TECHNOSTRESS AND DISENGAGEMENT FROM KNOWLEDGE SHARING: AN EMPIRICAL ANALYSIS

by © Monalisa Mahapatra

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Abstract

Knowledge sharing is important for organizations to generate new and innovative ideas and to sustain competitive advantage in the volatile business environment. However, there exist various counterproductive knowledge behaviors and, in this study, I focus on one such behaviors known as "disengagement from knowledge sharing". Using the Job Demands-Resources framework, I intended to understand whether information and communication technologies (ICTs) related phenomena in workplace setting such as technostress creators and technostress inhibitors influence employees' disengagement from knowledge sharing. Using online survey methodology, I collected data from full time employees, who regularly use ICTs for their professional tasks. The analysis was conducted with the partial least squares path modeling method in SmartPLS software. The results show technostress creators influence disengagement from knowledge sharing and this relationship is mediated by burnout. Finally, I also discussed the implications, limitations, and future research directions of the study.

Keywords: Disengagement from knowledge sharing, Technostress Creators, Technostress Inhibitors, Job Demands-Resources framework, ICTs

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I would like to note the previous works of mine that informed this thesis. While they are not a part of the thesis, they did serve as a backbone to development of the literature review. In my thesis I used the original sources to constitute my arguments and I do not directly quote these previous works:

Mahapatra, M. & Pati, S. P. (2018). Technostress creators and burnout: A Job Demands-Resources perspective. In Proceedings of the 2018 ACM SIGMIS Conference on Computers and People Research (SIGMIS-CPR'18). Association for Computing Machinery, New York, NY, USA, 70-77.

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Mahapatra, M. Pati, S.P., & Pradhan, R. K. (in press). Can meaningful work mitigate the impact of technostress creators? Evidence from India. In Rabindra Kumar Pradhan, Updesh Kumar (Eds.) Emotion, Well-Being, and Resilience Theoretical Perspectives and Practical Applications, Chapter 24.

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List of Abbreviations

Abbreviation	Meaning
AVE	Average Variance Extracted
DKS	Disengagement from Knowledge Sharing
ICTs	Information and Communication Technologies
JD-R	Job Demand-Resources Model
KSR	Knowledge Sharing Required
MTurk	Mechanical Turk
PKS	Propensity to Share Knowledge
PLS	Partial Least Square
SEM	Structural Equation Modelling
TSC	Technostress Creators
TSI	Technostress Inhibitors

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TECHNOSTRESS AND DISENGAGEMENT FROM KNOWLEDGE SHARING: AN EMPIRICAL ANALYSIS

1. Introduction

Knowledge management is important for organizations to generate new and innovative ideas and to sustain competitive advantages in the volatile business environment (Kankanhalli, Tan, & Wei, 2005). Knowledge sharing is one of the core processes of knowledge management, where employees voluntarily share their tacit and explicit knowledge with their co-workers within organizations (Serenko & Bontis, 2016). However, there exists various counterproductive knowledge behaviors where employees fail to share their knowledge, and such hindrance to organizational knowledge flows may reduce organizational profitability, competitiveness, and innovativeness (Serenko & Bontis, 2016). For example, knowledge hiding is an "intentional attempt by an individual to withhold or conceal knowledge that has been requested by another person" (Connelly, Zweig, Webster, & Trougakos, 2012, p. 65). Similarly, employees often deliberately accumulate knowledge and conceal the fact that they possess such knowledge, which is known as knowledge hoarding in organizations (Hislop, 2003; Webster et al., 2008).

While these concepts capture the fact that employees intentionally indulge in counterproductive knowledge behaviors, in many cases, organizational knowledge sharing fails to occur even when employees feel no need to protect their knowledge (Ford, 2008). Thus, to investigate the reason behind lack of knowledge sharing, Ford and Staples (2008) suggested the concept of disengagement from knowledge sharing, which is defined as individuals who are neither actively sharing (communicating) their knowledge, nor motivated to protect their knowledge. While disengagement from knowledge sharing is a more common problem than

knowledge hiding or hoarding (Ford, 2008), very few studies in the extant literature have focused on exploring this phenomenon. Aligned with this gap, in this study, I want to investigate technological factors that are associated with employees' disengagement from knowledge sharing.

My explanation is based on the theoretical framework of the Job Demand-Resources model, which highlights that every occupation may have specific demands and resources that impact critical job outcomes (Demerouti et al., 2001). While job demands are the physical, social, or organizational aspects of the job, which require sustained physical or mental effort (such as role ambiguity, time pressure, work overload, etc.), job resources are the factors of the job that reduce job demands and the associated physiological and psychological costs (social support, job autonomy, feedback, etc.). Thus, based on this model, I want to explore job demands and resources related to Information and Communication Technologies (ICTs) at the workplace that are associated with disengagement from knowledge sharing. Though there exists various workplace demands and resources, in this study I am focusing only on ICTs related job demands and resources, mainly because (1) over the past decades organizations are continuously implementing new and innovative ICTs, (2) employees are adapting to various ICTs to perform their daily job roles, (3) ICTs largely altered and changed the existing business processes, workflows, and old organizational structures and thus create demands and resources at workplace.

In doing so, I am incorporating the concepts of technostress, which is the stress experienced by the end-users of ICTs (Ragu-Nathan et al., 2008) to the job demand-resources framework to build my research model. I propose that technostress creators and technostress inhibitors act as job demands and job resources, respectively, for the employees who regularly

use any form of ICTs to complete their assigned tasks. Technostress creators are technological factors that create stress (i.e., technostress), while technostress inhibitors describe the organizational mechanisms that have the potential to reduce the effects of technostress (Ragu-Nathen et al., 2008). Technostress creators are associated with burnout (Srivastava, Chandra, & Shirish, 2015), while technostress inhibitors lessen this negative impact and are also associated with engagement at work (Ragu-Nathan et al., 2008). Further, I propose burnout and engagement at work influence employees' disengagement from knowledge sharing behavior. And finally, the relationships between technostress creators and technostress inhibitors with disengagement from knowledge sharing are mediated by burnout and engagement, respectively.

Thus, incorporating job demand-resources framework and technostress, in this study my research question is listed below:

Research Question: How do technostress and the job demand-resources model help explain the problem of disengagement from knowledge sharing in organizations?

This study makes three key contributions. Firstly, prior knowledge management literature in general has focused more on counterproductive knowledge behavior where employees hide their knowledge intentionally (Connelly et al., 2012; Holten et al., 2016; Serenko & Bontis, 2016; Webster et al., 2008). However, Ford and Staples (2008) proposed that disengagement from knowledge sharing is another serious issue where employees unintentionally fail to share their knowledge due to various factors such as time constraints, health issues, etc. This study further explores the phenomena of disengagement from knowledge sharing and is the second empirical study to do so, after the study of Ford, Myrden, and Jones (2015). Secondly, this study incorporates the theoretical framework of job demands-resources model and technostress literature to examine disengagement from knowledge sharing. While ICTs are one of the integral

parts of modern workplace, leveraging the job demands-resources model, I assessed the technology related stress factors with relation to knowledge management literature. Thirdly, this study can be used by practitioners to understand the impacts of ICTs at work and how they influence employees' knowledge sharing behaviors. Thus, they may be able to facilitate knowledge sharing among employees in a technology dominant workplace.

The rest of the paper is structured as follows. Firstly, I present the literature review on technostress, job demand-resources framework, and disengagement from knowledge sharing. Then, I propose my research model and the hypotheses and discuss the logical explanations behind those. Next, I describe my research method, followed by the results and discussion section. Finally, I discuss the limitations and future research directions before deliberating on the implications and conclusion of the study.

2. Literature Review and Hypotheses Development

In this section, after highlighting the existing literature on disengagement from knowledge sharing, job demands-resources framework, and technostress, I discuss the hypotheses using the theoretical framework of job demands-resources framework.

2.1. Disengagement from Knowledge Sharing

Disengagement from knowledge sharing is defined as "individuals who are neither actively sharing (communicating) their knowledge, nor motivated to protect their knowledge" (Ford et al., 2015; p. 478). It is different from other constructs like knowledge hiding or partial knowledge sharing where people intentionally hide their knowledge (Serenko & Bontis, 2016). Though disengagement from knowledge sharing is unintentional, it is a serious counterproductive knowledge behavior as one study found it constituted more than twice the

number of incidents of partial knowledge sharing or knowledge hiding combined (Ford, 2008).

Disengagement from knowledge sharing is characterized by low knowledge sharing and low knowledge hoarding where people are neither interested to share their knowledge nor intended to hide it (Ford & Staples, 2008). In other words, employees are not trying to protect their knowledge. However, they are less motivated to share knowledge and due to the low levels of interpersonal communications, disengagement from knowledge sharing occurs. A qualitative analysis by Ford (2008) shows that some of the reasons for such disengagement are people are either too ill, or too busy, or too tired to share their knowledge.

2.2. Job Demands-Resources Model

In extant literature, theories such as role theory (Tarafdar et al., 2007), transaction-based model of stress (Ragu-Nathan et al., 2008), transactional model of stress and coping (Srivastava et al., 2015) were used to study technostress while engagement theory and adaptive cost theory were used to explain disengagement from knowledge sharing (Ford et al., 2015). In this paper, I used the job demands-resources framework to propose my research model and hypotheses. The job demand-resources framework does not restrict itself to specific workplace settings while considering both positive and negative job characteristics that influence employees' behavior and well-being. It focuses on a holistic picture of organizational setting where employees not only experience demands such as job insecurity, time pressure, or sexual harassment but also enjoy resources such as leadership, autonomy, procedural fairness, etc., to counter the work tensions.

Aligned with the job demand-resources framework, in this paper, I am focusing on ICTs driven workplaces where employees regularly use technologies in their day-to-day job roles. Further, I intend to study ICTs related positive and negative characteristics at work and how they influence employees' knowledge sharing behaviors. Thus, job demand-resources is

well fit to provide the logical explanations and reasoning for my hypothesis development.

Job demand-resources model, one of the leading job stress models, assumes that the balance between positive (resources) and negative (demands) job characteristics influence employees' well-being (Schaufeli & Taris, 2014). According to the job demand-resources framework, every occupation may have specific factors that impact critical job outcomes (Demerouti et al., 2001). These factors can be categorized as either job demands or job resources. Here job demands were defined as "those physical, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain physiological and psychological costs" while job resources were defined as "those physical, social, or organizational aspects of the job that may do any of the following: (a) be functional in achieving work goals; (b) reduce job demands and the associated physiological and psychological costs; (c) stimulate personal growth and development" (Demerouti et al., 2001; p. 501). A few examples of job demands in occupational context include role conflict, time pressure, problems planning, and reorganization and examples of job resources can be safety climate, team harmony, performance feedback, and innovative climate (see Schaufeli & Taris, 2014, for the detailed list).

The job demand-resources model is widely studied using both cross-sectional and longitudinal data across various context (Hakanen et al., 2006; Schaufeli et al., 2009; Hansez & Chmiel, 2010). Focusing specifically in the information systems domain, research shows teleworkers who experience the demands of time pressure, role ambiguity, and role conflict experienced exhaustion, which is a core dimension of burnout while resources like autonomy, feedback, and social support increase their job engagement (Sardeshmukh et al., 2012). Similarly, interruptions and work-life conflicts are the demands and accessibility and efficient communication are resources associated with social media usage at work (van Zoonen et al.,

2017). In another study, Ghislieri et al. (2017) argued that employees experience extra job demands due to the supplemental work employees must do because of the extensive use of mobile technologies. They proposed that job demands such as workload, emotional dissonance, and supplement work during off-work hours assisted by technology were positively related to work-family conflict which negatively influenced work-family enrichment. Ghisliere et al. (2017) called this *off-work hours technology-assisted job demand*.

Apart from employees' well-being, past researchers also used the JD-R model to study various other dependent variables such as workplace bullying (Ariza-Montes, Leal-Rodríguez, & Leal-Millán, 2016), work-family conflict and work-family enrichment (Ghislieri et al., 2017). Aligned with these studies, here I am focusing on disengagement from knowledge sharing at organizations as our criterion variable. Further, as I focus on ICTs related job demands and resources, I am considering technostress creators and technostress inhibitors as demands and resources, respectively. Technostress creators are factors that create technostress at work, while technostress inhibitors are the organizational mechanisms that have the potential to reduce the negative impacts of technostress (Ragu-Nathen et al., 2008). The explanations of the relationship between technostress and disengagement from knowledge sharing will be discussed in the hypothesis development section.

2.3. Technostress

In the information systems domain, Tarafdar et al. (2007) and Ragu-Nathen et al. (2008) initially started the research on technostress, which is defined as a modern disease of adaptation caused by an inability to cope with new computer technologies healthily (Brod, 1982). Based on role theory (Gross & McEachern, 1996) and sociotechnical theory (Trist & Bamforth, 1951), the second order construct technostress creators was conceptually developed and empirically

validated (Tarafdar et al., 2007). Drawing reference from the transaction-based model of stress, technostress creators and technostress inhibitors correspond to the stressors and situational factors, respectively (Ragu-Nathan et al., 2008). Ragu-Nathan et al. (2008) stated "technostress creators represent the factors that create technostress in the organization" (p.421), while "technostress inhibitors describe the organizational mechanisms that have the potential to reduce the effects of technostress" (p.422). The various dimensions of technostress creators and technostress inhibitors and their definitions are given below. (see Tarafdar et al., 2007 and Ragu-Nathen et al., 2008, for the detailed description).

