TECHNOSTRESS IN INFORMATION TECHNOLOGY MANAGERS: A QUANTITATIVE EXAMINATION OF THE EFFECT OF TRANSFORMATIONAL, TRANSACTIONAL, OR LAISSEZ-FAIRE LEADERSHIP STYLE

by

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Abstract

Information and communication technologies (ICTs) infiltrate nearly every aspect of modern life. This pervasive technological revolution has led to significant growth in the utilization of ICTs. One specific undesirable phenomenon suggested to originate from the use of ICTs at home and at work is known as *technostress*. At the workplace, technostress not only impairs performance, productivity, employee commitment, and job satisfaction, but also increases the incidence of absenteeism and turnover. To date, the literature has not considered the impact that leadership style may have on the prevalence of technostress in practice. Utilizing a multiple linear regression analysis, this study evaluated whether transformational, transactional, or laissez-faire leadership styles and demographic factors including age, gender, education, and industry experience, influenced the perceived level of technostress in information technology managers working in the United States between the ages of 18 to 65. Results indicated that both transactional and laissez-faire leadership styles were statistically significant and positively influenced technostress.

Dedication

To my best friend, soul mate, and loving, devoted husband, Jim, your infinite support and encouragement have enabled me to travel this scholarly journey and realize a lifelong dream. I love you with my entire being. To the most important person in my life, the true source of inspiration for everything I do, my guardian angel and amazing daughter, Autumn. You are my heart, my soul, my most magnificent creation. I am so proud of who you are and have become. I, truly, admire your strength, intelligence, kindness, and beauty, inside and out. The sacrifices we, together, as a family have made, so I could quench my endless thirst for knowledge and seize the incredible treasures bestowed by wisdom, are remarkable and so extraordinarily appreciated. To you both, I dedicate this dissertation.

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To the distinguished instructors at Capella University, thank you for equipping me with the valuable skills and knowledge essential to make an impact not only within the literature but also upon the future generations of scholars that I intend to teach and hopefully, inspire.

I thank my educators from Punxsutawney, Brockway, and Brookville school districts, Clarion University of Pennsylvania, and Keller Graduate School of Management. Your efforts made a difference and influenced my future endeavors.

To my family, friends, and work colleagues at Clarion University of Pennsylvania, thank you for always listening to me ramble on about my research interests, whether or not you found them remotely interesting. Thank you for celebrating each scholastic victory and every milestone with me along the way.

To those of you beginning your intellectual odyssey at Capella University or another, doctoral or otherwise, stay the course and never abandon your dreams, no matter how lengthy or difficult the voyage.

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Abbreviations

Abbreviation	Description
CR	Contingent Reward
IC	Individualized Consideration
ICT	Information and Communication Technology
IIA	Idealized Influence Attributed
IIB	Idealized Influence Behavior
IM	Inspirational Motivation
IS	Intellectual Stimulation
IT	Information Technology
LF	Laissez-faire
MbEA	Management-by-Exception Active
MbEP	Management-by-Exception Passive
MLQ	Multifactor Leadership Questionnaire
MLQ-5X	Multifactor Leadership Questionnaire, Short Rater Form

CHAPTER 1. INTRODUCTION

Introduction to the Problem

Information and communication technologies (ICTs) infiltrate nearly every aspect of modern life. This pervasive technological revolution has led to significant growth in the utilization of ICTs. Accordingly, a considerable research interest has begun to focus not only on how individuals interact with technologies but also the negative consequences that stem from the use of them. One specific undesirable phenomenon suggested to originate from the use of ICTs at home and at work is known as technostress.

Technology-induced anxiety, technostress, is defined as the physical and psychological response experienced by individuals engaging with rapidly changing technology (Brod, 1984; Chua, Chen, & Wong, 1999; Salas, Driskell, & Hughes, 1996). The symptoms of technostress include, but are not limited to, irritability, mental fatigue, anxiety, avoidance, depression, impatience, loss of appetite, and insomnia (Brod, 1984; Freeman, Soete, & Efendioglu, 1995; Riedl, Kindermann, Auinger, & Javor, 2012; Selwyn, 2003; Weil & Rosen, 1997). Technostress can be toxic to the health, quality-of-life, and well-being of its sufferers (Mazmanian, Yates, & Orlikowski, 2006; Middelton & Cukier, 2006). At the workplace, technostress not only impairs performance, productivity, employee commitment, and job satisfaction, but also increases the incidence of absenteeism and turnover (Chau et al., 1999).

Employees from various industries, occupations, geographic locations, and cultures have experienced the repercussions of technostress (Clark & Kalin, 1996; Wang, Shu, & Tu, 2008). As a result of its damaging effects, organizational leaders are motivated to control those factors that trigger workplace technostress (Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2007). However, in order to effectively manage technostress within the work environment, leaders are challenged with the task of identifying its underlying sources. This study was designed to equip leaders with an improved understanding of technostress and to expand the literature by examining previously unexplored relationships between the dependent variable, technostress, and two independent variables (a) leadership style and (b) the individual characteristics of information technology managers.

Background of the Study

Within the academic literature, leadership style has been identified as playing a significant role in modifying employee behavioral and organizational outcomes (Bass & Avolio, 2004; Sadeghi & Pihie, 2012). Bass (1985) developed the full-range leadership theory (FRLT) to describe the unique leadership behaviors associated with transformational and transactional leadership styles. Moreover, Bass explained the connections between leader conduct and follower outcomes such as satisfaction and effectiveness.

The FRLT is comprised of three discernable leadership behaviors or styles (a) transformational, (b) transactional, and (c) laissez-faire, also known as passive avoidant (Avolio & Bass, 1991; Bass, 1985, 1990; Bryman, 1992; Burns, 1978). These leadership styles are measured through the evaluation of nine specific constructs, five related to transformational, three with transactional, and one with laissez-faire, using the Multifactor Leadership Questionnaire short rater form (MLQ-5X). According to the FRLT, each leadership style is comprised of its own set of unique behaviors (Bass & Avolio, 2004).

An employee's organizational role, specifically, the tasks they complete and the culture in which they function, are influenced by technology (Katz & Kahn, 1978; McGrath, 1976; Miles & Perreault, 1976; Tarafdar et al., 2007). Stress results from an individual interacting with ICTs within the task environment (Ayyagari, Grover, & Purvis, 2011; Lau, Wong, Chan, & Law, 2001; Parson, Liden, O'Conner, & Nagao, 1991; Tarafdar et al., 2007). The Person-Environment-Fit perspective conceptualizes that individual characteristics and perceptions influence this interaction process (Basoglu & Fuller, 2007; French, Caplan, & Van Harrison, 1982; Hancock & Szalma, 2008; Lazarus, 1999; Pervin, 1968). Individual characteristics such as employee-specific skills, abilities, and beliefs may serve as a coping mechanism to impede or moderate the effects of computer-induced stress (Bandura, 1982; Compeau & Higgins, 1995; Darowski, Helder, Zachs, Hasher, & Hambrick, 2008; Kahn & Byosiere, 1982). Therefore, leadership style is theorized to perform as an individual characteristic that may influence the perceived level of technostress within the organizational environment.

Statement of the Problem

In order to better understand the phenomenon and regulate its outcomes at the workplace, scholars and practitioners, alike, have pursued the identification of those factors that influence the level of technostress experienced by employees. Numerous studies have been conducted to determine if relationships exist between age, race, gender, socio-economic factors, and technostress in a variety of organizational environments (Burke, 2009; Harris, Carlson, Harris, & Carlson, 2012; Tarafdar et al., 2007). Prior to this study, research had yet to consider if leadership style influences the reported incidence of technostress in organizations. This study assessed the link between leadership style, based on the FRLT measured by the Multifactor Leadership Questionnaire short rater instrument (MLQ-5X), and technostress in information technology (IT) managers in various U.S. organizations (Avolio, 1999; Avolio & Bass, 1991, 2002; Bass, 1985, 1990; Bass & Avolio, 1990, 1995, 2004; Burns, 1978; Tarafdar et al., 2007).

