

Does Technostress cause Procrastination – The Dark Side of Technology

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Abstract

The use of Technology at the work place aims to make the organizational processes efficient. However, the study focuses on the dark side of technology i.e. Technostress in employees which is an emergent phenomenon with increased focus on use of technology in the Post COVID-19 time. This study focuses on the behavioral side of the employees that emerges due to Technostress. This causal study quantifies the impact of Technology Related Stress i.e. Technostress on employees making a delay in work i.e. Procrastination. For the present study, based on convenience and snowball sampling, the data was collected from 390 employees who have day-to-day interaction with Information Communication Technology ICT. These employees were from the Telecommunication Industry and Software Houses. Following the research work of Nimrod (2018), Technostress has been operationalized having five dimension namely - Overload, Invasion, Complexity, Privacy and Inclusion while Procrastination was measured using Metin, Taris, and Peeters (2015). The results reflect a significant positive association of Overload, Invasion, Complexity and Privacy with procrastination while Inclusion was found to be statistically insignificant. Hence, the shady side of technology persists and the organizations need to ensure that technology adoption does not stress its employees to an extent that they start stalling work. For this, it is proposed that Technostress management trainings be organized to ensure the employees are well equipped to address the challenges proposed by Technostress at the work place.

Keywords: Technostress, Procrastination

Introduction

The impact of the technology use in the workplace has been profound and continues to evolve rapidly but has created disturbances- physical and psychological, leading to stressful circumstances. Technological resources, despite its many benefits, introduced a phenomenon known as "Technostress" in organizational employees. Technostress refers to the negative psychological and emotional impact experienced by individuals due to their interactions with technology. Pansini et al. (2023) provide an inclusive review on Technostress. Technostress, as conceptualized by Brod (1984), was initially described as "a contemporary disturbance resulting from an inability to effectively manage new computer technologies."

Recent learning characterizes Technostress as a composite phenomenon involving Technostress creators, referred to as techno-stressors, as well as psychological strain, such as feelings of frustration, and workplace outcomes, including diminished work performance (Califf & Brooks, 2020). Individuals can encounter Technostress at any stage of their adoption and utilization of information and communication technology (ICT), and it may manifest in diverse forms (Salo et al., 2019; Tams et al., 2018).

The rapid incorporation of technology in the workplace has introduced the phenomenon of "Technostress," characterized by negative psychological and emotional impacts resulting from technology use. This stress can lead to decreased job satisfaction, reduced productivity, and increased burnout. Despite extensive research on Technostress, there is limited understanding of its relationship with procrastination in organizational settings. This study aims to investigate how Technostress contributes to procrastination among employees, affecting their performance and workplace behavior. Understanding this relationship can help organizations implement effective interventions to mitigate Technostress and improve employee productivity.

Numerous investigations have revealed that Technostress can result in adverse outcomes across behavioral, psychological, work-related, and health domains. Specifically, Technostress has been linked to diminished job satisfaction and organizational commitment among individuals (Ragu-Nathan et al., 2008). In terms of behavioral consequences, it has been observed to hinder individuals' productivity in the workplace (Tarafdar et al., 2007).

The COVID-19 pandemic heightened Technostress among medical staff and students, resulting in increased stress, burnout, and strain, with varying effects on their health (Kasemy et al., 2022). Furthermore, the implementation of sales technology contributing to Technostress has been found to decrease job satisfaction and increase role stress, although job commitment can serve as a mitigating factor (Pullins et al., 2020).

This research aims to address the research gap by examining the impact of Technostress on procrastination. In the age of this digital evolution, the phenomenon of Organizational Technostress has emerged as a critical area of concern. This stress, arising from the intricate relationship between employees and technology in the workplace, has been associated with a spectrum of negative outcomes, notably manifesting in the form of Negative Workplace Behaviors.

This research has the objective to study the relationship between Technostress and procrastination in the organizational context. Awareness of the relationship between Technostress, procrastination, and Conservation of Resources theory can help individuals recognize and manage these issues. Employers can provide resources such as time management training, technology breaks, and stress management programs to mitigate Technostress and combat procrastination.