The five dimensions of technostress creators are techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. *Techno-overload* is dealing with the excessive amount of information in a limited time, which forces employees to work faster and longer. *Techno-invasion* is the omnipresent effect of technology, which essentially blurred the line between work-home balances and created unnecessary disturbances. The third dimension, *techno-complexity* describes situations where employees are forced to spend more time and effort to learn and understand workplace technologies because of the complexity associated with ICTs (Tarafdar et al., 2007). Due to this, employees may not be able to develop new skills quickly enough, and their use of existing skills to new technologies may result in creating issues and errors. *Techno-insecurity* is related to situations where ICTs creates a fear of job loss among employees as they perceive new technologies may lead to automation, or people with better skills and abilities will replace them in the long run. Finally, *techno-uncertainty* deals with frequent and innovative technical changes that make workers unsure about their work and job roles (Tarafdar et al., 2007).

As the name suggest, technostress inhibitors represent organizational mechanisms that reduces the negative impacts of technostress creators on employees and their job outcomes

(Ragu-Nathen et al., 2008). Based on existing literature and practitioner discussions they introduced three inhibitors: literacy facilitation, technical support provision, and involvement facilitation. While the first two include the provision of trainings, knowledge transfer sessions, and help desk services throughout the year, involvement facilitation related to the active inclusion of employees during new systems implementation processes.

In the information systems literature, compared to technostress inhibitors, technostress creators and their impacts on job outcomes are studied more extensively. Studies show technostress creators are positively related to role conflict and role overload (Wang & Shu, 2008), burnout (Srivastava et al., 2015), and work exhaustion (Gaudioso et al., 2017). Conversely, these factors are negatively related to job engagement (Srivastava et al., 2015) and employee satisfaction with ICTs use (Fuglseth & Sørebø, 2014). Researchers also investigate factors like organizational environment (Wang et al. 2008), technological characteristics (Ayyagari et al. 2011), personality and espoused cultural differences (Krishnan, 2017), and individual characteristics such as age, gender, job experience, and education (Marchiori, Mainardes, & Rodrigues, 2019) as antecedents to technostress creators. In this paper, I consider both technostress creators and technostress inhibitors together to study their impacts on employees' disengagement from knowledge sharing behavior.

2.4. Hypothesis Development and Research Model

Using the theoretical framework of job demands-resources model, in the below section, I discuss how technostress creators and technostress inhibitors are related to disengagement from knowledge sharing through the meditation roles of burnout and engagement, respectively.

2.4.1. Technostress creators, burnout, and disengagement from knowledge sharing

The JD-R model postulates that high job demands force employees to put in additional effort to achieve work goals. As a result, employees may experience some psychological and physical problems such as fatigue and irritability (Demerouti et al., 2001). Employees may recover from this by taking a break, switching tasks, or performing fewer demanding activities (Schaufeli & Taris, 2014). However, when such recovery is insufficient, the individual is in a continued state of activation that gradually exhausts her/him physically and/or mentally leading to burnout (Schaufeli & Taris, 2014). Burnout is a state of physical, emotional, and mental exhaustion, which greatly demotivates employees and eventually leads to attrition if no measure is taken to curb burnout (Malach-Pines, 2005). Along with the various physical, social, or organizational aspects of the job that can act as job demands, researchers are now discussing several technology-based job characteristics such as technology job overload and job monitoring as demands that positively influence job tension among employees (Carlson et al., 2017). Aligned with these discussions, in this study I propose that technostress creators act as job demands and are associated with burnout among employees.

While on the one hand the ubiquitous nature of ICTs in the modern workplace setting has dramatically improved the production efficiency, quality, and effectiveness (Bharadwaj, 2000; Melville et al., 2004), on the other hand, it also demands high physical, social, and cognitive skills from the employees to smoothly operate and manage various technical workflows and applications (Ayyagari et al., 2011). Technostress creators through their five dimensions capture this demanding nature of workplace technologies; thus, I argue that technostress creators act as job demands.

Firstly, techno-overload describes situation where ICTs force employees to work faster and longer (Ragu-Nathan et al., 2008). For example, while email communication becomes an

integral part of modern workplace for its speed of deliver and ease of use, huge amount of emails often causes the problem of email overload, which is positively associated stress, disruption, and burnout while hampering employees' productivity (Dabbish & Kraut, 2006, McMurtry, 2014; Reinke & Chamorro-Premuzic, 2014).

Secondly, due to the extensive use of modern communication technologies, employees can now be reached at any time and feel the need to be constantly connected (Tarafdar et al., 2007). Techno-invasion which captures this omnipresent nature of ICTs essentially blurs the boundary between work and home as employees work odd hours and perceive the loss of privacy (Mandel, 2005; Chandra et al., 2015). This is often related to work-family conflict which triggers work-exhaustion among employees (Ahuja et al., 2007; Gaudioso et al., 2017).

Thirdly, organizations are always under the pressure to implement latest technologies for competitive advantages which lead to frequent ICTs update (Fisher & Wesolkowski, 1999). Also, to counter the increasing threats of data theft, data piracy, and information loss, new ICTs are becoming more sophisticated and complex. This complex nature of modern technologies creates the issue of "skill discrepancy" where employees must spend much of their time learning how to use the new ICTs as existing skills are not enough (Parson et al., 1991). Also, the extensive use of Enterprise Resource Planning systems, Customer Relationship Management systems creates interdependencies that required interactions and collaborative efforts between different functions and organizational branches across the globe. Techno-complexity, which captures these intricacies associated with modern ICTs forces employees to go beyond the traditional silo management which creates role conflict and role overload based on culture, perspectives, and competencies (Tarafdat et al., 2007). Further, role conflict and role overload are positively associated with stress and burnout among employees (Sethi et al., 1999; Jawahar et al., 2007; Yip et al., 2008).

Fourthly, techno-insecurity is associated with situations where users feel threatened about losing their jobs, either because of automation from ICTs or to other people who have a better understanding of ICTs. Further, implementation of certain ICTs like Enterprise Resource Planning systems required significant process and configuration changes to offer best practices which may not be accepted by all the employees (Ragu-Nathan et al., 2008). Thus, they may feel threatened due to the lack of control on their jobs which the technology imposes, thus reducing the job satisfaction and limiting their effectiveness and efficiency (Chandra et al., 2015).

Finally, the continuous changes and updates in organizational ICTs often unsettle employees and create uncertainty (Tarafdar et al., 2007). Because of this ever-evolving ICTs, employees find it difficult to develop a base of knowledge or a meaningful pattern and their existing knowledge became obsolete (Kupersmith, 1992; Weil & Rosen; 1997). Due to these factors, even employees who are keen about learning new applications eventually get frustrated which can lead to stress and interpersonal conflicts (Brod, 1982; Zorn, 2003).

Aligned with this discussion, I argue technostress creators act as job demands which need a greater degree of effort from the employees to deal with those. In the absence of suitable situational or individual coping mechanisms, these demands gradually exhaust employees physically and/or mentally leading to burnout (Ragu-Nathan et al., 2008; Srivastava et al., 2015). Thus, I hypothesize that there is a positive relationship between technostress creators and burnout. Hence,

Hypothesis 1: Technostress creators as job demands will be positively related to job burnout.

I further argue that when employees are experiencing burnout at work, they will be less engaged in organizational knowledge sharing behavior. While organizations are taking extensive steps to promote knowledge management to sustain competitive advantage in the volatile

business environment, knowledge sharing is particularly important to generate new ideas and business opportunities (Kankanhalli et al., 2005). Knowledge sharing requires additional efforts from employees who do the sharing with another person or group (Chang & Chuang, 2011). Moreover, knowledge sharing is often considered as an example of organizational citizenship behavior where employees go beyond their assigned job roles to help others (Kelloway & Barling, 2000; Ford et al., 2015). Thus, employees suffering from burnout will disengage from knowledge sharing not because they want to protect their knowledge, but because they are physically, emotionally, and mentally exhausted to perform an additional task of knowledge sharing.

Burnout also manifests itself in the form of "depersonalization of others, and lack of felt accomplishment in working with others" (as cited in Jawahar, Stone, & Kisamore, 2007, p. 143). Thus, employees feel the tendency to deindividuation and fail to produce desired results after repeated efforts, which further leads to a feeling of inefficacy and reduced motivation. Thus, while factors like knowledge self-efficacy, enjoyment in helping others (Kankanhalli et al., 2005; Lin, 2007), and social interaction (Chang & Chuang, 2011) are positively influence employees to share their knowledge, feeling of inefficacy and tendency to deindividuate essentially influence employees to disengage from knowledge sharing. Thus, I hypothesize:

Hypothesis 2: Job burnout will be positively related to disengagement from knowledge sharing.

Further, theories like person-environment fit theory (Edwards & Cooper, 1990) and adaptive cost theory (Cohen, 1978) argue that individuals have limited skills and abilities and they muster these skills to meet the demands of the environment. When there are taxes on these capabilities due to external demands, individuals put their efforts on more relevant and necessary jobs rather than perceived non-essential tasks like knowledge sharing. As we discussed before,

due to technostress creators, employees are now forced to work faster and long hours while facing the issues of skill discrepancy, work-family conflicts, information overload, and fear of job loss. In such a context, employees are facing a constant need to improve their own technological abilities and skills. They are more likely to use their free time to educate and train themselves. Thus, they become disengaged from knowledge sharing due to lack of time and energy. In summary, technostress creators and burnout deter employees from knowledge sharing while burnout also mediates the relationship between technostress creators and knowledge sharing. Hence, I hypothesize the following:

Hypothesis 3: Job burnout will mediate the relationship between technostress creators and disengagement from knowledge sharing.

2.4.2. Technostress inhibitors, engagement, and disengagement from knowledge sharing

Job resources mitigate the negative impacts of burnout on employees (Demerouti et al., 2001). Lack of such resources precludes the actual goal accomplishment, which leads to failure and frustration (Bakker, Demerouti, & Verbeke, 2004). In this study, we propose that technostress inhibitors, as job resources, are positively associated with engagement at work and indirectly associated to employees' disengagement from knowledge sharing behavior.

Technostress inhibitors are organizational mechanisms, such as literacy facilitation, technical support provision and involvement facilitation, which potentially reduce the negative impacts of technostress creators on employees (Ragu-Nathan et al., 2008). Job engagement refers to "the simultaneous employment and expression of a person's 'preferred self' in task behaviors that promote connections to work and to others, personal presence (physical, cognitive, and emotional) and active, full performances" (Kahn, 1990, p.700). Highly engage employees are more involve in their jobs both physically and cognitively than others. Job engagement is more

likely to occur when individuals find the job meaningful, perceive there to be physical, mental and emotional safety within the workplace, and when they have physical, mental and emotional availability (i.e., resources) (Kahn, 1990).

Technostress inhibitors deal with the provision of proper training and guidance to use new and updated ICTs, timely technical support at work, and allowing employees to participate during the system planning and implementation phases. By doing so, employees become familiar with the workplace ICTs and understand the related benefits and opportunities associated with these technologies (Ragu-Nathan et al., 2008). Further, when organizations invest money and time on training and knowledge transfer sessions to educate and train employees, they perceive that there is administrative support to help and guide them during difficult situations while dealing with ICTs at work (Ahmad et al., 2014).

Here, I argue that, aligned with perceived organizational support literature, the role of technostress inhibitors with engagement can be discussed. When employees perceive that the organizations care for their well-being and they receive support and appreciation from peers and supervisors, they are more likely to invest themselves into their work roles (Saks, 2006; Rich, Lepine, & Crawford, 2010). Similarly, when organizations allow user involvement during system planning and implementation, this creates a sense of meaningfulness among employees where they participate in discussions on new systems designs and implementations and thus will show high level of engagement. Secondly, organizations with efficient technical support teams and help desks, not only encourage employees to explore new ICTs during the implementation, but also provide continuous support to resolve technical issues employees are facing during their work. This creates a safe work environment where employees invest themselves fully into their job without the fear of facing negative consequences. Thus, the fourth hypothesis is as follows:

Hypothesis 4: Technostress inhibitors as job resources will be positively related to job

engagement.

Ford et al. (2015) tested competing theories, engagement theory and adaptive cost theory, to explain disengagement from knowledge sharing. As per engagement theory, meaningfulness of the job, safety, and availability at workplace should be positively related to engagement at work and job engagement should be negatively related to disengagement from knowledge sharing through a spillover effect. On the contrary, based on adaptive cost theory, employees should attend more to in-role task performance, which would be a cost to their knowledge sharing behavior. The results of their study provided support for adaptive cost theory by indicating a positive relationship between job engagement and disengagement from knowledge sharing. They argued that when employees are more engaged with their job roles it left fewer resources for an extra-role activity like knowledge sharing.

Aligned with that study, here I argue that in the presence of technostress inhibitors, employees will be more engage with their specific job tasks. In doing so, tasks like knowledge sharing, which is not always mandatory but a citizenship behavior, are less likely to occur. Thus, employees pay more attention and invest more energy to accomplish their job tasks and knowledge sharing becomes deprioritized. In other words, employees when more engaged with their jobs, tended to pay less attention to knowledge sharing activities and their disengagement from knowledge sharing behavior increased. Hence, I hypothesized:

Hypothesis 5: Job engagement will be positively related to disengagement from knowledge sharing.

Hypothesis 6: Job engagement will mediate the relationship between technostress inhibitors and disengagement from knowledge sharing.

2.4.3. Control variables

Based on the job demands-resources framework, I integrated the technostress and knowledge management literatures to propose my research hypotheses. However, in the existing knowledge management literature, there are two key variables that are relevant for disengagement from knowledge sharing: propensity to share knowledge and knowledge sharing required. Thus, in this research, I used propensity to share knowledge and knowledge sharing required as control variables and examined their relationships with disengagement from knowledge sharing.