Purpose of the Study

The objective of this quantitative research study was to investigate the full-range leadership theory (FRLT) and the technostress theory to determine if leadership style influences the level of technostress experienced by information technology workers in various U.S. organizations (Antonakis & House, 2002; Bass, 1985; Bass & Avolio, 1990, 1995, 2004; Burns, 1978; Tarafdar et al., 2007). The independent variable was leadership style with constructs defined as transformational, transactional, or laissez-faire. Other demographic information was collected such as age, gender, education, and industry experience, serving as additional independent variables. The dependent variable was defined as technostress.

A recent discovery has identified a moderating link between transformational leadership and the stressors produced from IT jobs such as work-life balance and exhaustion (Syrek, Apostel, & Antoni, 2013). Research implications suggested that leadership style may serve to inhibit the effects of various workplace stressors (LePine, Podsakoff, & LePine, 2005; Syrek, et al., 2013). This study explored another workplace stressor, technostress, by determining how managers experience its effects based on their self-perceived leadership style. The results of this investigation addressed a research gap by expanding the literature surrounding technostress.

Rationale

The ICT invasion has given rise to an increase in workplace stress and instability in the work-life balance (Ashforth, Kreiner, & Fugate, 2000; Eisen, Allen, Bollash, & Pescatello, 2008; Schneider, Schwartz, & Fast, 1995; Suprateek, Xiao, Saonee, & Manju, 2012). Employees who work in a computerized environment are argued to experience higher levels of stress due to (a) increased workloads, (b) multitasking, (c) an inability to keep up with or adapt to technology, (d) the threat of being replaced by technology, (e) a compulsion to work quickly and immediately respond to workplace requests, and (f) the need for frequent training (Agervold, 1987; Kinman & Jones, 2005; Jex, 1998; Korunka & Vitouch, 1999; Tarafdar et al., 2007; Tarafdar & Tu, 2011; Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2011). ICTs impose a pressure and obligation upon employees to stay electronically connected with and respond to workplace requests on a round-the-clock basis (Kinman & Jones, 2005; Korak-Kakabadse, Kakabadse, & Kouzmin, 2003). Given the practical implications and the understanding of technology-generated stress in the work environment, the rationale of this particular research study was to test the impact of several factors that influence ICT stress on individuals in organizations, and more specifically, the leadership style and individual characteristics of information technology managers.

Research Question

To achieve a greater understanding of the factors that influence technostress and fill a current research gap, the quantitative research question evaluated in this study was, "What effect does transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience have on the level of technostress realized by information technology managers in the U.S.?"

Omnibus Hypothesis

The null and alternative hypotheses are stated as:

H_o: There is no relationship between transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience and the level of technostress realized by information technology managers in the U.S.

H_a: There is a relationship between transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience and the level of technostress realized by information technology managers in the U.S.

Statistically speaking, the omnibus hypothesis that was explored by this model is H_o: R-squared is equal to 0. [Ha: R-squared is greater than 0.]

Significance of the Study

Few studies exist that have identified those factors that influence the effects of technostress on U.S. professionals. Far fewer studies have examined the impact of technostress upon information technology managers. The study of the phenomenon of technostress and the influence that leadership style has upon it remains a gap in the literature. This study extended the literature on leadership style and its effects on workplace stressors such as technostress (LePine, et al., 2005; Syrek et al., 2013).

This research study contributed to the Organizational Management, Leadership, and Information Technology fields by providing practitioners with statistical evidence to explain the relationships between leadership style, the individual characteristics of ICT users, and technostress. With this information, practitioners will not only have a greater understanding of the factors that influence technostress but can also potentially minimize the negative effects associated with this phenomenon (Ayyagari et al., 2011; McGee, 1996; Tarafdar et al., 2007).

Technostress is estimated to cost organizations approximately $300 billion annually (American Institute of Stress, 2007). This is a result of decreased efficiencies and work contentment, and increased burnout, health care costs, absenteeism, and turnover (Ayyagari, et al., 2011; Cooper, Dewe, & O'Driscoll, 2011; McGee, 1996; Sutherland & Cooper, 2000; Tarafdar et al., 2007; Tennant, 2001). The investigation of the research problem not only expanded the technostress literature but also equipped organizational management with scientific evidence that, if implemented, can potentially reduce costs to minimize some of the negative consequences associated with technostress.

Definition of Terms

ICT. Information and communication technologies (ICT) refers to the use of computer-based systems and applications including, but not limited to, e-mail, database systems, application development tools, business enterprise systems, the Internet, computer hardware and software, tablets, phablets, smart phones, wireless technologies, cloud computing, leap motion controllers, smart glasses, 3D and 4D technologies, nanotechnology, robo-technology, artificial intelligence, optical audio, biometrics, etc.

Laissez-Faire or Passive-Avoidant. Laissez-faire or passive-avoidant leaders are often uninvolved and fail to take ownership of their organizational management responsibilities (Avolio, 1999; Bass, 1985; Burns, 1978; Eagly, Johannesen-Schmidt, & van Engen, 2003). These detached leaders provide their followers with the complete freedom to make decisions and solve workplace problems. Laissez-faire leaders provide little or no direction to their followers. Characteristically operating in crisis mode, laissez-faire leaders frequently neglect to communicate goals and objectives or define a plan to accomplish them if established (Hershey, Blanchard, & Johnson, 2000).

Leadership Style. Leadership style has been identified as playing a significant role in modifying employee behavioral and organizational outcomes (Bass & Avolio, 2004). Bass (1985) created the FRLT to describe the distinctions between transformational and transactional leadership behaviors. In addition, Bass explained the relationships between leader behaviors and follower outcomes such as satisfaction and effectiveness. FRLT integrates the following three distinct leadership styles (a) transformational, (b) transactional, and (c) laissez-faire or passive-avoidant (Bass & Avolio, 2004).

Multifactor Leadership Questionnaire (MLQ). A leadership style measurement tool that quantifies the transformational and transactional leadership concepts. The classic form (MLQ 5X Short) is the self-form used as part of this study to measure the self-perception of leadership behaviors (Mind Garden, 2014).

Techno-complexity. The first of the five conditions of technostress where ICTs are perceived by users to be so complex that they feel incompetent and obligated to spend more time learning about them (Tarafdar et al., 2007; Tu et al., 2005).

Techno-insecurity. The second of the five conditions of technostress where users believe their jobs are in jeopardy by either an ICT or another employee with improved technological skills (Tarafdar et al., 2007; Tu et al., 2005).

Techno-invasion. The third of the five conditions of technostress where ICTs invade and upset the work-life balance by reducing personal time. Users are compelled or pressured to stay connected and immediately respond to workplace requests during non-work hours (Tarafdar et al., 2007; Tu et al., 2005).

Techno-overload. The fourth of the five conditions of technostress that occurs when ICTs compel users to increase their job and load pace, altering their work habits (Tarafdar et al., 2007; Tu, Wang, & Shu, 2005).

Techno-uncertainty. The fifth of the five conditions of technostress where users feel uneasy by continuous ICT change. This uncertainty forces users to be in a constant state of ICT knowledge acquisition (Tarafdar et al., 2007; Tu et al., 2005).

Technostress. Technological stress (technostress) is defined as the physical and psychological response experienced by individuals as a consequence of engaging with rapidly changing technology (Brod, 1984; Chua et al., 1999; Clark & Kalin, 1996; Rosen & Weil, 1997).

Transactional. Transactional leaders are focused on organizational stability through short-term performance objectives. Leader-follower relationships are impersonal and task completion is driven by a series of rewards or punishments (Bass & Avolio, 1990; Bono & Judge, 2004; Hooper & Bono, 2012). Transactional leaders are concerned that the workplace runs smoothly and efficiently on a daily basis. These leaders are less inclined to accept or promote organizational change that disrupts workflow.

Transformational. Transformational leaders are visionaries who inspire follower trust and commitment through idealized influence. They raise awareness of the importance and value of designed outcomes to promote change (Antonakis, Avolio, & Sivasubramaniam, 2003; Sadeghi & Pihie, 2012). Transformational leaders are preemptive, understand the need for constant change, accept risk, and are well-adapted to changing environments. These leaders encourage a collective team environment and challenge their followers to take ownership for their work.

Assumptions and Limitations

This study incorporated a number of research assumptions and limitations.