Literature Review

The proposed model in this study draws upon the Conservation of Resources (COR) theory as elucidated by Hobfoll (1989) and Hobfoll et al. (2018). This hypothesis posits that stressors and susceptibility to stressors deplete and diminish the assets and energy reservoirs of employees that they endeavor to accumulate and conserve. According to COR theory, resources encompass various objects, personal attributes, conditions, or energies valued by individuals. The theory suggests that employees actively acquire, maintain, and safeguard these resources to effectively address the demands and challenges inherent in their roles. Conversely, stress is posited to deplete these resources, thereby influencing individuals' overall work attitudes, behaviors, and psychological well-being.

Furthermore, COR theory asserts that the threat of resource loss can be alleviated through resource acquisition. It posits that individuals typically operate under the risk of depleting physical, mental, and emotional resources, leading them to manage their existing resources to prevent further depletion in the event of loss. COR emphasizes that the impact of resource loss outweighs that of resource gain. Consequently, when employees encounter resource depletion due to demanding job conditions, they may exhibit reduced motivation to respond effectively, focusing instead on conserving their current assets.

The core tenet of COR theory centers on the accumulation and preservation of resources. Individuals actively strive to gather and protect valuable physical, mental, financial, and social resources. Stress ensues when these vital resources are threatened or actually lost. Conversely, access to additional resources can mitigate the risk of resource depletion caused by stress.

Technostress, originally conceptualized by Brod (1984), represents a contemporary adaptation challenge stemming from individuals' struggles to effectively manage new computer technologies. As defined by Rosen and Weil (1997), it encompasses any adverse impact on attitudes, thoughts, behaviors, or psychological well-being directly or indirectly attributed to technology.

Technostress encompasses the stress experienced when individuals struggle to keep up with the constantly evolving information and communication technologies (ICTs) and the changing cognitive and social demands associated with their use (Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2007).

There have been several ways in which technology has contributed to Technostress including: Firstly -Information Overload: Arnold, Goldschmitt, and Rigotti (2023) provide a comprehensive review with regards to information overload. With the constant influx of emails, notifications, and data, employees can become overwhelmed by the

sheer volume of information they need to process. This can lead to feelings of stress, anxiety, and a sense of being constantly "plugged in" or "on call." Secondly - 24/7 Connectivity: Sharma and Gupta (2023) investigate the role of Technostress and the access to computer 24/7 Technology resulting in blurred boundaries between work and personal life. Employees may feel the pressure to be constantly available and responsive, even outside of regular working hours. This can lead to burnout, as individuals struggle to disconnect and find a healthy work-life balance. Thirdly, increased Expectations and Pressure: Siddiqui, Arif, and Hinduja (2023) discuss Technostress as a catalyst to leave the teaching profession in Pakistan during COVID-19 pandemic. Technology has enabled faster communication and instant access to information. As a result, expectations for quick responses and high productivity have risen. Employees may feel pressured to always be available and accomplish tasks at a rapid pace, leading to increased stress levels. Fourth, digital Distractions: Liu (2022) discuss reading in the age of digital distraction. The prevalence of smartphones, social media, and other digital distractions can hinder productivity and concentration. Employees may find themselves constantly checking their devices, leading to reduced focus, decreased efficiency, and heightened stress levels.

Technological Challenges and Skill Gaps: Reddy, Chaudhary and Hussein (2023) provide a digital literacy model to narrow the digital literacy skills gap. Rapid technological advancements can create stress for employees who struggle to keep up with the pace of change. Learning new software, adapting to new systems, and mastering complex technologies can be demanding and cause anxiety, especially for those who feel inadequate or fear becoming obsolete.

Pang and Ruan (2023) discuss information and communication overload influence on technology users' social network exhaustion, privacy invasion and discontinuance intention with a cognition-affect-conation approach. As technology becomes more integrated into work processes, employees may worry about data breaches, cyber-attacks, and the potential invasion of their privacy. These concerns can add to stress levels, particularly for employees handling sensitive information.