As the name suggested, propensity to share knowledge is a "person's predisposition toward sharing his/her knowledge" (Ford & Staples, 2010, p. 397). Propensity to share knowledge highlights the importance of knowledge sharing and the enjoyment and motivation people get from sharing their knowledge. Employees with high propensity to share knowledge have an intrinsic motivation to share knowledge (Ford & Staples, 2010). They believe that knowledge should be freely shared and do not tend to hide their knowledge from others. Hence, I propose the below hypothesis:

Hypothesis 7a: Propensity to share knowledge is negatively related to disengagement from knowledge sharing.

Knowledge sharing required captures to what extend employees are formally required to share their knowledge by the organizations.[1] While knowledge sharing is often considered as an extra-role activity and aligned with organizational citizenship behavior, in recent years the trend is changing. With the increase competitions and changes in the business world, knowledge

[1] The construct "knowledge sharing required" and its measure were developed for the work of Ford et al. (2015). Though they used it as a tool to measure and describe their sample characteristics, the "knowledge sharing required" measure, itself, was not published in any journal.

sharing is becoming essential within organizations, and with their dealers and suppliers. In such a context, it is required by the organizations to share knowledge and knowledge sharing is a component of employees' performance evaluation. When knowledge sharing is formally required by the job, employees will be less disengaged from knowledge sharing as their future promotions and benefits are linked to their knowledge sharing behavior. Hence, I hypothesized

Hypothesis 7b: Knowledge sharing required is negatively related to disengagement from knowledge sharing.

In summary, I have proposed to examine the relationships of technostress creators and technostress inhibitors with disengagement from knowledge sharing. I used the job demands-resources framework with two key control variables to study the same (see Figure 1 for a pictorial representation of the full research model that I have developed for this study).

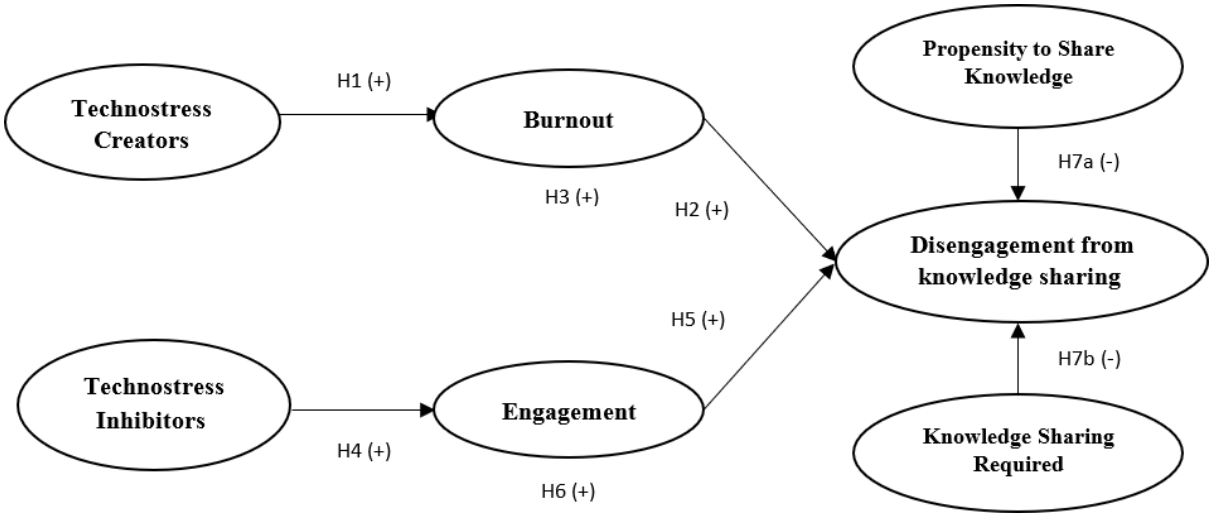


Figure 1: The Research Model

3. Research Methodology

In this section of the thesis, I provide the details of the procedure regarding the data collection (time-lag survey), the sample, and measures used. I also explain the analyses (variance-based structural equation modeling, using partial least squares path modeling method) in the following sections.

3.1. Procedure

In this study, I followed a quantitative research approach as the objective is to test pre-specified hypotheses. I am not introducing any new concepts or constructs in this study, rather I developed my hypotheses based on existing literature and theory and intend to test those. Hence, a quantitative approach is suitable for this study (Kaplan & Duchon, 1988). Further, I used a time lagged online survey method to collect the data to avoid the issues of common method bias linked to cross-sectional data collection as this is self-reported data from a single source (Podsakoff, MacKenzie, & Podsakoff, 2012). There was a gap of two weeks between the Time 1 and Time 2 survey. According to Phillips and Kausler (1992), within the initial 24 hours, the most forgetting of events occurs and after that there is a constant decrease in recall ability. Thus, a two-week time interval was chosen to ensure a reduced response bias as participants may find it difficult to recall their original responses from Time 1 (Marche, Jordan, & Owre, 2002). A longer timeframe was avoided to reduce the risk of participant attrition.

The two surveys were designed using the Qualtrics survey software (https://www.qualtrics.com/) and distributed using Amazon's Mechanical Turk (MTurk, discussed in more detail below in Sample section). In the first survey at Time 1, data related to the predictor variables (technostress creators, technostress inhibitors, engagement, and burnout) were measured. The survey started with the letter of informed consent to provide an overview of

the survey to the participants. It contained various details related to the first survey such as purpose of the survey, time required to complete it, possible risks and benefits, how confidentiality and anonymity was maintained, storage of data and results, etc. In this section, it was also mentioned that the questions are optional, and participants had the choice to skip any question, if they did not want to answer. At the end of the informed consent form, participants were asked to provide their willingness to participate in the survey by clicking either the "I agree" or "I do not agree" buttons. The survey ended for the people who did not agree to participate without showing the questionnaire and thanked them for their initial interest.

After the informed consent form, the survey questionnaire started for Time 1. At the beginning, I gave the definition of ICTs as the questionnaire for technostress creators used the abbreviation of ICTs. Then, the survey was arranged in two different blocks where one block contained the questions for technostress creators and technostress inhibitors while questions for engagement and burnout were presented in another block. The measures in the two blocks were randomized in nature i.e., the order of appearance of the variables of interest was not constant. For example, in case of the second block, some participants got job engagement first while some got burnout first. In survey designs, the order in which the questions appear may act as a source of bias that influences the reliability and validity of the data and subsequent analysis (Perreault, 1975).

Based on the order of appearance, the content of a question may contain information that influences a respondent's answer to any question that follows (Drury & Farhoomand, 1997). Especially when questions related to a single construct appeared together there is a high chance that the participants' answers were elicited from the earlier questions. Thus, to avoid such issues, the survey questionnaire was presented in a randomized block design.

At the end of the survey, participants were asked to provide their MTurk identification

number (this is a unique identifier that stays the same over time and it enables MTurk workers to be paid) and their comments or feedbacks regarding the survey. After the submission of Time 1 questionnaire, a debriefing note was presented to thank the participants for their time and participation in the study. Further, as some questions were related to stress and burnout at work, there was a chance that participants experienced stress during the survey.

Additionally, burnout represents a significant health risk, so participants were debriefed on how to score the items on burnout. Thus, in the debriefing form, it was recommended that if participants experienced stress or were experiencing burnout, they should seek the help of employee assistance programs and/or counselors available in their organizations. If no such facilities were available, they should speak to a general/family physician or access the publicly available resources such as Canadian Mental Health Association and Mental Health America. The debriefing form also contained the links to the official websites of these two organizations and the toll-free number for that of Canada.[2]

In the Time 2 questionnaire, I collected data on disengagement from knowledge sharing, propensity to share knowledge, knowledge sharing required, and demographic characteristics such as age, gender, education level, and industry. Similar to Time 1, it also contained an informed consent form, followed by the survey questionnaire and a debriefing form at the end. However, compared to the Time 1 survey, the second survey has a less detailed consent form as it was sent to only those participants who completed the first survey and aware of the study.

Following the same arguments given earlier for Time 1 questionnaire to reduce any response bias, I used randomized block design for the survey for Time 2. The first block had the questions for propensity to share knowledge and disengagement from knowledge sharing while the second block had an attention check question and the questions for knowledge sharing

[2] The toll-free number of Mental Health America was not available. Thus, it was not given in the debriefing form.

required. In these two blocks, the orders of the measures were randomized. There was a third block which contained the demographic questions such as age, gender, education level, and industry. Lastly, participants were asked to provide their MTurk ID and their comments and feedback, if any, followed by the debriefing form for the second survey to thank the participants for their time and patience. Additionally, the debriefing form also contained a summary of the research for which the data was collected along with the similar recommendations mentioned in the first survey for stress and difficulties (if participants experienced any stress or difficulties).

An example of each survey is provided in Appendix A (Time 1), and Appendix B (Time 2); it should be noted that the order of questions is one of the several possible iterations, given the randomization of the constructs within each block.

Both Time 1 and Time 2 surveys were available for two days before expiration (i.e., participants could not see the surveys anymore). As noted earlier, the participants, who completed Time 1 survey, were asked to provide their unique participant pool (MTurk) ID. I sent the Time 2 questionnaire only to those participants, who completed Time 1 survey and asked for their MTurk ID again. Finally, using that unique ID, I matched the responses from Time 1 and Time 2 questionnaires. Participants received $1.25US per survey, so $2.50 in total who completed both the surveys. Participants who completed the first survey only, received $1.25 and $0 for the second survey.

As I collected data from individuals, before distributing the surveys I completed the Tri- Council Policy Statement: Ethical Conduct for Research Involving Humans Course on Research Ethics (TCPS 2: CORE) certification and obtained the ethics approval from the Interdisciplinary Committee on Ethics in Human Research at Memorial University of Newfoundland (ICEHR #20201139-BA).

3.2. Study Measures

To measure the constructs, no new scales were developed in this study. I used validated scales from existing literature to formulate the questionnaire.

The five dimensions of technostress creators were adopted from the studies of Srivastava et al. (2015), in which the content, convergent, and discriminant validities and the reliability of the measures were established. Here, techno-overload, techno-complexity, and techno-insecurity each had five reflective items, while techno-invasion and techno-uncertainty, had four reflective items each. The items are measured with 7-point Likert scale with 1 being "Strongly Disagree" to 7 being "Strongly Agree." For each of the five factors of technostress creators, a factor score was created by averaging the item responses. These five factors were the first order reflective measures which were used as formative indicators for the second order construct technostress creators. Technostress creators is a formative construct with five different dimensions, and it is not necessary that people experience all these five dimensions together. For example, an individual may experience techno-invasion in his daily life but not necessarily feels the effect of techo-uncertainity. Reliability scores are not applicable for formative measures; thus, one is not provided here for the second-order construct of technostress creators. However, the Cronbach's alpha values were calculated for each of the five dimensions of technostress creators.

An example item for techno- overload is "*I am forced by ICTs to work much faster*" and its Cronbach's alpha value was 0.94. For techno-invasion, the Cronbach's alpha value was 0.93 and an example item is "*Because of ICTs, I spend less time with my family."* Techno-complexity has a Cronbach's alpha value of 0.94 and an item of it is "I need a long time to understand and use new ICTs." Finally, example items for techno-insecurity and techno-uncertainty are "Because of new ICTs, I need to update my skills to avoid being replaced" and "In our organization, there are always new developments in the ICTs we use" and their

Cronbach's alpha values are 0.94 and 0.95 respectively. For all these five dimensions, the Cronbach's alpha values are greater than the recommended minimum value of 0.7 (Nunnally, 1978).

I used the scale from Ragu-Nathan et al. (2008) to measure the three dimensions of technostress inhibitors. This is a 7-point Likert scale with 1 being "Strongly Disagree" to 7 being "Strongly Agree". For each of the three factors of technostress inhibitors, a factor score was created by averaging the item responses. These were then used as formative indicators of the higher-order construct of technostress inhibitors. Reliability scores are not applicable for formative measures; thus, one is not provided here.[3] Among the three dimensions, literacy facilitation has five items and an example item is "*Our organization emphasizes teamwork in dealing with new technology*." It has a Cronbach's alpha value of 0.90. The other two dimensions, technical support provision (Cronbach's alpha: 0.95) and involvement facilitation (Cronbach's alpha: 0.84), each has four items and example items are "*Our end-user help desk does a good job of answering questions about technology*" and "*Our end users are encouraged to try out new technologies*" respectively. The validity and reliability of this measure was established by Ragu-Nathan et al. (2008).

For measuring burnout at work, a short 10-item scale was adopted from the study of Malach-Pines (2005). It asks participants how often they feel "*tired*" or "*helpless*" when they think about their work. Apart from tired and helpless, the scale contains another eight such feelings. All the ten feelings were measured using a 7-point Likert-type scale with 1 being "never" and 7 being "always." The Cronbach's alpha for this measure was 0.94. Among the many burnout scales, I used this short 10-item scale of burnout as it is easy-to-use and has high

[3] As formative constructs, technostress creators and technostress inhibitors do not have any reliability measures and thus, no Cronbach's alpha values. However, I calculated the Cronbach's alpha values for each of their individual dimensions.

face validity (Malach-Pines, 2005).

The next construct, engagement at work was measured using the scale borrowed from the article of Salanova et al. (2005). It is a six item scale and one of the items is "*At work, I feel full of energy."* The scale is a 7-point Likert scale with 1 being "Strongly Disagree" to 7 being "Strongly Agree" and a Cronbach's alpha value of 0.96. This is the most commonly used measure for job engagement and has excellent performance in discriminant, convergent and face validity.

