to reduce stress caused by technological factors. Technostress only adds to the stress of teachers if the technology used interferes with their work. It is possible that after going through the social distancing period which has been running for almost 3 years, the teaching staff at that respective institution are already familiar with using technology to work and teach online, and are used

to working and teaching remotely so training and manuals related to the application of online methods are no longer needed, apart from that they can also learn independently through YouTube considering that the majority of respondents are teachers from generations X and Y where these generations are familiar with and accustomed to using technology.

In terms of gender, techno-overload, techno-invasion, and techno-insecurity have a significant effect on the productivity of female respondents. This is similar to the research conducted by [9] which states that techno-overload and techno-invasion have a significant effect on women's productivity or performance. Techno-insecurity has the highest effect (36.2%) compared to techno-overload and techno-invasion. Techno-insecurity has the effect of reducing the productivity of female teachers where they feel their performance is threatened, threatened by their co-workers, and feel that they have to constantly update their technological skills. Meanwhile, for men, techno-overload and techno-invasion have a significant effect on productivity in male respondents where techno-overload (39.6%) has the biggest effect. For techno-overload, the effect is greater for male respondents (39.6%) compared to female respondents (30.7%). Likewise, the techno-invasion has a greater effect on male respondents (27.4%) compared to female respondents (22.9%).

5. CONCLUSIONS

Based on the results of this study, some conclusions are drawn. First, the 4 dimensions of technostress (techno-overload, techno-invasion, techno-complexity, and techno-insecurity) significantly affect productivity where the higher the stress caused by techno-overload, techno-invasion, techno-complexity, and techno-insecurity, the lower the level of teachers' productivity. Second, one dimension of technostress, namely techno-uncertainty, does not significantly affect productivity. Third, technostress inhibitors as moderators do not significantly affect the relationship between technostress and productivity. Fourth, there are differences in stress levels from technostress dimensions between men and women. Techno-overload and techno-invasion significantly affect productivity for female and male respondents, but the impact is greater for men. Meanwhile, techno-insecurity significantly affects productivity for female respondents and has the greatest effect compared to techno-overload and techno-invasion for female respondents. Thus, the results of this study can be a reference for further research in identifying other factors that affect technostress and productivity variables and can use other moderating variables to create new and better research models.

6. IMPLICATIONS AND LIMITATIONS

Support and encouragement from the school management are very important so that the productivity of the teaching staff can be maintained. Working remotely using technological aids is very helpful and more efficient because no time is wasted on the road so that time can be used to carry out the tasks of teachers such as teaching, making curricula, and so on. On the other hand, workload also needs to be considered so that it is not too excessive that it can trigger stress to the teachers, resulting in less productivity such as illness or stress. The use of technology and its development needs to be seen as an opportunity, not as a threat so that teachers can work better and more efficiently. Therefore, school management needs to pay attention to the balance between working remotely and welfare so that teachers are maintained physically and mentally so that they can remain productive. Up-to-date training such as making teaching modules, curricula, and others can be put in the form of e-learning, but it is necessary to pay attention to the material and timeframe so that it can have the expected effect. Giving awards can help teachers to be more productive and feel valued. The awards can be given to the teachers who are most helpful to colleagues, students, and so on.

The limitation of this study only discusses the effect of technostress on productivity and the role of technostress inhibitors as a moderator with the respondent population of teachers in an educational institution. Research can certainly be developed more broadly to capture the scope of research that is not only in educational institutions but can be expanded to other industries or using a different approach. Second, research can be further developed by pairing other variables to measure productivity.

The results of this study can serve as a reference for further research to identify other factors that affect productivity by using other moderating or intervening variables or adding independent variables. Furthermore, technostress inhibitors can also be used as independent variables so that new research models can be formed better for further research in other industries.

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