Siddiqui, Arif, and Hinduja (2023) discuss the fear of technology in employees that may become overly reliant on technology and fear the consequences of system failures, crashes, or technical glitches. The fear of losing important data, missing deadlines, or disrupting work processes can contribute to increased stress and anxiety.

Techno-stressors, also known as "techno-stress creators" (Califf & Brooks, 2020; Li & Wang, 2021; Tarafdar et al., 2007), encompass ICT-related stimuli, incidents, or demands according to Ayyagari et al. (2011) and Califf and Brooks (2017). These stressors are identified by researchers such as Califf and Brooks (2020), Tarafdar et al. (2007), and Wang and Yao (2021) and vary depending on individuals' professions, occupational roles, and specific technology usage characteristics. For instance, Ragu-Nathan et al. (2008) identified techno-overload, techno-complexity, techno-invasion, techno-insecurity, and techno-uncertainty as stressors prevalent among white-collar workers integrating ICTs into their work processes. Hwang and Cha (2018) reported that security-related professionals commonly experience techno-overload, techno-complexity, techno-uncertainty, role conflict, and role ambiguity as stressors. Ayyagari et al. (2011) identified techno-stressors including work-home conflict, privacy invasion, work overload, role ambiguity, and job insecurity among business ICT users. Lei and Ngai (2014) noted that irrespective of professional backgrounds, techno-stressors such as conflict between work and home, invasion of privacy, and role ambiguity are prevalent.

Procrastination in the workplace refers to the deliberate postponement of planned work-related tasks while engaging in non-work activities, without detriment to business, employee, workplace, or client, as defined by Metin, Taris, and Peeters (2016). Procrastination has been extensively studied in academic settings (van Eerde, 2016), yet its prevalence in the workplace is increasingly recognized (Klingsieck, 2013). Personality traits such as high neuroticism and low conscientiousness (Steel, 2007), along with situational factors such as limited task significance, restricted autonomy, and feedback (Lonergan & Maher, 2000), influence procrastination behaviors. Metin et al. (2018), Nguyen et al. (2013), and Wan, Downey, and Stough (2014) have linked procrastination to heightened levels of stress, fatigue, reduced work engagement, and performance decline. This behavior is associated with negative workplace outcomes such as lower pay, diminished performance, and shorter job tenure.

While procrastination research has predominantly focused on academic contexts, recent attention highlights its relevance in workplace settings (Klingsieck, 2013; van Eerde, 2016). Factors influencing procrastination include both individual traits and situational conditions, underscoring its impact on workplace dynamics and outcomes.

Based upon the literature of Technostress and procrastination, the study has the following hypotheses:

Hypothesis 1: Technostress will have a positive relationship with procrastination, such that higher levels of Technostress will be associated with increased tendencies to procrastinate.

Hypothesis 1a: Techno Overload has a significant impact on procrastination at work.

Hypothesis 1b: Techno Invasion has a significant impact on procrastination at work.

Hypothesis 1c: Techno Complexity has a significant impact on procrastination at work.

Hypothesis 1d: Techno Privacy has a significant impact on procrastination at work.

Hypothesis 1e: Techno Inclusion has a significant impact on procrastination at work.

The literature on Technostress depicts that it is an adverse psychological impact arising from the use of technology (Tarafdar et al., 2007). Past studies recognizing the growing relevance of technology in workplaces, Technostress characterized by the negative psychological impact of technology use, is positively linked to procrastination among employees. Specifically, the adverse effects of Technostress on individuals' well-being, role stress, and productivity (Tarafdar et al., 2007) may contribute to procrastination tendencies, manifesting as delays in task initiation and completion (Lim, 2002; Suh & Lee, 2017). This hypothesis suggests that the challenges associated with technology use in the workplace may exacerbate procrastination behaviors among employees. The Conservation of Resources (COR) Theory provides a valuable lens for understanding the proposed relationship between Technostress and procrastination. According to COR Theory, stress occurs when there is a perceived threat of resource loss, actual resource loss, or a lack of resource gain after investing effort.