Finally, the criterion variable disengagement from knowledge sharing was measured using the scale developed by Ford et al. (2015). It asked participants to think about work-related knowledge and their behaviors at work for the past four weeks with members of the organizations and choose an answer that describes the frequency of four different behaviors. One such behavior (an item of this scale) is "*I don't care about sharing my expertise, and I don't care about protecting it either*." The frequency was measured using a 7-point Likert-type scale with 1 defined as "Not once / Did not do" and 7 defined as "More than once a day." An 8th option was provided for "Not applicable/No opinion." Participants who answered 8, were recoded as a missing variable. This measure has a Cronbach's alpha value of 0.84. Disengagement from knowledge sharing had face, content, and convergent validity tested in a qualitative study (Ford, 2008), and a pilot study (Ford et al., 2015).

The first control variable, propensity to share knowledge was measured using the scale from Ford and Staples (2010). Ford and Staples (2010) adapted this scale from the study of Kolekofski Jr. and Heminger (2003). An item of this scale is "*I tend to make my knowledge readily available*." It is a 7-point Likert scale with 1 for "Strongly Disagree" to 7 for "Strongly Agree" and has a Cronbach's alpha value of 0.91. The face validity, discriminant validity and predictive validity of this measure were established (Ford, 2004).

As mentioned before, the scale for knowledge sharing required was developed for the Ford et al. (2015) article on disengagement from knowledge sharing, but the scale was used only to describe the participant composition in terms of knowledge sharing requirements in their job, not as a formal control variable. Subsequently, this measure has not been published in any research paper after that. An example item of this measure is "*I have been told sharing knowledge is a part of my regular job duties*." This is also a 7-point Likert scale where 1 stands for "Strongly Disagree" to 7 stands for "Strongly Agree." One item in this measure did not perform well and was removed (see more details in the Analyses section below). The resulting Cronbach's alpha after the poor performing item was removed was 0.88.

Apart from the above measures, I also collected participants' demographic information such as age (actual age in years), gender (male, female, other), educational background (categorical data), and industry (categorical data). See Appendix C for the list of all items that were used in this study.

3.3. Participants

I used Amazon's Mechanical Turk (MTurk, https://www.mturk.com/) to distribute the survey. MTurk is a popular option for recruiting and collecting experimental, intervention, and survey data (Schleider & Weisz, 2015). Using MTurk, researchers can recruit individuals with an MTurk account, known as "workers" (here, called participants), to complete various ‘‘Human Intelligence Tasks’’ (HITs), such as completing surveys or summarizing articles. Finally, researchers pay the participants upon successful submission of the HITs.

I chose MTurk for various reasons. Firstly, it facilitates rapid, relative low-cost data collection from various participants. Secondly, the researcher cannot access the personal information of the participants as the participants are only identifiable by their unique "Worker

ID". Thus, the anonymity and confidentiality of the participants are maintained. Thirdly, the built-in features in MTurk allowed researchers to assign specific eligible criteria (e.g., full-time vs. part-time employees, country of origin) to the participants. Finally, MTurk monitored the performance of the participants and their "reputation" determines how many HITs they are permitted to complete in the future (Rand, 2012).

Using random sampling in the MTurk participant pool, I collected data from full time employees who regularly use ICTs to accomplish their professional tasks. Along with full time employees, I also selected participants who are "MTurk Masters" to do the surveys. Masters are those participants who demonstrated excellence across a wide range of tasks, and need to pass MTurk's regular statistical monitoring to retain their status.

For Time 1, a total of 217 employees answered the online survey. Two weeks later, I sent the Time 2 survey to only these 217 participants using their MTurk ID as a reference and received a total of 166 valid responses. The 166 responses from Time 2 were matched to their corresponding responses from Time 1 using the unique MTurk ID. Hence, the response rate for Time 2 in this study is 76.5%. (Since I do not know how many MTurk Masters saw the initial invitation, I cannot compute the overall response rate of the study.) To increase the number of participants, initially I was planning on distributing the survey again. However, due to COVID-19 pandemic, organizations were shut down and most employees started working from home. As my research is on stress, I argued that participants will experience more stress during COVID-19 era compare to pre COVID-19 as factors like the pandemic, job loss, market uncertainty, and continuous work from home would make people more anxious and tensed. Furthermore, the role of IT and the associated technostress was likely amplified during the mandated social distancing. Thus, data from pre and during COVID-19 era cannot be considered together, hence, I stopped collecting any more data.

Among the 166 participants, there were 109 males (65.66%) and 56 females (33.73%),

and one person selected other as their gender. The ages of participants ranged from 24 years to a maximum age of 67 years. The mean age of the sample was 37.87 with a standard deviation of 8.27. The majority of the participants had at least an undergraduate degree (i.e., 90 people had an undergraduate degree (54.21%) and 25 people had a Master's degree (15.06%)). Two people (1.2%) had completed some high school while 16 individuals (9.63%) had the high school degree as their highest degree, 23 had some college education (13.85%), and ten people (6.02%) had a post-secondary diploma.

Nearly every industry was represented within the sample, with the largest number of people working in the services for profit sector (44 people, 26.5%) and 24 people selected other (14.45%). There were 8.43% (14) of the sample from the education service sector, 7.83% (13) of the sample from the manufacturing (durable) sector, and 6.62% (11) from the government sector.

Additionally, I also conducted an independent sample t-test in SPSS software to check if there was any selection bias between participants who completed both the surveys and those who dropped out from the second survey. The results for all the variables, except literacy facilitation (t (216) = 2.702, $p < 0.05$) were not significant. However, literacy facilitation is one of the three dimensions of technostress inhibitors and the results of independent sample t-test for the second order construct technostress inhibitors was also not significant. Thus, it is unlikely that there is a selection bias between Times 1 and 2 present in the sample of this study. There may, however, still be a selection bias based on the sample pool (MTurk participants versus general population).

See Table 1 for full summary of the demographics of the sample.

Table 1: Demographics of survey respondents

Measures	Items	Frequency	Percentage
Gender	Male	109	65.66
	Female	56	33.73
	Other	1	0.60
Age	21 to 30 years	29	17.46
	31 to 40 years	86	51.80
	41 to 50 years	37	22.28
	Above 50 years	14	8.43
Education	High School Dropout	2	1.2
	High School	16	9.63
	Some college	23	13.85
	Post-secondary diploma	10	6.02
	Undergraduate	90	54.21
	Masters	25	15.06
Industry	Services for profit	44	26.51
	Other	24	14.45
	Education service	14	8.43
	Manufacturing (durable)	13	7.83
	Government	11	6.62
	Finance	9	5.42
	Insurance	6	3.61
	Manufacturing (non-durable)	8	4.82
	Services-Not for profit	1	0.60
	Wholesale/Retail	9	5.42
	Real Estate	6	3.61
	Construction/Mining	8	4.82
	Healthcare	7	4.22
	Transportation	4	2.41
	Utilities	2	1.20

4. Analysis and Results

In this section, I discuss the statistical analyses techniques that were used in this study.

4.1. Analysis Technique

To analyze the proposed model and associated hypotheses, structural equation modelling (SEM) was used. SEM is a technique that allows researchers to study complex relationships between theoretical (often latent) constructs and it is used to assess ‘‘whether a hypothesized model is consistent with the data collected to reflect [the] theory’’ (Lei & Wu, 2007, p. 34).

There are two major approaches for SEM analysis: covariance-based structural equation modelling and variance-based structural equation modelling, also known as partial least squares analysis (Astrachan, Patel, & Wanzenried, 2014; Van Riel, Henseler, Kemény, & Sasovova, 2017). For this study, I implemented the partial least square (PLS) method for data analysis using SmartPLS software. There are a few reasons for choosing PLS over covariance-based SEM as discussed below.

Firstly, the reason for choosing PLS over covariance-based SEM is due to the required sample size for these techniques. The covariance-based SEM typically requires a much larger sample size compared to PLS. While PLS works very well with larger sample sizes, it also offers solutions for models with small sample sizes and models with many constructs and large number of items (Fornell & Bookstein, 1982; Hair, Risher, Sarstedt, & Ringle, 2019). In this research, the sample size of 166 is comparatively small to support a stable covariance-based analysis. Hence, PLS seems suitable to analyze the data in this study.

Secondly, in this study both technostress creators and technostress inhibitors are second order constructs while their respective first-order constructs were reflective measures. Also, these first order constructs were formative with respect to the second order construct. PLS allows unrestricted use of formative measures and single-item measures (Hair et al., 2019).

Thirdly, PLS method has a high degree of statistical power and gives a more conservative estimate of the relationship between latent variables compared to that of covariance-based SEM (Dijkstra, 1983; Reinartz, Haenlein, & Henseler, 2009). This is quite useful for research that examines less developed or still developing relationships (Hair et al., 2019). The research on disengagement from knowledge sharing is still in its nascent stage and needs more exploration. In this study I examine the relationship between technostress creators and technostress

inhibitors with disengagement from knowledge sharing through the mediating role of burnout and engagement, respectively. Thus, data analysis using PLS is more appropriate compared to covariance-based SEM.

Specifically, in this research, I used SmartPLS software (downloaded from https://www.smartpls.com/) for the PLS-SEM analysis. PLS analysis is done in two steps: (1) outer model (measurement model) is tested; then (2) the inner model (i.e., theoretical model and hypotheses) is tested. Each step is presented next. It is important to note that in SmartPLS all the calculations had been done using standardized data. Hence, all the measures had 0 mean and had standard deviation of 1.

4.2. Data Quality

MTurk is one of the widely used database in social science research. (Buhrmester, Talaifar, & Gosling, 2018). Buhrmester et al. (2018) also stated that "in social science journals with an impact factor greater than 2.5, 2011 saw fewer than 50 papers using data from MTurk, whereas 2015 saw more than 500" (p. 150). Further, collecting data using MTurk is quick, cost effective, and convenient compared to collecting data from individual firms or institutions (Keith, Tay, & Harms, 2017). Thus, aligned with many of the existing studies, I also collected data using MTurk participant pool.

Amazon classifies its participant pool into two types: regular workers and master workers. Master workers are the individuals who "consistently demonstrated a high degree of success in performing a wide range of human intelligent tasks across a large number of requesters" (Loepp & Kelly, 2020, p. 2). Additionally, they also spent twice as much time working in MTurk compare to regular workers. Thus, for this study, I selected master workers to fill out the survey to maintain data quality. I wanted to collect as many data possible for Time 1 to reduce the attrition rate during time

2. Thus, there was no attention check in Time 1, but I did incorporate an attention check in Time 2.

To assess quality of the data received, I completed four analyses: 1) look for nonsensical answers (e.g., single letter or words that do not make sense relative to the question); 2) look for completion times that were extremely fast; 3) look for patterned replies (e.g., all 7's or all 3's); and 4) examine the attention check question in Time 2 survey.

Even though it was not mandatory, many participants gave their feedback in both the surveys. I checked the feedback responses and there were no nonsensical answers. Thus, no data was deleted based on that.

Next, I checked the "time to complete" for Time 1 survey. Prior to collecting data, my supervisor and I tested how long it would take to complete the survey. With thorough reading of the letter of informed consent plus the questions, the time to complete ranged from 5 to 7 minutes. However, if the participant skimmed the informed consent form, it would take him/her approximately 2 to 3 minutes to complete the survey. So, I set a time of 2 minutes or less to identify possible poor-quality data. Ten respondents among the 217 responses from Time 1 had a time of completion less than 2 minutes, so they were scrutinized in greater detail for the other indicators, like nonsensical qualitative answers or patterned responses. These respondents did not have these indicators. Thus, the Time 2 survey was sent to all the 217 participants due to the expected attrition rate.

Among the ten participants identified as fast responders, two persons did not respond to the second survey, so that respondent's data was deleted from the final analysis. The other eight data did not show any easily identifiable pattern and were included in the analysis. For the Time 2 survey, one individual did not respond correctly to the check point question and that respondent's data was deleted from Time 1 and Time 2. Once the quality of the data was assessed, the performance of the data was assessed via the measurement model.

4.3. Reliability, Unidimensionality and Validity Analysis

Reliability refers to the reproducibility of an assessment instrument. High value of reliability indicates that the scale would give the same results if it were used over time, in the same setting with similar participants (Downing, 2003; Sullivan, 2011). Scale unidimesionality refers to "the existence of a single trait or construct underlying a set of measures" (as cited in Gerbing & Anderson, 1988, p. 186). It simply indicates that if a latent variable explains all the correlations observed between a set of items, then that set of items is unidimensional in nature (Falissard, 1999), thus have internal consistency. Validity of a measure is concerned with the meaningfulness of the measure (Drost, 2011) and refers to "how accurately a study answers the study question or the strength of the study conclusions" (as cited in Sullivan, 2011, p. 119). It is important not only to develop reliable and unidimensional measurement scales, but also to use that scale for theory testing. In such a case, validity is important to establish how accurately the scale measures the construct of interest.

There are different types of validity: content validity, face validity, predictive, concurrent, convergent validity, and discriminant validity (Drost, 2011). Content validity and face validity are related to subjective judgment and assess "the degree to which constructs are accurately translated into the operationalization" (Drost, 2011, p. 116). It is essential to check the content and face validity of newly developed measurement scales. However, in this study all the scales were borrowed from existing literature, as noted in the "Measures" section. Hence, in this study, I am providing further evidence of reliability and discriminant validity of these scales based on the analyses of the 166 data points collected.