Assumptions

The full-range leadership (FRLT) and technostress models served as the theoretical assumptions of this study (Ayyagari et al., 2011; Bass, 1985; Basoglu & Fuller, 2007; Bass & Avolio, 2004; French et al., 1982; Hancock & Szalma, 2008; Lazarus, 1999; LePine et al., 2005; Pervin, 1968; Syrek et al., 2013; Tarafdar et al., 2007; Walumbwa, Avolio, & Zhu, 2008). Leadership style, as described by the FRLT, was assumed to perform as an individual characteristic, influencing the perceived level of technostress within the organizational environment. Technostress was presumed to be influenced by individual user characteristics and perceptions. The study incorporated the overall technostress construct and creator sub-constructs for the inferential model (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008; Tarafdar et al., 2007).

The topical assumptions of this study were consistent with the concept that all information technology managers are subject to technostress (Ayyagari et al., 2011; Tarafdar et al., 2007). In addition, only the influence of transformational, transactional, and laissez-faire leadership styles were observed in this study (Bass, 1985; Bass & Avolio, 2004; LePine et al., 2005; Syrek et al., 2013; Walumbwa et al., 2008).

The methodological assumptions of this study were related to the MLQ-5X and the technostress instruments. Both have demonstrated appropriate measures of reliability and validity (Bass & Avolio, 1990, 1995, 2004; Muenjohn & Armstrong, 2008; Tarafdar et al., 2007). The populations used to create and validate the MLQ-5X and technostress instruments are similar to that used in this study. The MLQ-5X utilized male and female senior managers of varying levels of education and experience from Fortune 500 companies and the technostress instrument incorporated both male and female employees of varying levels of education and experience from two public sector companies in various industries (Bass & Avolio, 1990, 1995, 2004; Tarafdar et al., 2007). This study integrated a population of both male and female information technology managers from various industries with varying levels of education and industry experience between the ages of 18 to 65.

In order to use multiple regression, the statistical methodological assumptions included (a) normality, variables are normally distributed, (b) linearity, a linear relationship exists between the dependent variable and the independent variables, (c) homoscedasticity, the variance of error is constant across all independent variables, (d) reliability, independence of observations or a low level of error and a high level of reliability, and (e) multicollinearity, a high correlation between multiple independent variables, is absent (Obsorne & Waters, 2002; Field, 2009; Tabachnick & Fidell, 2007).

The study assumed that sample participants were representative of information technology managers employed by U.S. companies ranging in age from 18 to 65. Sample participants were assumed to have truthfully answered all survey questions. Because survey responses were grounded on the observations of the sample participants, the results may be comprised of self-reporting biases. Sample participant responses were assumed to be irrelevantly affected by either extraordinary circumstances or outside pressures.

The survey was administered electronically; therefore, the assumption was made that all survey participants had the appropriate computer fluency and access to respond. Because the survey instrument was distributed via electronic means, delivery and e-mail filtering errors could have, on a limited basis, prohibited sample participants from receiving the survey.

Bias was assumed to be minimized in several ways. For one, the researcher has both academic and professional experiences with ICTs and leadership. Secondly, sample participants were randomly selected and each self-identifying information technology manager who met the survey criteria had the same probability of selection (Cooper & Schindler, 2006). Thirdly, a field test was conducted to evaluate the integrity, readability, logical flow, face validity, and relevance of the survey questions. Moreover, the survey instrument provided an optional answer of "Not Applicable" or "Do Not Know." Finally, to minimize response bias, survey participants were given the opportunity to respond to the survey on their own time, and at their own pace and location.

Limitations

The study is limited to the evaluation of the full-range leadership theory (FRLT) perspective as a potential driver of technostress and does not consider other leadership perspectives such as Charismatic, Servant, and Citizen. The primary focus of this research study is how leadership style, based on the FRLT model, influenced the perceived level of technostress among information technology managers. The study identified the dominant leadership style of each information technology manager as measured by the MLQ-5X. Even though each leadership style is comprised of a combination of various behavioral attributes, the overall leadership style is what was emphasized. The study is limited because even though the individualized behavioral component sub-scores for each of the FRLT leadership styles was measured, they were not evaluated independently or in combinations thereof other than for purposes of determining the overall leadership style. Additional research was recommended to extend the scope of this research study to include an individual assessment of these behavioral sub-categories to determine their level of influence on technostress. Underlying causal relationships between the independent and dependent variables cannot be drawn from the statistical method used in this study.

Nature of the Study

The quantitative study incorporated a non-experimental survey research methodology. The study investigated the effect that leadership style and individual characteristics have on the level of technostress experienced by United States information technology managers. In this study, the dependent variable was technostress and the independent variables were leadership style and the individual characteristics that may impact technostress. Figure 1 illustrates these relationships.

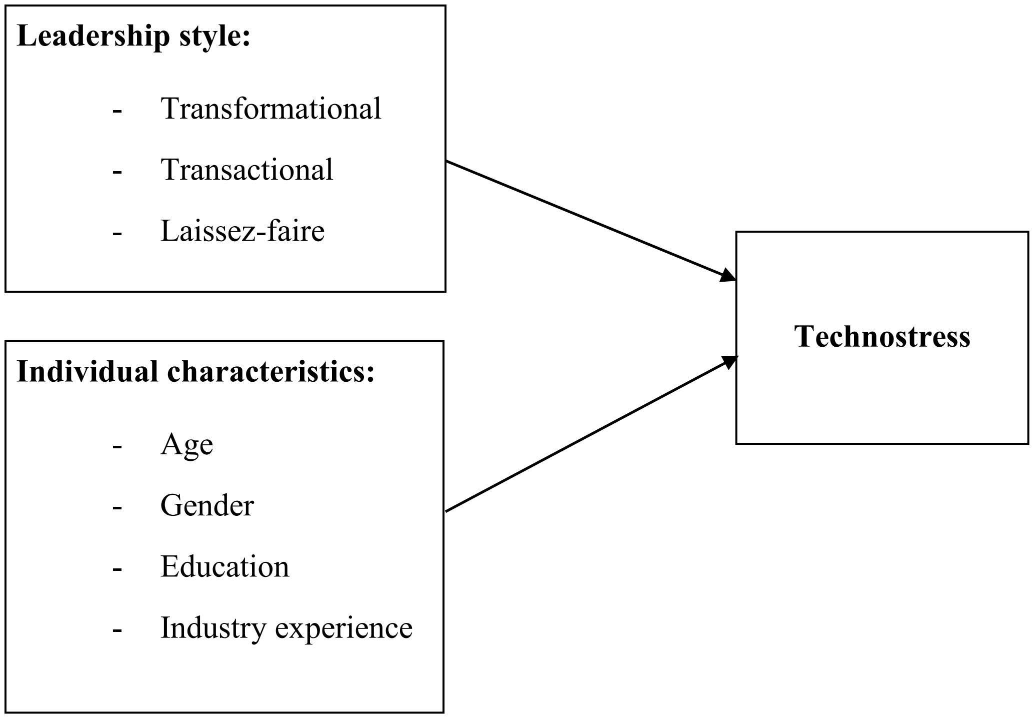

Figure 1. Theoretical Framework

The population for this study consisted of information technology managers employed by companies from various industries within the United States between the ages of 18 to 65 working in a leadership position. SurveyMonkey™ randomly selected 129 survey participants from the sample frame, recruited via an electronic invitation to take part in the study. A link embedded within the e-mail request directed each respondent to the survey website. Upon review and acceptance of the informed consent form, respondents were permitted to complete the survey.

Organization of the Study

Chapter 1 provided an overview of the study, the context of the research problem, the problem statement, purpose, and rationale. In addition, the research question and its overall significance to the study were presented. Key terms used throughout the study were defined and research assumptions and limitations were discussed.

Chapter 2 will present a review of the literature associated with the stressors that result from the use of and changes in information and computer technologies. Chapter 2 will evaluate the literature related to technostress and the information technology manager. This chapter will also review the research surrounding leadership style theory.

Chapter 3 outlines the methodological approach assumed by the researcher during the study. A quantitative, non-experimental survey research design was the specific research method used in this study. This chapter describes various details of the research method such as the research design, sample, setting, data collection method, instrumentation, validity, reliability, analysis, and ethical concerns.