In the context of Technostress and procrastination, Technostress represents a potential threat to individuals' psychological resources, stemming from the challenges associated with technology use. As individuals grapple with the negative psychological impacts of Technostress, they may experience a depletion of psychological resources, contributing to heightened stress.

Methodology

The population of the study are the Employees of the telecommunication and software houses. These individuals are holding jobs and having day-to-day interaction with Information Communication Technology (ICT). The population caters employees connected with use of technology on regular day-to-day basis. These include the employees in software houses and similar technology based organizations. The technology industry is dynamic and subject to rapid changes. The dynamism of the technological advancements make these employees subject to more Technostress. The study intends to understand how the “employee” who is subjected to Technostress, how this Technostress impacts his procrastination.

Non-probability sampling methods, namely convenience sampling and snowball sampling, were strategically chosen based on their suitability for participant selection in the research study. Convenience sampling involves selecting participants based on their accessibility and willingness to participate, while snowball sampling relies on existing participants to refer or recruit additional participants.

A sample size of 390 was used for the study. However 215 responses were found acceptable. Technostress as measured by Nimrod (2018) has been taken into the study. Nimrod (2018) identified 5 main dimensions of Technostress: Overload (3 items), Invasion (2 items), Complexity (3 items), Privacy (3 items) and Inclusion (3 items). These have been measured on a 5-point scale. The dependent variable of the study is Procrastination measured by Metin, Taris, and Peeters (2016) scale. They measured Procrastination on a 12 item, 7-point scale. The instrument has some demographics added which were used for analysis in STATA.

Analysis & Interpretation

The analysis section covers for descriptive data analysis, correlational analysis and the regression results.

The following table reflects the descriptive statistics.

Table 1 Descriptive Statistics

| | <i>Overload</i> | <i>Invasion</i> | <i>Complexity</i> | <i>Privacy</i> | <i>Inclusion</i> | <i>Procrastination</i> |
|--------------------|-----------------|-----------------|-------------------|----------------|------------------|------------------------|
| Mean | 4.2917 | 3.9654 | 4.1125 | 4.5210 | 4.2708 | 5.9091 |
| Standard Error | 0.1049 | 0.1291 | 0.1198 | 0.1407 | 0.1064 | 0.1310 |
| Median | 4.3333 | 4.0000 | 4.3333 | 4.1667 | 4.3333 | 6.2083 |
| Mode | 4.3333 | 4.0000 | 4.6667 | 4.3333 | 4.6667 | 6.4167 |
| Standard Deviation | 0.4194 | 0.5163 | 0.4792 | 0.5626 | 0.4255 | 0.5241 |
| Sample Variance | 0.1759 | 0.2666 | 0.2296 | 0.3166 | 0.1810 | 0.2747 |
| Kurtosis | 0.6327 | -1.1651 | -0.2607 | -0.1718 | -0.0689 | -1.2698 |
| Skewness | -0.6525 | 0.3774 | -1.0386 | -0.0692 | -0.9214 | -0.6166 |
| Minimum | 2.0000 | 3.5000 | 3.3333 | 3.0000 | 3.3333 | 4.9167 |
| Maximum | 5.0000 | 5.0000 | 4.6667 | 5.0000 | 4.6667 | 6.4167 |
| Count | 215.0000 | 215.0000 | 215.0000 | 215.0000 | 215.0000 | 215.0000 |

The dataset provides descriptive statistics for six key variables: Overload, Invasion, Complexity, Privacy, Inclusion, and Procrastination. The analysis of these variables offers insights into central tendencies, variability, and distributional characteristics.