Coefficient alpha or famously known as Cronbach's alpha is one of the most well-known measures of reliability (Falissard, 1999). I used the SPSS software to calculate the alpha values for each construct including the individual dimensions of technostress creators and technostress

inhibitors as mentioned above in the "Study Measures" section. Technically, with PLS analyses, Cronbach's alpha is not used as the primary measure of internal consistency; however, it was reported in the "Measures" section for ease of comparison with prior research which used different analytic methods. For all the constructs except knowledge sharing required, the Cronbach's alpha values are greater than the recommended minimum value of 0.7 (Nunnally, 1978).

Knowledge sharing required has four items and its Cronbach's alpha value was 0.556. So, further analysis was done and the second item of knowledge sharing required construct was identified as a poor performing item. Then, I checked the original scale and found that while the other three items are about knowledge sharing and formal job duties, the second item links knowledge sharing with performance appraisal. Thus, I deleted the second item "*During my formal performance evaluations, I am evaluated on my sharing of knowledge with my subordinates/supervisors/coworkers*" and the calculated alpha value was 0.883, greater than the recommended minimum value of 0.7 (Nunnally, 1978). The implication of removing this item is discussed further in the discussion section.

Then for the measurement model, I calculated the factor loadings to identify item loadings to each construct (see Appendix D). This helped determine convergent validity, which checks whether the items for a particular construct are more correlated with one another than with the items of another construct (Petter, Straub, & Rai, 2007). For each construct, the factor loadings measure the strength of the correlation between each item and the related construct (Srivastava et al., 2015), and for reflective measures, the loading should be above 0.50 (as cited in Srivastava et al., 2015). For this study, except for a few, all other factor loading values are greater than 0.50.

As can be seen, there were some items that were below the 0.50 loading. However, given

the following considerations, they were kept in the measure: (1) they all loaded on their relevant construct and not on other constructs (convergent validity sufficiently maintained); (2) their items were theoretically relevant to the construct (face validity); (3) these were well-established measures and I wanted to protect measure integrity for future meta-analyses.

The next step was to calculate the composite reliability and average variance extracted (AVE: the ratio of the construct variance to the total variance amongst indicators) for the measures using PLS. For composite reliability, the recommended threshold value is 0.70, while for AVE, 0.50 is the acceptable level (Fornell & Larcker, 1981). The composite reliabilities (CR) values and AVE values were greater than the minimum acceptable level ($\geq$ 0.7 for CR, $\geq$ 0.50 for AVE): burnout (0.93, 0.56), disengagement from knowledge sharing (0.81, 0.52), engagement (0.96, 0.79), knowledge sharing required (0.91, 0.77), and propensity to share knowledge (0.91, 0.60), respectively. Thus, the measures had sufficient internal consistency (i.e., reliability). All the values of AVE and CR are given in Appendix D along with the factor loadings.

Finally, discriminant validity verifies that the items under a construct do not highly correlate with any other constructs in the model (Gefen & Straub, 2005). According to Fornell and Larcker (1981), if the values of the square root of the AVE are all greater than the inter-construct correlations, then the construct exhibits satisfactory discriminant validity. From the Table 2, it is clear that the values of square root of the AVE (reported on the diagonals of the table) are all greater than the inter-construct correlations (the off-diagonal entries in the table). Therefore, discriminant validity is also satisfied.

These analyses indicated that the measurement model was sufficient to proceed to hypothesis testing.

Table 2: Correlation for the Constructs

	Burnout	DKS	Engagement	KSR	PKS	TSC	TSI
Burnout	**0.748**						
DKS	0.355	**0.724**					
Engagement	-0.502	-0.099	**0.891**				
KSR	0.044	0.074	0.281	**0.877**			
PKS	-0.492	-0.295	0.40	0.218	**0.774**		
TSC	0.502	0.255	-0.175	0.299	-0.280	N/A	
TSI	-0.324	0.013	0.603	0.361	0.313	-0.141	N/A

Notes
DKS: Disengagement from Knowledge sharing; **KSR:** Knowledge Sharing Required; **PKS:** Propensity to Share Knowledge; **TSC:** Technostress Creators; **TSI:** Technostress Inhibitors.
The figures in **bold** on the diagonal indicate the **square roots of the average variance extracted** (AVE).

4.4. Hypotheses Testing

Once the psychometrics of the measures were assessed, the hypothesized paths in the research model were calculated using PLS-SEM techniques. Specifically, all the relevant predictor variables (technostress creators, technostress inhibitors, burnout, and engagement), criterion variable (disengagement from knowledge sharing), and the control variables (knowledge sharing required and propensity to share knowledge) were modeled with the hypothesized relationships in SmartPLS software (see Figure 2). Then, the research model was executed using the PLS Algorithm function and the path coefficients were calculated. Next, using the bootstrapping function (with 500 sample) the significance of the path coefficients was determined. The sample size for bootstrapping varies greatly in existing studies (500 to 5000, Streukens & Leroi-Werelds, 2016). Sample size 500 is the default option for bootstrapping in SmartPLS and many existing studies used 500 for their bootstrapping analysis (Fink, Harms, & Kraus, 2008; Landau & Bock, 2013). Further, a study by Deng et al. (2013) showed that "the number of bootstrap replicates, ranging from 500 to 2000, had little effect on either bootstrap standard error or confidence interval" (p.9). Aligned with these arguments, I used a sample of

500 for bootstrapping. The results are illustrated in Figure 2, along with the R^2 values for all endogenous variables. The total variance explained for disengagement from knowledge sharing was 16.4%. Finally, I present the results for each hypothesis.

4.4.1. Technostress creators, burnout, and disengagement from knowledge sharing

Hypothesis 1 stated that technostress creators are positively related to burnout at work and the results of the analysis support this ($\beta = 0.50$, $p < 0.001$, $R^2 = 0.25$). In other words, technostress creators explain 25% of variance in burnout at work.

As per Hypothesis 2, burnout is positively related to disengagement from knowledge sharing. The analysis shows that the relationship between burnout and disengagement from knowledge sharing is significant ($\beta = 0.31$, $p < 0.05$).

The third hypothesis explains the relationship between technostress creators and disengagement from knowledge sharing through the mediating role of burnout. The results support Hypothesis 3 as burnout mediates the relationship between technostress creators and disengagement from knowledge sharing. There are significant indirect effects from technostress creators to disengagement from knowledge sharing ($\beta = 0.16$, $p < 0.05$).

4.4.2. Technostress inhibitors, engagement, and disengagement from knowledge sharing

Hypothesis 4 states that technostress inhibitors are positively related to engagement at work. The results of the analysis support this relationship, where technostress inhibitors explains around 36% of variance in engagement at work ($\beta = 0.60$, $p < 0.001$, $R^2 = 0.36$).

Hypothesis 5 proposes that job engagement is positively related to disengagement from knowledge sharing. This relationship is not significant as shown in the analysis ($\beta = 0.12$, $p > 0.05$). In other words, job engagement does not influence an individual's disengagement from

knowledge sharing behavior in this model.

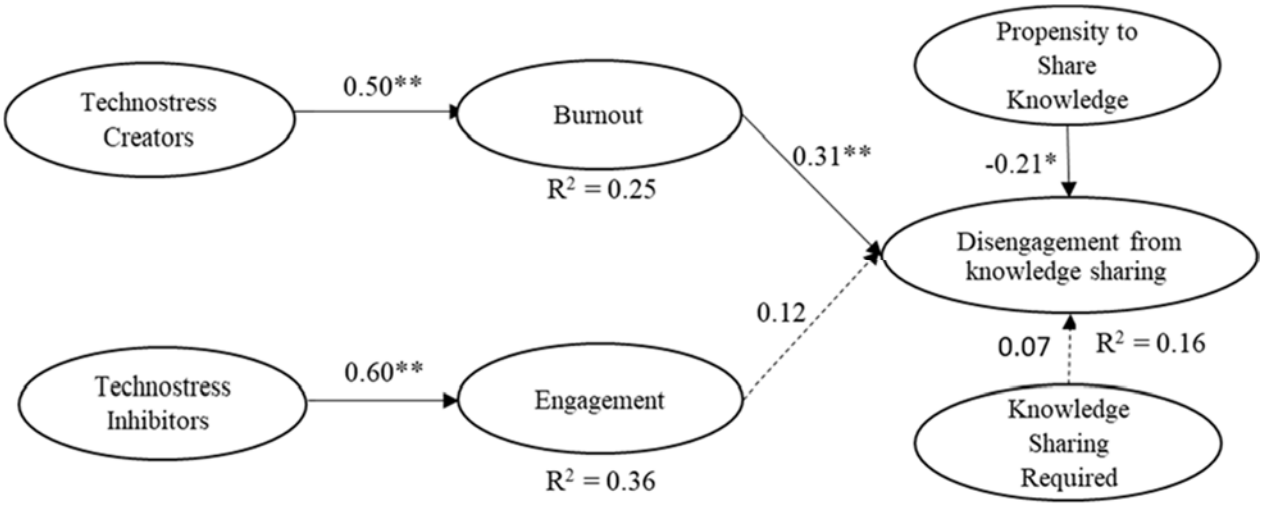
According to Hypothesis 6, engagement at work mediates the relationship between technostress inhibitors and disengagement from knowledge sharing. However, this mediation relationship is not significant as per the results ($\beta = 0.08$, $p > 0.05$).

4.4.3. Control variables

The two control variables knowledge sharing required and propensity to share knowledge, each negatively influence disengagement from knowledge sharing. The analysis shows the relationship between propensity to share knowledge and disengagement from knowledge sharing (Hypothesis 7a) is significant ($\beta = -0.21$, $p < 0.05$). However, Hypothesis 7b, which discusses about knowledge sharing required is not significant ($\beta = 0.07$, $p > 0.05$).

The analysis shows that employees with high propensity to share knowledge are less involved in disengagement from knowledge sharing, thus, hypothesis 7a is supported. On the other hand, knowledge sharing required (as measured by participants' understanding of their job descriptions) does not influence disengagement from knowledge sharing at work.

The result of the research model is given in Figure 2. Overall, the results accounted for 16% of the total variance in disengagement from knowledge sharing.



Notes
Solid lines denote significant pathways; dotted lines denote non-significant pathways (p > = 0.05).
**p < = 0.01 level;
*p < = 0.05 level.

Figure 2: Result of the Research Model

5. Discussion

Knowledge sharing, one of the core processes of knowledge management, is essential for organizations to generate innovative ideas and to sustain competitive advantages in the volatile business environment (Kankanhalli et al., 2005). Along with the benefits of knowledge sharing, researchers have also examined various counterproductive knowledge behaviors which commonly assumes that people hide their knowledge intentionally to protect it and to gain advantages compared to others at workplace (Ford et al., 2015; Serenko & Bontis, 2016). However, Ford (2008) suggested that people unintentionally disengage themselves from knowledge sharing, which is a more common problem in organizations than knowledge hiding or hoarding.

Disengagement from knowledge sharing is defined as a behavior that exists when

employees neither actively share (communicate) their knowledge, nor are motivated to protect their knowledge (Ford & Staples, 2008). The research on disengagement from knowledge sharing is still in its early stage and needs further exploration. Aligned with this, I sought to address the question of why employees show disengagement from knowledge sharing behavior at work. While previous research compared engagement theory and adaptive cost theory to explain disengagement from knowledge sharing (Ford et al., 2015), I used the job demands-resources theory (Demerouti et al., 2001) to understand the same. Using the concept of technostress creators and technostress inhibitors as job demands and job resources respectively, I hypothesized their indirect relationship with disengagement from knowledge sharing through the mediating role of burnout and engagement at work.

From the results, it is clear that, technostress creators, acting as job demands, are positively related to burnout at work. The advent of modern ICTs has led to profound changes in the workplace, while offering multiple advantages to organizations as well as employees. At the same time, one cannot ignore the many adverse impacts of modern ICTs and burnout appears to be one of those.

As ICTs are an integral part of modern workplace, employees regularly face the impacts of technostress creators in terms of role ambiguity, work overload, work-family conflicts, etc. Over time, these demands theoretically lead to exhaustion and burnout among employees. These findings are aligned with the existing studies that showed technology at work can act as demands that enhance unpredictable workloads, interrupt family life, create skill discrepancy, and is associated with burnout among employees (Carlson et al., 2017; Ter Hoeven, van Zoonen, & Fonner, 2016).

Additionally, employees have to face daily job demands such as technostress creators that not only influence their professional lives but also affect their personal lives. For example,

studies on email and telephone usage explicitly stated that the nature of the mediums allow individuals to send requests easily and quickly to anyone at any time, thus blurring the boundary between home and work life and forcing employees to attend those requests immediately and effectively (Ter Hoeven et al., 2016). Further, due to the unpredictable and uncertain nature of the modern ICTs plus their constant updates, employees are forced to train and educate themselves to learn new applications (Ragu-Nathan et al., 2008). Because of these demands, employees may experience burnout at work.

As hypothesized, burnout has a significant positive relationship with disengagement from knowledge sharing. This finding also supports existing research which showed burnout negatively influence knowledge sharing behavior among teachers (Zhang, Zhou, & Zhang, 2016). Thus, it is aligned with the arguments that when employees experience burnout, they may be too physically, mentally, and emotionally exhausted to perform an additional task of knowledge sharing. Knowledge sharing is considered by some to be a form of citizenship behavior (Kelloway & Barling, 2000) and often considered a non-essential job role. Employees may lack the interest to spend their limited skills and abilities on knowledge sharing behavior and become disengaged from knowledge sharing. Further, in a literature review, Salvagioni et al. (2017) discussed the negative impacts of burnout on employees' physical and psychological health along with its occupational consequences. Hence, it is very likely that burnout relates to an overall reduction in job-related behaviors and organizational knowledge sharing happens to be one of those.