Chapter 4 provides an evaluation and interpretation of the research results. Chapter 5 presents a discussion of the research results, limitations, implications, conclusions, and recommendations for future research.

CHAPTER 2. LITERATURE REVIEW

Introduction

Chapter 2 provides an evaluation and synthesis of relevant literature not only to establish a comprehensive theoretical understanding of technostress but also identify the gaps in research surrounding those factors that influence its effects. The chapter begins with an exploration of the computer revolution and information and communication technology use in business and in particular, information technology practice. Next, technological stressors and their consequences are identified and examined, framed through the lens of prevalent technostress concepts and theories. Finally, leadership research, and in specific, the full-range leadership theory, is investigated with respect to technological stress in information technology practice. The following section reveals those strategies incorporated to locate the literature that provided the foundation of this research study.

Literature Research Strategies

Initially, Boolean phrase searches of common subject terms such as *technostress, technological stress,* and *computer stress* were conducted using the Summon search engine. Subject terms resulting from these preliminary searches became the source of subsequent searches. The databases that produced the most relevant results included Google Scholar, Academic Search Premier, and Business Source Complete. Data mining was conducted to locate seminal works and isolate additional key search terms associated with technostress including job stress, computer anxiety, technophobia, technological innovations, and job productivity.

To catalogue and systematize the collection of applicable literary works, a database was constructed. Within this database, information was logged about each pertinent journal article and book including the title, author(s), date, publisher, volume, page numbers, DOI number, methodological approach, methods and instruments, theories, sample frame, findings, theoretical framework, implications, limitations, and areas for future research. The search strategy associated with how each work was acquired was, also, logged. Consequently, because each work cited as part of the research study was labeled, this database served as a reference list warehouse.

The Computer Revolution

The genesis of the desktop personal computer in 1981 by International Business Machine Corporation (IBM) revolutionized the business landscape (Browning, 1990; Usselman, 2010; Usselman & Bix, 2010). Prior to the inception of computers at the workplace, organizations manually produced mathematical computations through mechanical tabulating devices. The introduction of computers enabled companies to produce a much larger volume of calculations and transactions in far less time while minimizing the risk of human error (Ceruzzi, 1998; Misa, 2007). The number-crunching capability of computers initially led to their widespread adoption.

Productivity

Computers grew further in popularity as companies began to recognize their immense capacity to function as tools to enhance productivity. By automating repetitive tasks and business processes, computers facilitated the reduction or elimination of redundancies (Edwards, 2001; Mahoney, 1988). Excess labor, energy, and material input were averted while quality, precision, and accuracy outputs were improved. As a result, the nature of how business was conducted drastically changed as did the quality and quantity of throughput.

Information Accessibility

This technological shift not only triggered an emergence of enhanced business practices but also workplace data and information became more readily and accurately available. Reports that were once completed weekly or monthly could be generated almost instantaneously, providing managers with the ability to make decisions more rapidly (Ancona & Caldwell, 1992; Baum & Wally, 2003; Grant, 1996; Turner & Makhija, 2012). This expanded information flow afforded supervisors with greater flexibility to identify and analyze organizational problems and respond with an appropriate action plan. Information became more accessible, expanding enterprise creativity and strategic thinking.

Personal Computing

As the computer gained acceptance by corporate America and ownership costs began to decline, home PC demand began to stir (Beaudry & Doms, 2010; Latour, Hanna, Miller, & Pitts, 2002). Not only were personal computers more affordable, they also became increasingly advanced while simultaneously more user-friendly. PC sales climbed sharply from 1 million in 1980 to over 30 million in the mid-1980's as computer use broadened beyond mathematicians, researchers, data processing professionals, and the workplace to nearly everyone in mainstream society (Diaz, 2012; Shackel, 1997; The

Personal Computer, 2013). This upsurge signaled the future importance of computers and their influence upon technological innovation and humanity as a whole.

The Information Age

The introduction of the World Wide Web in the early 1990's was a driving force behind one of the most notable events of the Twentieth Century, the Information Age (Hilbert & Lopez, 2011). The World Wide Web facilitated accessibility to the Internet, a massive system of interconnected computer networks, enabling instantaneous delivery of information across the globe. With a personal computer and Internet access, information that may have been difficult or nearly impossible to retrieve was now readily available and easily transferable. Human knowledge growth exploded, doubling once each twenty-five year period before the Information Age to every thirteen months thereafter, with estimates of multiplying every 11 hours by 2014 (Buckminster, 1981; Coles, Cox, Mackey, & Richardson, 2006; Jesiek, 2007; Kurzweil, 2005).

The Internet, also referred to as "the net," "cyberspace," and "the virtual world," radically shaped the evolution of modern societal communication and human interaction (Matusitz, 2005; McKenna, Green, & Gleason, 2002; Wellman & Hampton, 1999). During the Information Age, sluggish modes of communication such as postal correspondence, facsimile, and telegraph were substituted for more rapid ones including e-mail, virtual conferencing, online messaging, and social networking (Aragon, 2003; Chen, 2013; Matusitz, 2007). An implication of this shift in communications infrastructure was the profound widening in scope from a narrowed audience to one with a large-scale global reach. Interactions and knowledge sharing expanded beyond geographical boundaries, redefining the interconnectedness between cultures and revolutionizing international trade and commerce (Edoho, 2013; Zembylas & Vrasidas, 2005).

Globalization

Advances in information and communication technologies have completely transformed the way that business is conducted across the world. In particular, ICTs have vastly increased the speed of information transfer, eliminating the communication obstacles that once adversely impacted the ability to establish relationships or interact with international trade partners (Inda & Rosaldo, 2002). This real-time, synchronous exchange of information has not only accelerated the growth of the global economy by shrinking international investment and trade barriers, but has also driven a more cost effective use of worldwide capital and other various aspects of manufacturing and production (Makhlouf, 2014; Wallerstein, 2009). ICTs and technological innovations have ultimately promoted an increase in global competition and production efficiencies, resulting in a reduction of input costs and subsequently, consumer prices (Martin, Metzger, & Pierre, 2006; Stiglitz, 2013; Suter, 2006).

Despite the lucrative impact of ICTs upon globalization from an organizational business management perspective, a number of negative consequences result. For one, some countries are unable to sustain their strategic competitive advantage when other countries with more abundant resources, greater market appeal, or advanced technological proficiencies enter the market and can produce goods and services less expensively with improved quality (Eckel & Neary, 2010; Goldberg, Khandelwal, Pavcnik, & Topalova, 2010). Secondly, industrialized countries such as the U.S. lose jobs to countries with emerging economies that can produce labor more cheaply

(Greenaway, Gullstrand, & Kneller, 2008). Finally, start-up companies from developing countries struggle to compete with and survive due to multinational enterprises that have expanded into their markets.

Computer Revolution Trends

Notwithstanding its transformative, thirty-five year impact upon the world, the computer revolution is, still, in its infancy as information and communication technologies continue to rapidly develop and advance. For example, the speed and performance of computer microprocessors doubles every 24 months, nearly all businesses use computers in some capacity in their operations, and as per the U.S. Bureau of Labor Statistics (2012), information technology jobs are expected to increase by 22% before 2020 (Savitz, 2013). Consistent with the U.S. Census Bureau (2014), in 1982, only 8.2% of households owned a computer as compared to 78.9% in 2012. Social media sites such as Twitter and Facebook have active registered users totaling 645 million and 1.3 billion, respectively (Huffington Post, 2014a, 2014b). The upcoming section examines information and communication technologies from a current angle to reveal their effect upon companies and their employees, and in particular, the information technology management practitioner.

Information and Communication Technologies

Information and communication technologies have markedly transformed the environment in which organizations and their personnel operate. The continuous evolution of technological change, in conjunction with the devices and options that computerized advancements give rise to, have permanently altered the dynamics of business and how, when, and where work is completed. While many strategic advantages are secured through the implementation of ICTs, a number of complexities and drawbacks surround their utilization (Rastrick & Corner, 2010). A synthesis of the literature in connection with the outcomes of ICTs, advantages and disadvantages, follows.