The mean values for the variables indicate that respondents generally reported moderate to high levels of perceived Overload (4.29), Complexity (4.11), Privacy concerns (4.52), and Inclusion (4.27). Procrastination had the highest mean score at 5.91, suggesting a notable prevalence of this behavior among respondents. The median values closely align with the means, reinforcing the central tendency findings. The standard deviation and sample variance provide insights into the dispersion of the data. Privacy (0.56) and Invasion (0.52) had the highest standard deviations, indicating greater variability in responses. Overload and Inclusion exhibited lower standard deviations (0.42 and 0.43, respectively), suggesting more consistency in these perceptions. Procrastination, despite its high mean, had a moderate standard deviation (0.52), reflecting a wide range of responses.

Skewness and kurtosis values offer additional insights into the data distribution. Most variables exhibited slight negative skewness, indicating a longer left tail and a concentration of higher scores. Notably, Complexity (-1.04) and Inclusion (-0.92) had more pronounced negative skewness, suggesting a greater frequency of higher values. Kurtosis values were close to zero for most variables, indicating distributions that are relatively normal in terms of peakedness. However, Invasion (-1.17) and Procrastination (-1.27) had negative kurtosis values, suggesting flatter distributions with lighter tails. The range of scores, as indicated by minimum and maximum values, highlights the extent of variability in responses. Procrastination scores ranged from 4.92 to 6.42, indicating substantial variation. Overload and Privacy scores ranged from 2.00 to 5.00, suggesting a wider perception spectrum among respondents.

This analysis provides a foundational understanding of respondents' perceptions and behaviors related to the six examined constructs, forming a basis for further inferential statistical analysis to explore underlying relationships and causations.

Table 2 Correlation Analysis

| | <i>Overload</i> | <i>Invasion</i> | <i>Complexity</i> | <i>Privacy</i> | <i>Inclusion</i> | <i>Procrastination</i> |
|-----------------|-----------------|-----------------|-------------------|----------------|------------------|------------------------|
| Overload | 1.0000 | | | | | |
| Invasion | 0.4468* | 1.0000 | | | | |
| Complexity | 0.3501* | 0.0636 | 1.0000 | | | |
| Privacy | 0.0451 | 0.3024* | 0.6010* | 1.0000 | | |
| Inclusion | 0.1816 | 0.2919 | 0.2997* | 0.1054 | 1.0000 | |
| Procrastination | 0.2144* | 0.2255* | 0.1776* | 0.1267* | 0.4047* | 1.0000 |

* Significant at $p < 0.05$

The correlation analysis reveals that Procrastination has several significant relationships with other variables. Specifically, Procrastination is positively correlated with Overload (0.2144*), Invasion (0.2255*), Complexity (0.1776*), Privacy (0.1267*), and Inclusion (0.4047*), with all correlations being significant at $p < 0.05$. Among these, Inclusion shows the strongest correlation with Procrastination, suggesting that as feelings of inclusion increase, so does the tendency to procrastinate. Although the correlations with Overload, Invasion, Complexity, and Privacy are weaker, they still indicate that higher levels of these variables are associated with increased Procrastination. These findings suggest that multiple factors contribute to procrastination behaviors, with inclusion playing a particularly notable role.

Table 3 regression analysis examines the influence of the dimensions of Technostress—Overload, Invasion, Complexity, Privacy, and Inclusion—on Procrastination.

Table 3 Regression Estimates

| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> |
|-------------------|---------------------|-----------------------|---------------|
| R Square | 0.2055 | | |
| Adjusted R Square | 0.1750 | | |
| Significance F | 0.0051 | | |
| Intercept | 4.9180 | 3.0196 | 1.6287 |
| Overload | 0.2325 | 0.0932 | 2.4960 |
| Invasion | 0.0720 | 0.0165 | 4.3504 |
| Complexity | 0.4143 | 0.1827 | 2.2677 |
| Privacy | 0.1805 | 0.0500 | 3.6113 |
| Inclusion | 0.3717 | 0.4112 | 0.9039 |