Further, knowledge sharing at work aims to help others to solve problems and to communicate work related issues. Employees who are experiencing burnout often experience fatigue, feel incompetence about themselves, and indifference about work (Maslach, Schaufeli, & Leiter, 2001). Thus, employees may ignore others request to communicate their knowledge as

they lack the enthusiasm and confidence to do so and, hence, indulge in disengagement from knowledge sharing.

In this study, burnout also mediated the relationship between technostress creators and disengagement from knowledge sharing, providing support for the third hypothesis. This highlights the relevance of technology stressors with respect to disengagement form knowledge sharing. While some researchers have focused on other forms of stress (e.g., time pressure; Connelly, Ford, Turel, Gallupe & Zweig, 2014), other nuances like techno-invasion, techno-complexity, techno-overload and the like have been ignored. With the continuous evolution of modern ICTs at workplace, employees with limited skills and abilities, may focus more on completion of job-related tasks other than knowledge sharing.

This study highlighted the relationship between technostress creators and disengagement from knowledge sharing through the mediating role of burnout. As mentioned before, research on disengagement from knowledge sharing is still in its early stage and needs further development. In doing so, Ford et al. (2015) compared two hypotheses: the spillover hypothesis (based on engagement theory) and the provisioning hypothesis (based on adaptive cost theory) and included a combination model. Their analysis showed availability had significant negative relationship with disengagement from knowledge sharing. Availability is the mental and physical wellness of the individual (i.e., it is the health and cognitive resources of employees which required adaptation when it was depleted). While their findings provided two possible explanations for disengagement from knowledge sharing (availability and job engagement), the results from this study complemented the availability findings.

In particular, this study incorporated technostress creators, an ICT-related workplace factor, with disengagement from knowledge sharing. The findings of my study suggest that employees invested more time and energy to understand and adopt to new and innovative

technologies at workplace. In the modern workplace, majority of the in-role job duties become more technology dependent with frequent updates and enhancements. In such scenarios, employees experienced burnout, which was associated with the presence of various technostress creators at work. These employees showed less interest in knowledge sharing and often indulged in disengagement from knowledge sharing behavior. Here, burnout may map onto availability (a.k.a. health and cognitive resources), which was the most important factor associated with disengagement from knowledge sharing as per Ford et al. (2015). They highlighted that "people need the physical and cognitive energy to be able to share their knowledge" (p. 490). Burnout may be a more severe form with the loss of physical and cognitive energy. In other words, employees with poor availability may suffer burnout in a long run, if the not revitalized. Further, the scale used to measure availability (Ford et al., 2015) has items similar to that of burnout scale used in this study. For example, both the scales have questions regarding tired, physical health issues, stresses, etc. Thus, complementing the findings of Ford et al. (2015), results from this study provided another explanation for disengagement from knowledge sharing at work. In a highly ICTs dependent workplace, employees suffer from burnout due to the presence of technostress creators. Burnt out employees with low physical and cognitive energy may indulge in disengagement from knowledge sharing behavior at workplace.

Examining the resources side of the job demands-resources model, I found technostress inhibitors are positively related to engagement at work. Technostress inhibitors as job resources appear to stimulate personal growth and development and help employees to achieve their work goals. It further aligns with the concept of meaningfulness, one of the three predictors of engagement at work (Kahn, 1990). Employees feel "available to engage in their job roles when they have appropriate level of resources" (Ford et al., 2015, p. 479). Through technostress inhibitors, organizations provide various mechanisms to help employees to use and understand

the new and evolving ICTs at workplace. Thus, technostress inhibitors are the resources that help employees to engage with the work and job roles.

However, engagement was not significantly related to disengagement from knowledge sharing, thus Hypothesis 5 is not supported. This result is surprising given that previous findings support the relationship between job engagement and disengagement from knowledge sharing (Ford et al., 2015). However, the sample size for Ford et al. (2015) was 265 compared to my sample size of 166, so maybe there is a lack of sufficient statistical power to find the relationship. Another plausible reason for this could be the presence of burnout in the analysis. The presence of burnout may have engagement less salient in such a way that employees who are more engaged in their jobs eventually feel burnout at work which further lead to disengagement from knowledge sharing. Future research needs to address these possible explanations. Additionally, engagement does not mediate the relationship between technostress inhibitors and disengagement from knowledge sharing, thus Hypothesis 6 is also not supported.

The results for the control variables are quite interesting. The analysis shows propensity to share knowledge negatively influenced disengagement from knowledge sharing (Hypothesis 7a). A plausible reason could be the fact that propensity to share knowledge is an intrinsic factor and an individual's predisposition, which may be less susceptible to other external or situational factors while knowledge sharing required is a formal organizational requirement. In many organizations, knowledge sharing is often not mandatory but a citizenship behavior (Kelloway & Barling, 2000; Zhang et al., 2016). However, employees with high propensity to share knowledge genuinely believe that knowledge should be freely shared and they support open communication of knowledge in organizations (Ford & Staples, 2010). Thus, irrespective of the organizational requirement, they will be less disengaged from knowledge sharing as they enjoy sharing their knowledge with others.

Contrary to the above result, the relationship between knowledge sharing required and disengagement from knowledge sharing (Hypothesis 7b) is not significant. Thus, knowledge sharing required does not appear to be related to employees' disengagement from knowledge sharing behavior. Despite the formal requirements by the organizations to share knowledge, employees' disengagement from knowledge sharing remains unaffected. My research does not examine the relationship between knowledge sharing required and the other knowledge sharing behaviors. It is possible that knowledge sharing requirements may be related to full or partial knowledge sharing (e.g., Ford & Staples, 2010) or employees may play dumb or use deception to hide their knowledge and to create a false image of knowledge sharing (Connelly et al., 2012).

These arguments provide a possible explanation for the non-significant result of Hypothesis 7b. However, I also examined the items of the knowledge sharing required measure further and they measure the individual's perception that knowledge sharing is part of their job description. The second item, which did not perform well with the other three, assessed whether knowledge sharing was part of their formal performance appraisals. Thus, there may be differences between employees' perception of job description vs. what is actually measured in performance appraisals. A post hoc analysis of the model with all the four items of knowledge sharing required was quite interesting, which showed a significant but positive relationship between knowledge sharing required and disengagement from knowledge sharing ($\beta = 0.29$, $p < 0.001$). Thus, it indicated that job descriptions are not relevant regarding the occurrence of disengagement from knowledge sharing. Future research should examine if performance appraisals are relevant for disengagement from knowledge sharing.

However, future research should examine this to test if the inclusion of knowledge sharing in performance appraisals alters the amount of the various knowledge sharing behaviors (e.g., disengagement from knowledge sharing, knowledge hiding, partial knowledge sharing).

Further, from a technical viewpoint, the scale to measure knowledge sharing required is not an established measure and has not been used in any previous studies as a variable of interest. While Hypothesis 7b has a non- significant result, further testing, and validation of the scale with a large sample may exhibit a clearer result.

6. Limitations and Future Research

Although this study contributes to the disengagement from knowledge sharing literature, there are a few limitations. First, the sample size in this study is 166, which is relatively small. However, due to COVID-19 pandemic, non-essential organizations and non-essential jobs were changed to remote work. This change may very likely impact the types of technostress individuals would be experiencing, compounded with the stress of the pandemic, threats to health and life, and fear of job loss and market uncertainty. Given this is very likely a relevant extraneous variable, it was decided to discontinue data collection to remove this threat to internal validity.

Second, I hypothesized and tested the basic job demands-resources model instead of the updated theoretical framework (Schaufeli & Taris, 2014). The updated model examines the correlational relationships between job demands and resources and between burnout and engagement. However, the research on disengagement from knowledge sharing is still in its early stage and needs further exploration. In doing so, I tried to examine technological factors that may influence disengagement from knowledge sharing. Further, the updated model needs a larger sample and a covariance based structural equation modelling is suitable for the analysis. Future researchers can study the updated model with a larger sample size.

Third, the data were self-reported and thus it may be subject to respondents' personal memory and biases whilst answering the questions. However, the study is about individuals'

perceptions and personal details (e.g., burnout, stress), which cannot be known or answered by others such as peers or supervisors. Given the issue of fundamental error bias (e.g., Ross, 1977), others are not able to accurately assess if an individual is hiding knowledge, partially sharing knowledge or if the individual is disengaged from knowledge sharing (Ford, 2008; Ford et al., 2015). To address the threats to internal validity due to all self-reports being used, I used a time-lagged survey to reduce the issues of response bias and common method bias. However, a longitudinal study is more immune to such biases (though the existence of such biases cannot be completely ruled out) and future researchers can conduct a longitudinal study with similar goals to complement the findings of this study (Ford et al., 2015; Reiche, 2012).

Related to this is the issue regarding common method bias; however, I had several procedures in place to minimize this threat. Specifically, as recommended by Podsakoff, et al., (2012), I used the following: anonymity of respondents, using well validated scales, two-week time gap between predictor and criterion data collection. Given these procedural considerations, I argue the common method bias issue is not a likely significant factor in my study's results.

7. Implications

In today's world, the evolution of modern technologies forces organizations to implement, upgrade, and assimilate ICTs more than ever and employees have to deal with these technologies both in their professional and personal lives. In such a scenario, organizations must focus on curbing the negative consequences of technology usage to improve employees' mental and physical health and to enhance their involvement in both formal and informal work roles. Aligned with the discussion, this study provides some suggestions for practitioners.

It is important for top management to acknowledge the negative impacts of technostress

creators and the related burnout among employees, and how this in turn is related to disengagement from knowledge sharing. While knowledge sharing is crucial for organizations, employees with sound physical and mental health are more likely to engage in knowledge sharing compared to employees who are stressed and suffer from burnout at work. Thus, it is essential to conduct appropriate training and wellness sessions regularly to help employees who are stressed and facing burnout at work. For example, a study showed providing training to build technology competence and technology self-efficacy among sales professionals counter the negative impacts of technostress creators on overall performance (Tarafdar, Pullins, & Ragu-Nathan, 2015).

In another practitioner-oriented paper, Harper (2000) provided some solutions to manage the impacts of technostress among librarians in the United Kingdom. He suggested that both the employees and the management need to take responsibilities to counter the impacts of technostress. For example, in the recruitment stage, managers must inform applicants regarding the importance of technological adaptability. Additionally, they need to inform employees and give them adequate warning about planned technological changes and must show commitment to learning new technologies. As for employees, they need to acknowledge "it is not necessary to know it all" and must put efforts to adapt to new technologies.

Besides these efforts by management and employees, organizations are also introducing formal rules and regulations to counter the negative impacts of ICTs. For example, Volkswagen and Daimler are adopting formal rules to reroute or delete emails outside employees' work hours or vacation time to reduce work-family conflict and issue of email overload. Further, organizations are also providing email trainings and establishing policies related to limiting email use to help employees to manage email overload (McMurtry, 2014).

Irrespective of the organizational requirements, people with high propensity to share

knowledge are less likely to disengage from knowledge sharing. This, along with past research showing that they are also more likely to engage in full and (benevolent) partial knowledge sharing (Ford & Staples, 2010), suggests this is an important individual trait if knowledge sharing is a critical job task. So, organizations need to design appropriate hiring practices to hire people with high propensity to share knowledge.

Finally, while future research needs to verify this potential factor, it appears that job descriptions are not related to disengagement from knowledge sharing behaviors, but job performance appraisals might be. To that end, managers may focus on the design of performance appraisal measures to incorporate knowledge sharing as knowledge sharing as a formal job description is often not sufficient to motivate employees.

8. Conclusion

In knowledge management literature, it is commonly assumed that people hide their knowledge intentionally to protect it from others. Contrary to this, the concept of disengagement from knowledge sharing highlights that sometimes people simply fail to communicate their knowledge with others unintentionally because of various reasons such as illness or heavy workload, etc. In this study, using the job demands-resources framework, I examined the role of technostress creators and technostress inhibitors (two ICTs related phenomena at work) on employees' disengagement from knowledge sharing behavior through the mediating role of burnout and engagement, respectively. The results show that technostress creators at work indeed influence burnout which is positively related to disengagement from knowledge sharing. Thus, organizations need to give thought to how they use technologies if they want less disengagement from knowledge sharing.

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Appendix A: Time 1 Survey Sample

introduction

You are invited to take part in a research project entitled **"Technostress and Knowledge Sharing"**.

This form is part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. It also describes your right to withdraw from the study. In order to decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision. This is the informed consent process. Take time to read this carefully and to understand the information given to you. Please contact the researcher, Monalisa Mahapatra (mmahapatra@mun.ca) or the supervisor, Dr. Dianne Ford (dpford@mun.ca), if you have any questions about the study or for more information not included here before you consent.

It is entirely up to you to decide whether to take part in this research. If you choose not to take part in this research or if you decide to withdraw from the research once it has started, there will be no negative consequences for you, now or in the future.

Introduction:

My name is Monalisa Mahapatra, and I am an M.Sc. student in the Faculty of Business Administration at the Memorial University of Newfoundland. As part of my master's thesis, I am conducting this research under the supervision of Dr. Dianne P. Ford.