Intensified Competition

Innovation in information and communication technologies, coupled with a relaxation of international trade laws, have sparked intense marketplace competition. With fewer trade barriers, modern technologies have created an arena of global consumers with converging demands for products and services (Awuah & Amal, 2011). The Internet alone, with two billion users exchanging more than $8 trillion per year, has increased worldwide GDP by 21% over the last 5 years (Manyika & Roxburgh, 2011). Ironically, organizations challenged by these global competitive pressures imposed by ICTs rely heavily on ICTs to support and maintain their business strategies.

Keeping Pace With Constant Change

Organizations yield a considerable return with informed investment in and management of ICTs including productivity gains, enhanced human capital development and workplace practices, and consumer benefits such as improved product and service price and quality (Black & Lynch, 2004; Jorgenson, Ho, & Stiroh, 2005; Stiroh, 2008). However, irrespective of size or international trade role, businesses are faced with the daunting task of keeping pace with frequent changes in and understanding complex technologies (Liu & Chen, 2012). This tempo produces an environment where regular training and knowledge sharing is essential so employees can remain current with those technologies required to perform their jobs. Correspondingly, organizational end users are expected to adapt to constant ICT updates, upgrades, and modifications and the changes in policies, practices, and procedures that result.

Work-Life Balance

Advances in ICTs have distorted the borders and influenced the balance between work and other common elements of life (Greenhaus, Collins, & Shaw, 2003; Valcour & Hunter, 2005). Referred to as the work-life balance, this phenomenon is described as the time spent, involvement in, and satisfaction realized from the roles and activities related to an individual's on-the-job and off-the-job experiences (Bittman, 2005; Burgess & Waterhouse, 2010). Research has determined that work-life balance plays a major role in overall health and well-being (Grzywacz, Butler, & Almeida, 2009; Kofodimos, 1993). Those who strike an acceptable balance have an improved quality of life and experience less role overland and stress and the consequences that arise as a result including, but not limited to, tension and anxiety (Carlson, Grzywacz, & Zivnuska, 2009). Contrastingly, those observed with a perceived conflict or imbalance experience greater levels of stress, reduced quality of life, and adverse health implications (Chesley, 2005).

The literature is divided with respect to ICTs and whether they positively support or harmfully impact work-life balance. Some researchers have argued that ICTs provide employees with greater flexibility to simultaneously manage their workloads and life commitments (Hill, Hawkins, Ferry, & Weitzman, 2001; Kelliher & Anderson, 2010). By logging into the workplace at any time from virtually any computer at home or some other location of convenience, employees are afforded the benefit of staying connected to the workplace and performing job duties while attending to other non-work related obligations. Employees who are provided with a workplace flexibility benefit perceive less difficulty and fewer problems in managing their work-life balance.

Furthermore, researchers contend that ICTs encourage a stable work-life balance when organizations endorse telecommuting, virtual workplaces, or other flexible work environment arrangements. Telecommuters, also called remote workers, mobile professionals, location independent professionals, and technomads, work from practically anywhere, their home or another site, with access via the Internet. Approximately 2.6% or 3.3 million U.S. workers telecommute, considering home their primary workplace, while those who work from home multiple days per week that do not consider home their primary workplace increased nearly 80% between 2005 to 2012 (U.S. Census Bureau, 2012). Consistent with the literature, telecommuters alleged improved job autonomy, enhanced engagement, and less fatigue, exhaustion, and stress as compared to their brick and mortar counterparts (Ahuja, Chudoba, Kacmar, McKnight, & George, 2007; Bakker, Demerouti, & Euwema, 2005; Sardeshmukh, Sharma, & Golden, 2012; Schaufeli & Bakker, 2004).

Paradoxically, although ICTs provide employees with the freedom to access the workplace at any time, this control can inflict disruption upon the work-life balance. In keeping with the literature, many employees feel pressured to stay connected to the workplace during non-working or leisure hours as a result of mounting organizational expectations (Derks & Bakker, 2010; Higgins & Duxbury, 2005; Jarvenpaa & Lang, 2005; Middleton, 2007; Van Hooff, Geurts, Kompier, & Taris, 2006). Moreover, as a consequence of their own compulsions to immediately respond to informational requests or remain plugged into the business, employees have become reluctant or unable to detach themselves from the workplace. According to the Pew Networked Workers Survey (2008), nearly half of the 96% of employees who use ICTs on the job are expected to work additional hours. When work intrudes upon life to the point that the perceived balance is disturbed, employees have higher levels of stress and job burnout, lower employee satisfaction, and impaired performance (Demerouti, Bakker, Nachreiner, & Schaufeli, 2000; Leiter, 1993; Lewig, Xanthopoulou, Bakker, Dollard, & Metzer, 2007).

Reduced Workforce

The ICT revolution, fueling a surge in productivity and the availability of information, has impelled organizations to reduce their workforces (Rosa & Hanoteau, 2012). A downscaling strategy can enable companies to decrease operational costs while increasing efficiencies, overall competitiveness, and shareholder value (Gandolfi & Littler, 2012). However, right-sizing can provoke undesirable employee attitudes and behaviors including increasing concerns of job insecurity and uncertainty, a deterioration of confidence in management, a reduction in job commitment and satisfaction, and an escalation in the stress and its negative effects (Ashford, Lee, & Bobko, 1989; Dutta, Guthrie, Basuil, & Pandey, 2010; Self, Armenakis, & Schraeder, 2007). The repercussions can be burdensome to those employees who survive the aftermath as more must be done with less and workplace expectations magnify.

Working Faster

ICTs have transformed the workplace, making an indelible mark on the lives of workers and leading to remarkable productivity increases. In accordance with the Kelly Global Workforce Index (2013), 53% of respondents reported an improvement in productivity on account of the advent of new information and communication technologies. Comparably, 80% of the Pew Networked Workers Survey (2008) participants stated that ICTs helped them to more effectively perform their work. Conflictingly however, ICTs impose workplace distractions that can harm employee productivity and accuracy and intensify stress levels (Visotsky, 1984; Warshaw, 1984).

ICTs are culpable for spawning an acute epidemic of workplace interruptions that destroy worker focus, forcing frazzled employees to work at a dizzying pace to stay on par with their tasks. Common workplace interruptions are instigated by e-mails, meeting and message notifications, instant messaging, the Internet and cell phone calls (Barley, Meyerson, & Grodal, 2010; Sykes, 2011; Wacjman & Rose, 2011). The productivity cost of these ICT-based disruptions, in terms of occurrences and time, is steep at approximately 96 interruptions per 8-hour work day, requiring up to twenty five minutes an interruption or an hour and a half of the work day for recovery time to compensate (Jackson, Dawson, & Wilson, 2001; Mark, Gonzales, & Harris, 2005; Solingen, Berghout, & Latum, 1998). When attention is diverted, workers must not only detangle themselves from the interruptions but also refocus, redirect, and expedite their efforts, often producing an emotional response of role overload and stress (Cameron & Webster, 2005). The outcome is that workers may either feel obligated or are mandated to lengthen their workday, either at the workplace or from home or some other location, just to keep up with their demanding and overwhelming workloads.

Multitasking

The present-day work environment necessitates that employees juggle multiple conflicting tasks on a regular basis. This ability to switch, engage in, and simultaneously manage the completion of multiple tasks is known as multitasking or task-switching (Buser & Peter, 2012; Monsell, 2003; Oswald, Hambrick, & Jones, 2007). A relevant example of multitasking is communicating via telephone with a customer while concurrently responding to an e-mail on an unrelated topic. ICTs have not only altered the prevalence of workplace task switching but technologies have also spawned new methods of multitasking (Reinsch, Turner, & Tinsley, 2008).

ICTs exacerbate the incidence and consequences of multitasking, however the literature is in opposition regarding the impact upon employees and the overall business environment. Some research has shown that multitasking can produce feelings of fatigue, tension, anxiety, and role overload, escalating inattention to detail, error rates, barriers to the completion of tasks, and inefficiencies (Boswell & Olson-Buchanan, 2007; Chesley, 2005; Hill et al., 2001; Murray & Rostis, 2007; Valcour & Hunter, 2005). External pressures resulting from the rapid availability of information and the competitive, downsized workplace can inflict a rampant task-shifting force to work at a feverish, constantly irregular rate. This multitasking mandate can become entwined in the organizational culture, tacitly viewed by employees as a requirement of the job, regardless of the stress and physical burnout that can result (Bannister & Remenyi, 2009).