The model accounts for 20.55% of the variance in Procrastination ($R^2 = 0.2055$), with an adjusted R^2 of 0.1750, indicating moderate explanatory power. The overall model is statistically significant (Significance F = 0.0051). The results reveal that Overload ($\beta = 0.2325$, $p < 0.05$), Invasion ($\beta = 0.0720$, $p < 0.05$), Complexity ($\beta = 0.4143$, $p < 0.05$), and Privacy ($\beta = 0.1805$, $p < 0.05$) are significant predictors of Procrastination. Among these, Invasion shows the strongest effect, suggesting that as feelings of being invaded by technology increase, so does the tendency to procrastinate. Additionally, higher levels of Overload, Complexity, and Privacy concerns related to Technostress are associated with increased Procrastination. Conversely, Inclusion ($\beta = 0.3717$) is not a significant predictor ($p > 0.05$), indicating that feelings of inclusion in the technological environment do not significantly impact Procrastination. These findings highlight the multifaceted nature of Technostress and its significant role in influencing procrastinative behaviors. Addressing Technostress comprehensively, by mitigating its various dimensions, is crucial in reducing Procrastination among individuals.

Conclusion & Recommendations

The present study investigates the impact of various dimensions of Technostress—namely Overload, Invasion, Complexity, Privacy, and Inclusion—on Procrastination. The regression analysis reveals that Technostress significantly contributes to Procrastination, explaining 20.55% of its variance. Specifically, Overload, Invasion, Complexity, and Privacy concerns emerge as significant predictors of Procrastination. Among these, Invasion demonstrates the strongest influence, indicating that increased feelings of technological invasion are strongly associated with higher levels of procrastinative behavior. Conversely, Inclusion does not significantly impact Procrastination, suggesting that the sense of being included within the technological environment does not play a major role in procrastination tendencies. These findings underscore the complex and multifaceted nature of Technostress and its substantial role in fostering procrastinative behaviors.

Based on the findings of this study, several recommendations can be made to mitigate the effects of Technostress on Procrastination such that organizations should implement strategies to manage and limit the technological demands placed on individuals. Policies should be established to protect personal boundaries and minimize the invasive aspects of technology. Clear guidelines regarding after-hours communication and personal data privacy

can help reduce feelings of invasion. Simplifying technological tools and processes can alleviate the complexity-related stress. Providing user-friendly interfaces, comprehensive training, and ongoing support can help individuals navigate complex technologies more effectively. Although Inclusion was not found to significantly impact Procrastination, fostering an inclusive technological environment is still valuable. Encouraging collaboration, providing support networks, and ensuring equitable access to technology can contribute to a more positive overall experience.

The analysis highlights several policy implications for organizations aiming to reduce procrastination among employees by addressing various dimensions of Technostress. Firstly, implementing workload management strategies, such as clear task prioritization and time management training, can help employees manage their tasks more efficiently, addressing the issue of overload. Establishing boundaries for technology use is also crucial; creating policies that limit after-hours work-related communications and ensure employees have the opportunity to disconnect from technology can mitigate feelings of invasion. Furthermore, investing in user-friendly technology and comprehensive training programs can simplify technological interfaces, enhancing employees' comfort and competence with technological tools.

Strengthening data privacy and security measures is another important step. Implementing robust privacy policies and ensuring transparent communication about data handling practices can alleviate employees' privacy concerns. Moreover, it is essential to monitor and adjust inclusion initiatives to ensure they foster engagement without inadvertently increasing procrastination. Finally, developing holistic Technostress reduction programs that integrate the above strategies in a coordinated manner will ensure a comprehensive approach to managing Technostress. By addressing these significant predictors of procrastination, organizations can create a healthier work environment that minimizes Technostress and its adverse effects, ultimately enhancing employee productivity and satisfaction.

Future research should explore additional factors that may influence the relationship between Technostress and Procrastination, such as individual coping mechanisms, organizational culture, and the role of specific technologies. Longitudinal studies could also provide deeper insights into the long-term effects of Technostress on procrastinative behaviors.

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