Purpose of study:

The purpose of this research is to understand and to explore the phenomenon of knowledge sharing in organizations. Organizational knowledge sharing is essential to generate new and innovative ideas. With the widespread adoption of technologies at the workplace, it is important to understand how various technology-related phenomena influence organizational knowledge sharing. Thus, in this research, we try to explore the

possible relationship between workplace stress due to technology usage, perceived job outcomes, and employees' knowledge sharing behavior.

What you will do in this study:

This study will be conducted in the form of two online surveys, the first one completed now, and the second to follow two weeks from now. In the first questionnaire, you will be asked to fill out the first survey about the technology that you use for your job and your opinions about it, and questions about your energy, focus, and behaviors at work. The second survey will be sent out to you two weeks after the initial survey is over. It will contain the questions about your sharing of knowledge at work along with the control variables for the study. Please note that you can skip any question that you do not wish to answer.

Length of time:

The first survey is estimated to take 15 to 20 minutes of your time. The second survey, which will be sent to you in two weeks' time, is estimated to take 10 to 15 minutes of your time.

Withdrawal from the study:

There are four ways you may withdraw from the study:

- Once when you click "Do not agree" on page-4 of the survey, the survey ends.
- At any time during the survey, you can close the browser and quit the survey.
- Do not complete the second survey - any surveys that do not have a matching second survey, are excluded from the study.
- Within three weeks of the first survey, you may email the researcher with your unique identifier code to have your data deleted from the study.

After **March 24, 2020** withdrawal is no longer possible as the analyses will have commenced.

Possible Benefits
This study helps us to understand various possible factors that hinder employees' knowledge sharing activities. It differentiates between intentional and unintentional knowledge hiding behavior at the workplace and emphasizes that employees do not always hide their knowledge intentionally. The results of this research may highlight an important factor for knowledge workers who work with technology in their jobs.

Possible Risks
The survey contains questions about a type of stress and burnout among employees. So, participants may feel psychological stress while answering those questions. Participants have the right to withdraw from the study or not answer questions they find stressful. In addition, participants may refer to their employee assistance programs for additional support. If you do not have access to an employee assistance program or counselor at your workplace, you may access publicly available resources, such as:

In CANADA: Canadian Mental Health Association: https://cmha.ca/find-your-cmha
Toll-free (1-833-456-4566 /// for those in Quebec: 1-866-277-3553)
IN USA: Mental Health America: *https://mhanational.org/finding-help*

Confidentiality
The ethical duty of confidentiality includes safeguarding participants' identities, personal information, and data from unauthorized access, use, or disclosure. The data from this research will be analyzed in my final thesis and may be published in academic conferences and academic journals; however, the data will be reported in aggregate form, so that it will not be possible to identify individual participants.

Anonymity
Anonymity refers to protecting participants identifying characteristics, such as the name or description of physical appearance. In this research, no information about the participants will be collected beyond a unique identifier that the participant will create so we may pair their answers in the first and second surveys. We have no other identifiers collected (including no IP Addresses).

Storage of Data
Only the personnel involved in this study will have access to the data, specifically Ms. Mahapatra and Dr. Ford. The ID log will be kept on a separate password-protected computer from the participant data. For additional security, the data-file itself will also be password protected. The Memorial University policy on Integrity in Scholarly Research requires data retention for a minimum of five years. The data will not be used for archival purposes; rather it will be maintained in case the research is "audited" by another researcher or future analyses are required for revision purposes in the publication process.

The survey is hosted on Qualtrics and is protected as per the General Data Protection Regulation (GDPR) that came into effect on May 25, 2018. The GDPR contains a number of new protections for data and threatens significant penalties for non-compliance to security and confidentiality. Also, for further information on the security and privacy policy of the company, you may visit: https://www.qualtrics.com/privacy-statement/

Reporting of Results
The result will be published in a thesis and may be published in academic conferences and academic journals. The thesis will be publicly available at the QEII library of the Memorial University of Newfoundland (https://research.library.mun.ca/view/theses_dept/). However, the data will be reported in aggregate form, so that it will not be possible to identify individual participants.

Questions
We would be more than happy to answer any questions that you may have about the study over email. If you would like more information about this study, please contact Monalisa Mahapatra (mmahapatra@mun.ca) or her supervisor, Dr. Dianne P. Ford (dpford@mun.ca). The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.

Consent:
By completing this survey, you agree that:

- You have read the information about the research.
- You have been advised that you may ask questions about this study and receive answers prior to continuing.
- You are satisfied that any questions you had have been addressed.
- You understand what the study is about and what you will be doing.
- You understand that you are free to withdraw participation from the study by closing your browser window or navigating away from this page, without having to give a reason and that doing so will not affect you now or in the future.
- You are free to omit questions that you do not wish to answer.

By consenting to this online survey, you do not give up your legal rights and do not release the researchers from their professional responsibilities. Please retain a copy of this consent information for your records.

I am aware of the research procedure and I agree to participate in the survey.

- ○ I agree.
- ○ I do not agree.

Block 4

Please read the definition of ICTs before answering the survey questions. **Information and Communication Technologies or ICTs refer to the day-to-day computer-based applications you used in your job such as e-mail, enterprise social networking sites, office automation systems, database systems, application development tools, etc.**

Please indicate the extent to which you agree that the below statements describe **your experiences at work with your ICTs.**

There is no right or wrong answer, please choose the one that best fits your experiences. As well, you may skip any questions that you do not wish to answer.

Block 3

Please indicate the extent to which you agree with each of the statements below.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I am forced by ICTs to work much faster.	○	○	○	○	○	○	○
	○	○	○	○	○	○	○

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I am forced by ICTs to do more work than I can handle.							
I am forced by ICTs to work with very tight time schedules.	○	○	○	○	○	○	○
I am forced by ICTs to change my work habits to adapt to new technologies.	○	○	○	○	○	○	○
I am forced by ICTs to handle a higher workload because of increased technological complexity.	○	○	○	○	○	○	○

Please indicate the extent to which you agree with each of the statements below.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Because of ICTs, I spend less time with my family.	○	○	○	○	○	○	○
Because of ICTs, I have to be in touch with my work even during my vacation.	○	○	○	○	○	○	○
	○	○	○	○	○	○	○

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Because of ICTs, I have to sacrifice my vacation and weekend time to keep current on new ICTs.							
Because of ICTs, I feel my personal life is being invaded.	○	○	○	○	○	○	○

Please indicate the extent to which you agree with each of the statements below.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I do not know enough about the new ICTs to handle my job satisfactorily.	○	○	○	○	○	○	○
I do not find enough time to study and upgrade my ICT skills.	○	○	○	○	○	○	○
I need a long time to understand and use new ICTs.	○	○	○	○	○	○	○
I often find it too complex for me to understand and use new ICTs.	○	○	○	○	○	○	○
	○	○	○	○	○	○	○

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I find new recruits to this organization know more about ICTs than I do.							

Please indicate the extent to which you agree with each of the statements below.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Because of new ICTs, I feel constant threat to my job security.	○	○	○	○	○	○	○
Because of new ICTs, I need to update my skills to avoid being replaced.	○	○	○	○	○	○	○
Because of new ICTs, I feel constant threat by coworkers with newer ICT skills.	○	○	○	○	○	○	○
For fear of being replaced, I do not share my knowledge with my coworkers.	○	○	○	○	○	○	○
For fear of being replaced, I feel there is less sharing of knowledge amongst coworkers.	○	○	○	○	○	○	○

Please indicate the extent to which you agree with each of the statements below.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
In our organization, there are always new developments in the ICTs we use.	○	○	○	○	○	○	○
In our organization, there are always constant changes in ICT software.	○	○	○	○	○	○	○
In our organization, there are always constant changes in ICT hardware.	○	○	○	○	○	○	○
In our organization, there are always frequent upgrades in ICT networks.	○	○	○	○	○	○	○

Please indicate the extent to which you agree with each of the statements below.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Our organization encourages knowledge sharing to help deal with new technology.	○	○	○	○	○	○	○
	○	○	○	○	○	○	○

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Our organization emphasizes teamwork in dealing with new technology.							
Our organization provides end-user training before the introduction of new technology.	○	○	○	○	○	○	○
Our organization fosters a good relationship between IT department and end users.	○	○	○	○	○	○	○
Our organization provides clear documentation to end users on using new technologies	○	○	○	○	○	○	○

Please indicate the extent to which you agree with each of the statements below.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Our end-user help desk does a good job of answering questions about technology.	○	○	○	○	○	○	○
Our end-user help desk is well staffed by knowledgeable individuals.	○	○	○	○	○	○	○

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Our end-user help desk is easily accessible.	○	○	○	○	○	○	○
Our end-user help desk is responsive to end users' requests.	○	○	○	○	○	○	○

Please indicate the extent to which you agree with each of the statements below.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
Our end users are encouraged to try out new technologies.	○	○	○	○	○	○	○
Our end users are rewarded for using new technologies.	○	○	○	○	○	○	○
Our end users are consulted before introduction of new technology.	○	○	○	○	○	○	○
Our end users are involved in technology change and/or implementation.	○	○	○	○	○	○	○

Block 2

Please indicate the extent to which you agree with each of the statements below.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
At work, I feel full of energy.	○	○	○	○	○	○	○
I am immersed in my work.	○	○	○	○	○	○	○
In my job, I feel strong and vigorous.	○	○	○	○	○	○	○
When I get up in the morning, I feel like going to work.	○	○	○	○	○	○	○
I am enthusiastic about my job.	○	○	○	○	○	○	○
My job inspires me.	○	○	○	○	○	○	○

When you think about your work overall, how often do you feel the following?

	1 - Never	2 - Almost Never	3 - Rarely	4 - Sometimes	5 - Often	6 - Very Often	7 - Always
Tired	○	○	○	○	○	○	○
Disappointed with people	○	○	○	○	○	○	○
Hopeless	○	○	○	○	○	○	○
Trapped	○	○	○	○	○	○	○
Helpless	○	○	○	○	○	○	○
Depressed	○	○	○	○	○	○	○
Physically Weak / Sickly	○	○	○	○	○	○	○
Worthless / Like a Failure	○	○	○	○	○	○	○
Difficulties Sleeping	○	○	○	○	○	○	○
"I've had it"	○	○	○	○	○	○	○

Block 4

Please provide us with your Mechanical Turk Worker ID. This will be used to confirm your participation to disburse your payment, provide you with access to the second survey and we will also be used to link your answers in this survey to the second survey which is coming in 2 weeks. Once we have completed these actions (surveys will be linked by February 7, 2020), we will delete your ID from the data to make the data file anonymous.

Do you have any comments or feedback regarding this survey you wish to share with the researchers?

Block 5

Thank you for participating in the study! The code for the study is 900501.

Your participation and the data you contribute are valuable for our research.
Please note that two weeks after submitting this survey you will receive the second survey of this research. Kindly complete that one for the purpose of our research.

In this survey, you answered questions regarding job burnout (see below for the questions). The scores on this measure are important indicators of your well-being. This measure is scored by adding your responses (1-Never to 4-Sometimes to 7-Always) and dividing by 10. Scores 3.5 and above are indicators of burnout, with scores over 5.5 requiring immediate professional help. Please seek professional help for burnout if your score is high:

- Tired,
- Disappointed with people;
- Hopeless;
- Trapped;
- Helpless;
- Depressed;

- Physically weak/Sickly;
- Worthless/Like a failure;
- Difficulties sleeping;
- "I've had it".

Similarly, if you experienced stress or difficulties in this research, we recommend you discuss it with your employee assistance program or a counselor. If you do not have access to an employee assistance program or counselor at your workplace, you may speak to your general / family physician, or access publicly available resources, such as:

IN CANADA: Canadian Mental Health Association

Website: https://cmha.ca/find-your-cmha

Toll-free: 1-833-456-4566 (for those in Quebec: 1-866-277-3553)

IN USA: Mental Health America

Website: https://mhanational.org/finding-help

Your generosity and willingness to participate in this study are much appreciated.

The results of this research will be found at Memorial University's Queen Elizabeth II Library (URL: https://research.library.mun.ca/view/theses_dept/).

We appreciate your participation in this study and hope that this has been an interesting experience. If you have any additional questions about this research, please email, Monalisa Mahapatra (mmahapatra@mun.ca) or the supervisor, Dr. Dianne P. Ford (dpford@mun.ca).

If you have any ethical concerns about your participation in this study (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.
Once again, thank you for your participation in this study, you may now close your browser.

Appendix B: Time 2 Survey Sample

Default Question Block

You are invited to take part in the second questionnaire of the research project entitled **"Technostress and Knowledge Sharing"** in which I explore the phenomenon of knowledge sharing in organizations. Organizational knowledge sharing is essential to generate new and innovative ideas. With the widespread adoption of technologies at the workplace, it is important to understand how various technology-related phenomena influence organizational knowledge sharing. Thus, in this research, we try to explore the possible relationship between workplace stress due to technology usage, perceived job outcomes, and employees' knowledge sharing behavior.

This form is part of the process of informed consent and is to remind you of the key points already discussed in the previous informed consent process. It is entirely up to you to decide whether to take part in this research. If you choose not to take part in this research or if you decide to withdraw from the research once it has started, there will be no negative consequences for you.

In this questionnaire, you will be asked to provide information regarding your knowledge sharing behaviors at work, and some demographic information for statistical analyses. We will also ask you to provide your unique code so that we may match your two surveys. We cannot identify your personal identity; thus this unique code protects your anonymity. This survey is estimated to take 10 to 15 minutes of your time. Please note that you can skip any question that you do not wish to answer. The results of this research will be found at Memorial University's Queen Elizabeth II Library (https://research.library.mun.ca/view/theses_dept/).