Conflicting research has argued that multitasking not only improves with practice but also enables the end user a fresh perspective when returning to a task, catching more mistakes, not causing more (Applebaum & Marchionni, 2008). Furthermore, task switching minimizes downtime and enables the completion of more activities, not less, increasing productivity and positively contributing to the bottom line (Wasson, 2007). These researchers claim that multitasking is not a trend but a necessary skill in the global business environment, where a single activity or task focus can inhibit firm growth or sustainability (Roper & Juneja, 2008).

Inconsistent outcomes related to gender and multitasking effectiveness originate from the literature as well. Some researchers suggested that women are better at multitasking than men because their brains are physically hard wired to more effectively handle the completion of multiple tasks (Fisher, 1999; Mantyla, 2013; Pease & Pease, 2003, Spencer, 2013). Females, frequently mothers, are claimed to more effectively multitask because they spend more time multitasking, managing family and child rearing activities more regularly when compared to fathers (Offer & Schneider, 2011). Other researchers disagree, arguing that females are just as susceptible to and suffer from the same, if not more, emotional and psychological consequences of multitasking as their males peers and, if given the option to multitask, women are less prone to do so (Buser & Peter, 2012; Nomaguchi, 2009).

Growth in Information-Intensive Industries

Just as technological innovations have shaped the manner in which workplace activities are organized, directed, and completed, ICTs are credited with their effect on the immense growth of information-intensive industries. Information-intensive industries consist of service and business-related firms that are highly dependent upon professional and technical knowledge (Gordon, 2000; Idowu & Awodele, 2010). With an average growth rate of 4.7% per year, the information-intensive sector has realized the fastest level of growth as compared to all other major subdivisions and the U.S. economy, as a whole (Henderson, 2012). By 2020, the knowledge-intensive sector is expected to reach 2.9 million jobs and $1.9 trillion in real output (Henderson, 2012).

Spurred by the PC revolution, both domestic and international economies and labor markets have undergone significant changes. Computers and communication technologies have enabled companies to become more deliberate with cost savings strategies through automation and the repositioning of supply chains. Within the U.S. labor market, as innovative technologies are merged into operations to modify and improve practices and processes, companies can replace more educated, higher paid workers with less educated, lower paid workers (Alic, 2004; Mahoney, Robinson, & Vecchi, 2008). Workers performing lower-skilled, easily automated or obsolete tasks have been forced to work in jobs that are not easily systematized.

Increased global competition has amplified the demand for an information-centered, skills-intensive workforce. Accordingly, the number of highly-skilled, higher-wage jobs is trending upward while lower-skilled, higher-wage jobs are declining (D'Amours & Legault, 2013). With an increased pressure for more information-related services, industrialized nations are outsourcing lower-skilled production and service workers to developing countries as a cost-reduction strategy. However, the outsourcing of high-technology service and manufacturing jobs is beginning to increase as U.S. corporations are able to recruit highly skilled and educated personnel with comparable talents at a fraction of the expense (Giuri, Torrisi, & Zinovyeva, 2008).

This section has explored the literature to focus on the broad context of ICTs and their decisive implications on the business environment and workforce. These implications included increased competition, keeping pace with constant change, work-life balance, a reduced workforce, working faster, multitasking, and the growth of information-intensive industries. With a more narrowed lens, the next section will investigate ICTs from the perspective of the information technology manager and their relevant professional experiences.

Information Technology Managers

Information technology managers, also referred to as information systems, projects, or communications managers, steer the strategic technology-related activities of a company. To become an information technology manager, the minimum requirements are generally a Bachelor of Science degree and an average of five-years of work experience in an associated occupation, however many have an advanced degree. Prevailing academic programs of study are designed to provide the technical skills to supervise an IT department and administer an internal computer network while meeting the increasing demand for technological expertise in business operations such as marketing, consulting, information management, and customer service. Foundational curricula include management, finance, IT, ethics, and computer science while core courses consist of databases, network administration and security, strategic management, and systems architecture (U.S. News & World Report, 2014).

To anticipate and recommend future ICT improvements, achieve technological and information goals, and sustain and expand competitive advantages, IT managers usually have extensive knowledge surrounding existing information and technology resources and requirements of their firms and the industry in which they operate (U.S. Bureau of Labor Statistics, 2014). IT managers set and implement ICT policies, ensure the accessibility of data and networking services by coordinating IT activities, provide end user services including troubleshooting and training, and oversee network and data security. Correspondingly, these practitioners must stay current with ICT trends to evaluate how new technologies can help their organizations in the short and long runs.

The information technology industry is the fastest growing occupation in the U.S. economy, growing twice as fast as all other professions (U.S. Bureau of Labor Statistics, 2014). This expectation is based off of the need for organizations to boost their utilization of wireless communications and networks, web-based games, apps, and web analytics, strengthen their cybersecurity practices, and increase their use of cloud computing. According to the U.S. News & World Report (2012), four of the top ten best jobs of 2012 include (a) software developer, (b) database administrator, (c) web developer, and (d) computer systems analyst. Consistent with the Best Jobs for the 21st Century, the job outlook continues to be promising as companies are expected to hire 20% more computer software analysts and engineers by 2018 (Shatkin & Farr, 2008).

As technologies evolve and advance, companies strongly rely on their IT teams to manage the inexorable maze of modernization. The challenge is that, despite the significant demand for information technology jobs, fewer students are graduating with information technology degrees. If this trend persists, by 2018, only half of the available jobs will be able to be filled with qualified degree-holding candidates (College Board, 2007). The predicted shortage of qualified information technology recruits coupled with the rapid technological change common to the IT field, sets the stage for a disparate work-life balance.

At the present time, most information technology managers work at least 40 hours per week with nearly one third working more than 40 hours per week (U.S. Bureau of Labor Statistics, 2014). Within four years, at the zenith of the projected IT personnel shortfall, those employed in the profession will be expected to produce more work to fill the gap. Information technology professionals will presumably work even more hours to satisfy the needs of their organizations and the demands of the industry. Although many information technology professionals telecommute, few managers can work remotely, meaning that their increasingly longer work day is confined to the office.

The IT manager has become an indispensable asset to practically all business functions for the simple reason that ICTs have penetrated nearly all business processes and practices. IT managers bridge the divide between IT and business, acting as liaisons between business units, collaborating with human resources, finance, sales and marketing, and executive management to make changes to systems and processes to meet corporate needs (Farley & Prager, 2010). Likewise, IT managers use their ICT, business, and industry knowledge and experience to evaluate firm systems and processes to recommend strategic change efforts to lower costs, improve productivity, and realize additional strategic outcomes. Organizations are exceedingly dependent upon their IT teams to not only develop programs and manage the IT infrastructure but also educate end users on the use of ICTs to generate information to perform their jobs, solve workplace problems, and achieve corporate objectives (El-Masri, 2009; Yu & Guo, 2008).

As central as information technology management is to business practices, IT must exhibit its value as a strategic business partner and effectively communicate within the IT division and throughout the entire organization to build collaborative relationships. Failure to do so can result in a lack of organizational trust, a tarnished reputation, an inability to foster the relationship necessary to implement strategy, innovation, and change management events and the potential of outsourcing of IT functions (Gefen, Ragowsky, Licker, & Stern, 2011). Consistent with Dos Santos and Sussman (2000) and Elie-Dit-Cosaque, Pallud, and Kalika (2011), the IT manager must reframe the culture to support technological innovation and change management efforts by establishing collaborative associations, monitoring internal and external environments to minimize threats and weaknesses and capitalize on strengths and opportunities, aligning IT talents with that of business needs, managing projects, measuring their performance, and reporting on IT value.

Research supports the argument that IT managers are not communicating effectively with their companies and constituents (Cukier, 2007; Smith & McKeen, 2010). Ineffective communications inhibit the ability for the IT manager to strategically partner with the rest of the company. The lack of these soft skills feeds perceptions of cynicism and mistrust, further separating IT from the remainder of the organization and increasing the risk and probability of information technology outsourcing or offshoring (Karlsen, Graee, & Massaoud, 2008; McKeen & Smith, 2009). Hunter and Westerman (2009) advanced that the IT manager can successfully drive corporate innovation and change management through value reporting. The authors presented a framework to facilitate the discovery of value sources by (a) optimizing internal practices and processes, (b) reshaping and reinforcing external relationships, (c) internal reporting to promote knowledge sharing with the organization, and (d) external reporting to find new, more effective methods to convey information to external stakeholders (p. 96).

Selected as the population for this particular research study, the literature surrounding the role of the information technology manager was explored to frame an understanding of the profession and its distinctive aspects. This section outlined some of these characteristics such as the qualifications, expectations, challenges, and existing and prospective business environments. The next section introduces an in-depth review of the research associated with the stress imposed by information and communication technologies. Defined as technostress, the upcoming literature review examines the history, theories, studies, findings, and effects it imposes upon its casualties. The investigation will, then, focus on the specific influence that technostress has upon the information technology manager.

Technostress

Information and communication technologies have invaded practically every aspect of work and life. As an example, the number of computers in use across the world soared to over one billion in 2008 with an additional one billion computers expected to be placed in service by the end of 2014 and over two billion computers are connected to the Internet (Gartner Group, 2008; Internet World Stats, 2010). A burgeoning volume of research has begun to focus on the negative effects of ICT use. Some of these adverse consequences include disruptions, work-life imbalance, dependency and addiction, role overload, misuse and abuse, and computer or technological anxiety, otherwise known as technophobia or technostress.

Technostress was first described as a syndrome or disease that precludes or inhibits an end user from coping with ICTs in a positive way (Brod, 1984). Weil and Rosen (1997) later advanced the meaning to include the undesirable influence upon thoughts, perceptions, actions, or physiology, implicit or explicit to ICT use (p. 5). Originating from modern ICT use at home and at the workplace and the altered behaviors that result, technostress causes an inability to adapt with technology. Users feel compelled to stay connected, forced to take immediate action on work-related requests, and are driven to chronic multi-tasking to work faster due to the instantaneous availability of information (Agervold, 1987; Ayyagari et al., 2011; Kinman & Jones, 2005; Korunka & Vitouch, 1999; Straub & Karahanna, 1998; Wellman & Hampton, 1999).

The conventional, 9-to-5 workday has been permanently altered as a result of ICTs. With the invention of e-mail, smartphones, remote network access, cloud computing, document sharing, and applications, flexible work arrangements such as telecommuting, teleworking, and mobile offices have become increasingly popular. Even though flexible work arrangements have enabled more autonomy in defining working hours, this practice has blurred the lines between work and life, causing greater work overload and job stress (Beehr & Newman, 1978; Yun, Kettinger, & Lee, 2012). When work and life responsibilities collide, as initiated by ICTs in the work environment, technostress results (Butler, Aasheim, & Williams, 2007; Tarafdar et al., 2007).

The prevalence of technostress is not confined by geographic boundaries and has become a grave problem both domestically and worldwide. According to Tu et al. (2005), Chinese employees working in IT-oriented firms are increasingly frustrated with the need to constantly adapt to rapidly changing technologies and their health and well-being are deteriorating as a result. These employees report much higher mental health dysfunction and difficulties with interpersonal relationships (Tu et al., 2005). Similar results were discovered in studies of British and Pakistan professionals (Bozionelos, 1996; Khan, Rehman, & Rehman, 2013).

Symptoms of Technostress

Table 1 summarizes the alarmingly wide array of adverse physical, mental, and emotional indicators of technostress.

Table 1

Adverse Symptoms of Technostress

Category	Symptoms
Physical	Sweating, dizziness, shaking, fatigue, shortness of breath, trembling
	Gastric upset, eye strain, lightheadedness, sleep disturbances
	Headaches, numbness, increased cortisol production, strain
Mental	Panic or feelings of fear, obsessive thoughts, inability to concentrate
	Depression, feeling of helplessness, mental fatigue, nightmares
	Losing control or touch with reality, frustration
Emotional	Anxiety, persistent worry, resistance, irritability
	Intensive flight response, suspicion
	An overwhelming feeling of terror

Note. Information from "Technostress from a Neurobiological Perspective: System Breakdown Increases the Stress Hormone Cortisol in Computer Users," by Riedl, R., Kingermann, H., Auinger, A., & Javor, A. (2011), *Business & Information Systems Engineering, 2*(2012), pp. 61-69 and from "Impact of Technology on Physical and Mental Health of Library Professionals in Engineering Colleges of Anna University, Tamilnadu," by Mahalakshmi, K., & Sornam, S. A. (2012). *4th International Conference on Computer Research and Development, 39*(2012), pp. 1-5.

A range of symptoms may be presented by technophobic ICT users, some of which are categorized as biological while others are considered more psychological in nature (Cox, Griffith, & Rial-Gonzalez, 2000; Mahalakshmi & Sornam, 2012). Most technostress symptoms have detrimental effects on the health and well-being of the inflicted (Knani, 2013; Wang et al., 2008). For example, a recent study conducted by Riedl et al. (2011) identified that ICT breakdowns can increase the production of the stress hormone cortisol. Prolonged levels of cortisol can suppress the immune system and thyroid function, increase blood pressure and abdominal fat, and impair overall cognitive performance (De Kloet, Joels, & Holsboer, 2005; McEwen, 2006; Melamed et al., 1999; Walker, 2007). Other common physical symptoms include eye strain, fatigue, gastric problems, and sleep disturbances.

From a psychological standpoint, technostress can hinder the ability to concentrate due to constant worry, fear, panic, apprehension, and depression. Sufferers may be irritable, frustrated, moody, and resistant to change. Moreover, those afflicted by computer stress may experience poor judgment and decision-making, uncertainty, avoidance, recklessness, withdrawal, and loss of appetite (Aghwotu & Owajeme, 2010). These symptoms, arising from the attempt of individuals to deal with the constantly evolving change associated with ICT use, should be anticipated given the mounting varieties of technology in the workplace.

Although the symptoms of stress are ordinarily understood to have a caustic effect on physical, mental, and emotional well-being, a conflicting result is plausible. Stress can accelerate the production of the anabolic hormones that enhance immunity, repair cells, and improve overall health (Dienstbier, 1989; Epel, McEwen, & Ickovics, 1998; Levy & Myers, 2004). Whether destructive or constructive, technostress induces numerous biologic and psychosomatic responses, each with resulting consequences.

Causes of Technostress

Technostress is likely to emerge with the launch of new technologies and related organizational processes, practices, and procedures (Gendreau, 2007). Workers must frequently acclimatize themselves with innovations in and upgrades to ICTs, navigating through unfamiliar systems, networks, and applications, and learning how to operate new or updated equipment. When corporate resources are limited to support ICT-use training, employees may either be self-guided or rely on their friends and colleagues to grasp the intricacies of the new innovation. In view of that, employees may lack the knowledge and proficiency to adequately implement the technology let alone maximize its full benefits.

ICTs are changing at a much swifter speed than the workers engaged in the use of the technology. With the assault of unrelenting innovation, a majority of the workforce has only modest control over organizational ICT adoptions at best (Chen, Yen, & Hwang, 2012). Workers are constantly bombarded by an unwieldy volume of information. Employees are repeatedly challenged to stay up-to-date with the technical competencies required to operate the ICTs necessary to do their jobs (Bhattacerjee, Perols, & Sanford, 2008).

Researchers have attempted to isolate the various multidimensional causes of technostress. As identified from a review of the literature, technostress can be elicited by a litany of factors including inexperience with ICTs, performance anxiety, corporate environment, lack of training and standardization, role overload, conflict, or insufficient staffing, information overload, rapid rate of technological change, intimidation, poor management, ergonomics, and outdated equipment (Ayyagari et al., 2011; Day, Scott, & Kelloway, 2010; Doll & Torkzadeh, 1989; Ennis, 2005; Ragu-Nathan et al., 2008;

Tarafdar et al., 2007; Wang et al., 2008). Tarafdar et al. (2007) condensed the causes of technostress into five distinctive dimensions. Table 2 identifies these factors.