Withdrawal from the study:
If you wish to withdraw from the study, there are four ways you may withdraw from the study:

- Once when you click "Do not agree" on page-3 of the survey, the survey ends.
- At any time during the survey, you can close the browser and quit the survey.
- Do not complete the second survey - any surveys that do not have a matching second survey, are excluded from the study.

- Within one week of the second survey, you may email the researcher with your unique identifier code to have your data deleted from the study.

After **March 25, 2020**, withdrawal is no longer possible as the analyses will have commenced.

Questions:
We would be more than happy to answer any questions that you may have about the study over email. If you would like more information about this study, please contact Monalisa Mahapatra (mmahapatra@mun.ca) or her supervisor, Dr. Dianne P. Ford (dpford@mun.ca).

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.

Consent:
By completing this survey, you agree that:

- You have read the information about the research.
- You have been advised that you may ask questions about this study and receive answers prior to continuing.
- You are satisfied that any questions you had have been addressed.
- You understand what the study is about and what you will be doing.
- You understand that you are free to withdraw participation from the study by closing your browser window or navigating away from this page, without having to give a reason and that doing so will not affect you now or in the future.
- You are free to omit questions that you do not wish to answer.

By consenting to this online survey, you do not give up your legal rights and do not release the researchers from their professional responsibilities. Please retain a copy of this consent information for your records.

I am aware of the research procedure and I agree to participate in the survey.

I agree.

I do not agree.

Block PTS and DKS

Please think about your work-related knowledge and your behaviors at work for the past four (4) weeks with members of your organization. Please choose the answer that describes the frequency of the following behaviors.

DURING THE PAST FOUR (4) WEEKS, ...

	Not once / Did not do	Once	Twice	A few times	Several times	Once a day	More than once a day	Not appli / No opini
I did not describe my understanding but I did not seek to protect it either.	○	○	○	○	○	○	○	(
I was unable to share my knowledge at the time it was requested, not because it was confidential or should be withheld, but because I was simply unable to share.	○	○	○	○	○	○	○	(
	○	○	○	○	○	○	○	(

	Not once / Did not do	Once	Twice	A few times	Several times	Once a day	More than once a day	Not appli / No opini
I don't care about sharing my expertise, and I don't care about protecting it either.								
I did not share any knowledge at the time it was needed by the participant, but I did not try to withhold it either.	○	○	○	○	○	○	○	○

Please think about your workplace and your feelings toward sharing your knowledge with others at work. To what extent do you agree with the following statements?

	Strongly Disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
Generally, I enjoy sharing my expertise with others.	○	○	○	○	○	○
I tend to make my knowledge readily available.	○	○	○	○	○	○

	Strongly Disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree
My first tendency is to share knowledge if someone requests it.	○	○	○	○	○	○
Knowledge should be freely shared.	○	○	○	○	○	○
I agree when organizations encourage sharing knowledge within the unit.	○	○	○	○	○	○
I am willing to share knowledge regardless of its worth.	○	○	○	○	○	○
I usually believe that others won't understand my knowledge, so I don't bother sharing it.	○	○	○	○	○	○

Block KSreq

Please indicate the extent to which you agree that the statement describes your knowledge sharing experiences at work. Kindly note, there is no right or wrong answer. Please, choose the one that best fits your experiences.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Sc ag
I have been told sharing knowledge is a part of my regular job duties.	○	○	○	○	
Sharing knowledge is not formally noted in my job description or performance appraisals, but it is an integral part of my job.	○	○	○	○	
During my formal performance evaluations, I am evaluated on my sharing of knowledge with my subordinates/supervisors/coworkers.	○	○	○	○	
Sharing knowledge with subordinates/supervisors/coworkers is included in my formal job description.	○	○	○	○	

This is a data quality check. Please select 6 as an answer.

1
2
3
4
5
6
7

Block Demographics

Age

Gender

Male
Female
Other

Education Level

Less than high school
High school graduate
Some college
Post -secondary diploma
Undergraduate degree
Master's degree
Doctorate

Industry

Finance
Insurance
Manufacturing – Non-durable
Manufacturing – Durable
Services – Not for Profit
Services - Profit

Wholesale/Retail
Real Estate
Education Services
Construction/Mining
Healthcare
Government
Energy
Transportation
Utilities
Other

Please provide us with your Mechanical Turk Worker ID. This will be used to confirm your participation to disburse your payment, provide you with access to the second survey and we will also be used to link your answers in this survey to the second survey which is coming in 2 weeks. Once we have completed these actions (surveys will be linked by February 7, 2020), we will delete your ID from the data to make the data file anonymous.

Do you have any comments or feedback regarding this survey you wish to share with the researchers?

Block debrief

Thank you for participating in the study! Your participation and the data you contribute are valuable for our research. This debriefing form is intended to explain to you the purpose of the study in which you have just participated.

The code for the study is 901216.

The purpose of this research is to understand and to explore the problem of disengagement from knowledge sharing in organizations, where employees use information and communication technologies (ICTs) regularly for their job. Disengagement from knowledge sharing is defined as individuals who are neither actively sharing nor communicating their knowledge, nor motivated to protect their knowledge. Organizational knowledge sharing is essential to generate new and innovative ideas. Thus, disengagement from knowledge sharing becomes a significant issue to the knowledge management initiative programs of many organizations. Hence, we are exploring if technostress (the stress experienced by the end-users of ICTs) is related to the disengagement from knowledge sharing.

We are using the job demands-resources framework to help explain this relationship. Specifically, we focus on technostress creators and technostress inhibitors that influence disengagement from knowledge sharing through the role of job burnout and job engagement, respectively. Here, technostress creators are the factors that create technostress, while technostress inhibitors describe the organizational mechanisms that have the potential to reduce the adverse effects of technostress.

If you experienced stress or difficulties in this research, we recommend you discuss it with your employee assistance program or a counselor. If you do not have access to an employee assistance program or counselor at your workplace, you may speak to your general / family physician, or access publicly available resources, such as:

IN CANADA: Canadian Mental Health Association: https://cmha.ca/find-your-cmha
Toll free (1-833-456-4566 /// for those in Quebec: 1-866-277-3553)

IN USA: Mental Health America: https://mhanational.org/finding-help

Your generosity and willingness to participate in this study are greatly appreciated. The results of this research will be found at Memorial University's Queen Elizabeth II Library (https://research.library.mun.ca/view/theses_dept/).

We appreciate your participation in this study and hope that this has been an interesting experience. If you have any additional questions about this research, please email, Monalisa Mahapatra (mmahapatra@mun.ca) or the supervisor, Dr. Dianne P. Ford (dpford@mun.ca).

If you have any ethical concerns about your participation in this study (such as the way you have been treated or your rights as a participant), you may contact the Chairperson of the ICEHR at icehr@mun.ca or by telephone at 709-864-2861.
Once again, thank you for your participation in this study.

Appendix C: Survey Questionnaire

1. **Technostress Creators** (Srivastava et al., 2015)

Techno-overload

- I am forced by ICTs to work much faster.
- I am forced by ICTs to do more work than I can handle.
- I am forced by ICTs to work with very tight time schedules.
- I am forced by ICTs to change my work habits to adapt to new technologies.
- I am forced by ICTs to handle higher workload because of increased technological complexity.

Techno-invasion

- Because of ICTs I spend less time with my family.
- Because of ICTs I have to be in touch with my work even during my vacation.
- Because of ICTs I have to sacrifice my vacation and weekend time to keep current on new ICTs.
- Because of ICTs I feel my personal life is being invaded.

Techno-complexity

- I do not know enough about the new ICTs to handle my job satisfactorily.
- I do not find enough time to study and upgrade my ICT skills.
- I need a long time to understand and use new ICTs.
- I often find it too complex for me to understand and use new ICTs.
- I find new recruits to this organization know more about ICTs than I do.

Techno-insecurity

- Because of new ICTs, I feel constant threat to my job security.
- Because of new ICTs, I need to update my skills to avoid being replaced.
- Because of new ICTs, threat by coworkers with newer ICT skills.
- For fear of being replaced, I do not share my knowledge with my coworkers.
- For fear of being replaced, I feel there is less sharing of knowledge amongst coworkers.

Techno-uncertainty

- In our organization, there are always new developments in the ICTs we use.
- In our organization, there are always constant changes in ICT software.
- In our organization, there are always constant changes in ICT hardware.
- In our organization, there are always frequent upgrades in ICT networks.

2. **Technostress Inhibitors** (Ragu-Nathan et al., 2008)

Literacy Facilitation

- Our organization encourages knowledge sharing to help deal with new technology.
- Our organization emphasizes teamwork in dealing with new technology.
- Our organization provides end-user training before the introduction of new technology.
- Our organization fosters a good relationship between IT department and end users.
- Our organization provides clear documentation to end users on using new technologies.

Technical Support Provision

- Our end-user help desk does a good job of answering questions about technology.
- Our end-user help desk is well staffed by knowledgeable individuals.
- Our end-user help desk is easily accessible.
- Our end-user help desk is responsive to end users request.

Involvement Facilitation

- Our end users are encouraged to try out new technologies.
- Our end users are rewarded for using new technologies.
- Our end users are consulted before introduction of new technology.
- Our end users are involved in technology change and/or implementation. .

3. **Burnout** (Malach-Pines, 2005)

Please use the following scale to answer the question: When you think about your work overall, how often do you feel the following?

- Tired
- Disappointed with people
- Hopeless
- Trapped
- Helpless
- Depressed
- Physically weak/Sickly
- Worthless/Like a failure
- Difficulties sleeping
- "I've had it"

4. **Engagement** (Salanova et al., 2005)

- At work, I feel full of energy.
- I am immersed in my work.
- In my job, I feel strong and vigorous.
- When I get up in the morning, I feel like going to work.
- I am enthusiastic about my job.
- My job inspires me.

5. **Disengagement from Knowledge Sharing** (Ford et al., 2015)

Please think about your work-related knowledge and your behaviors at work for the past four (4) weeks with members of your organization. Please choose the answer that describes the frequency of the following behaviors.

DURING THE PAST FOUR (4) WEEKS, ...

- I did not describe my understanding but I did not seek to protect it either.
- I was unable to share my knowledge at the time it was requested, not because it was confidential or should be withheld, but because I was simply unable to share.
- I don't care about sharing my expertise, and I don't care about protecting it either.
- I did not share any knowledge at the time it was needed by the participant, but I did not try to withhold it either.

6. **Propensity to Share Knowledge** (Ford & Staples, 2010)

- I tend to make my knowledge readily available.
- My first tendency is to share knowledge if someone requests it.
- Knowledge should be freely shared.
- I agree when organizations encourage sharing knowledge within the unit.
- I am willing to share knowledge regardless of its worth.
- Generally, I enjoy sharing my expertise with others.
- I usually believe that others won't understand my knowledge, so I don't bother sharing it.

7. **Knowledge Sharing Required** (Ford et al., 2015)

- Sharing knowledge with subordinates/supervisors/coworkers is included in my formal job description.
- During my formal performance evaluations, I am evaluated on my sharing of knowledge with my subordinates/supervisors/coworkers.
- I have been told sharing knowledge is a part of my regular job duties.
- Sharing knowledge is not formally noted in my job description or performance appraisals, but it is an integral part of my job.

8. Demographics

- Age (actual)
- Gender (Male/Female/Other)
- Education Level

  Please check highest level of education achieved.

  - Elementary school
  - High school diploma
  - Some college
  - Post-secondary diploma
  - Undergraduate degree
  - Master's degree
  - Doctorate degree

- Industry

  Please check the best descriptor of your industry.

  - Finance
  - Insurance
  - Health
  - Energy
  - Manufacturing – Non-durables
  - Manufacturing – Durables
  - Services – Not for Profit
  - Services - Profit
  - Wholesale/Retail
  - Real Estate
  - Education Services
  - Construction/Mining
  - Transportation
  - Government
  - Utilities
  - Other

Appendix D: Factor Loadings

	BURN	DKS	JE	KSR	PSK	TSC	TSI
BURN1	0.706						
BURN10	0.822						
BURN2	0.713						
BURN3	0.787						
BURN4	0.839						
BURN5	0.664						
BURN6	0.692						
BURN7	0.725						
BURN8	0.759						
BURN9	0.755						
DKS1		0.649					
DKS2		0.708					
DKS3		0.580					
DKS4		0.915					
JE1			0.908				
JE2			0.862				
JE3			0.800				
JE4			0.896				
JE5			0.945				
JE6			0.926				
KSR1				0.857			
KSR3				0.930			
KSR4				0.842			
PKS1					0.842		
PKS2					0.863		
PKS3					0.836		
PKS4					0.848		
PKS5					0.864		
PKS6					0.421		
PKS7					0.628		
TC						0.787	
TINS						0.637	
TI						0.882	
TO						0.778	
TU						-0.025	
LF							0.874
TSP							0.884
IF							0.832
AVE	0.560	0.524	0.794	0.769	0.598	N/A	N/A
CR	0.927	0.810	0.958	0.909	0.909	N/A	N/A

Notes:
BURN: Burnout; **DKS:** Disengagement from Knowledge Sharing; **JE**: Job Engagement; **KSR:** Knowledge Sharing Required; **PKS:** Propensity to Share Knowledge; **TSC:** Technostress Creators, **TC:** Techno-complexity, **TINS:** Techno-Insecurity; **TI:** Techno-invasion; **TO:** Techno-overload; **TU:** Techno-uncertainty; **TSI:** Technostress Inhibitors; **LF:** Literacy Facilitation; **TSP:** Technical Support Provision; **IF:** Involvement Facilitation **AVE:** Average variance extracted; **CR:** Composite reliability