Table 2

Technostress Creators

Technostress Creator	Condition
Techno-overload	A condition that occurs when ICTs compels users to increase their job load and pace, altering their work habits.
Techno-invasion	A condition where ICTs invade and upset the work-life balance by reducing personal time. Users are compelled or pressured to stay connected and immediately respond to workplace requests during non-work hours.
Techno-complexity	A condition where ICTs are perceived by users to be so complex that they feel incompetent and obligated to spend more time learning about them.
Techno-insecurity	A condition where users believe their jobs are in jeopardy by either an ICT or another employee with improved technological skills.
Techno-uncertainty	A condition where users feel uneasy by continuous ICT change. This uncertainty forces users to be in a constant state of ICT knowledge acquisition.

Note. Information from "The Impact of Technostress on Role Stress and Productivity," by M. Tarafdar, Q. Tu, B. Ragu-Nathan and T. Ragu-Nathan, 2007, *Journal of Management Information Systems, 24*(1), pp. 301-328 and from "Computer-Related Technostress in China," by Q. Tu, Q. K. Wang and Q. Shu, 2005, *Communications of the ACM, 48*(4), pp. 77-81.

As per Tarafdar et al. (2007), the creators of technostress are comprised of the following factors: "techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty" (pp. 314-315, 322). Techno-overload is the condition where ICTs force employees to work more quickly, vary their workplace routines, and increase the span of the workday (Tarafdar et al., 2007, p. 315). Techno-invasion is described as the intrusion that ICTs impose upon the work-life balance, compelling users to remain permanently connected to the workplace so as to respond immediately to informational requests (p. 315). As a result, employees spend less time with their family or overseeing personal interests (Tu et al., 2005, pp. 78-79). Techno-complexity is the circumstance where the complex intricacies and sophistication of ICTs make users feel inadequate, forcing them to spend a greater amount of time learning about them (Tarafdar et al., 2007, p. 315). Techno-insecurity is the state of uncertainty that users feel when they perceive their jobs to be in jeopardy as a result of an ICT or another more skilled employee replacing them (Tarafdar et al., 2007, p. 315). Finally, techno-uncertainty is the condition where users feel uneasy by continuous changes in ICTs (Tarafdar et al., 2007, p. 315). This uncertainty forces users to be in a constant state of ICT knowledge acquisition (Tu et al., 2005, pp. 78-79).

Antecedents of Technostress

Through the application of the Person-Environment Fit theory, Ayyagari et al. (2011) extended the research conducted by Ragu-Nathan et al. (2008) and Tarafdar et al. (2007) by determining that technostress creators have identifiable antecedents or precursors. Results indicated that the usability of ICTs along with their intrusive nature, the anonymity they provide, and the steadfast pace of change predicted the incidence of computer anxiety stressors (Ayyagari et al., 2011, p. 848). Their research was not restricted in scope by industry, occupation, or a specific technology and is, therefore, more generalizable in its application. However, their research only considered ICT stressors such as work-home conflict, role ambiguity, work overload, job insecurity, and invasion of privacy (Ayyagari et al., 2011, p. 834).

Consequences of Technostress

The consequences of technostress are extensive and costly and can have a profound impact not only on the individual and their organizational environment but also the economy as a whole. The cost of technostress to U.S. organizations is more than $300 billion annually due to lost productivity, workplace accidents, absenteeism, and employee turnover (American Institute of Stress, 2007). Technostress accounts for over 50% of the 550 million workdays lost to absenteeism each year (American Institute of Stress, 2007). In addition, the physiological and psychological effects of technostress drive up healthcare and insurance costs.

Technostress intensifies the perceptions of role overload, a syndrome where employees feel as though their job is too demanding and challenging (Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2011). ICTs force workers to produce more work in less time. Similarly, technostress increases role conflict, a condition where work-life balance is upset and personal time is plagued by workplace interruptions (Tarafdar, Tu, & Ragu-Nathan, 2011; Tarafdar et al., 2011). Both role overload and role conflict are linked to poor managerial performance (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Lazarus, 1991). Technostress is also associated with reduced job satisfaction, productivity, involvement, organizational commitment, and creativity and time spent on critical thinking (Brillhart, 2004; Hung, Chang, & Lin, 2011; Krinsky, Kieffer, Carone, & Yolles, 1984; Ragu-Nathan et al., 2008; Tarafdar et al., 2007, 2010, 2011).

Workers experiencing prolonged levels of technostress may become overwhelmed and experience job burnout (Shropshire & Kadlec, 2012). Job burnout results in low energy, fatigue, exhaustion, a lack of interest, or disillusionment about competence and value of work, all of which drain motivation and impede performance (Burke & Greenglass, 1995; Moore, 2000; Muir, 2008; Wolpin, Burke, & Greenglass, 1991). Burnout reduces job satisfaction and commitment and increases employee turnover, the inability to concentrate, career change intentions, and interpersonal problems at home and at work (Simmons, 2009).

Role stress, or the problems, constraints, conflicts, or deficiencies imposed upon the performance of a function, indirectly drives a negative consequence of technostress, a reduction in job productivity (Srivastav, 2010; Tarafdar et al., 2007). In their investigation of technostress and the relationship with role stress, Tarafdar et al. (2007) determined that role stress is directly related to technostress. However, technostress is inversely related to productivity for as computer anxiety increases, output decreases.

Literature surrounding the Person-Environment (P-E) fit theory asserted that role stress emerges when the employee is misaligned with the environment (Dawis, 1992; Edwards, Caplan, & Harrison, 1998; Kristof-Brown, Zimmerman, & Johnson, 2005; Muchinsky & Monahan, 1987; Schnieder, Kristof, Goldstein, & Smith, 1997). When environmental demands exceed employee abilities, the imbalance widens and overload and stress ensue (Edwards, 2008). Therefore, individual employee characteristics are predicted to impact environmental fit by either facilitating or obstructing the alignment. Consistent with the P-E fit theory, the effects of individual characteristics including age, gender, level of education, and industry experience were evaluated to determine their intervening influence upon technostress.

Tarafdar et al. (2011) investigated how individual characteristics influence perceived levels of technostress. According to their research, men are more susceptible to technostress than women, despite being more inclined to use ICTs (Tarafdar et al., 2011). This study determined that women find ICTs to be more challenging to use than men and may, therefore, use ICTs less than men (Tarafdar et al., 2011). Further, they concluded that older workers experience less technostress than younger workers because their maturity has provided them with a more advanced skill set to manage stress (Tarafdar et al., 2011). Finally, employees with more tenure and education have less technostress than their peers with fewer years of experience and education due to more exposure to ICTs within the workplace, enabling one to adapt more quickly to change (Tarafdar et al., 2011).

Technostress may lead to other destructive consequences such as toxic morale, a reduction in the quality of products and services, poor internal communications, workplace conflicts, lost market share, injured reputation, inability to fill open positions or permanent vacancies, and a decrease in shareholder profits and value (Moses, 2013). Contrastingly, some effects of stress may be, to some degree, positive performing as a motivational stimulus (Farley & Broady-Preston, 2011; Liu, Spector, & Shi, 2007; Topper, 2007). Recent research discovered that, when employees are trained to reframe their perceptions of stress from one of pessimism to optimism, a significant improvement in work performance and wellness was experienced (Crum, Salovey, & Achor, 2013). Stressful experiences have been argued to heighten awareness, strengthen relationships, enhance mental sharpness and acuity, improve behaviors and attitudes, and impart a deepened sense of appreciation and meaning (Blackwell, Trzesniewski, & Dweck, 2007; Park & Helgeson, 2006). The next section describes the various strategies that practitioners can employ to manage technostress in an effort to minimize unfavorable consequences.

Strategies for Managing Technostress

According to the literature, many techniques have been suggested to prevent, combat, and lessen the effects of technostress at the workplace. Some of these methods include improved communications for new technology announcements, additional organizational support for training and troubleshooting, pre-established time-out periods for staff to unplug, setting realistic goals, and improved planning (Fisher & Wesolkowski, 1999; Gendreau, 2007; Weil & Rosen, 1997). Many of these coping techniques are designed to gain the buy-in of the workforce either through improved communications, education and training, or generate a climate of organizational support (Gronhaug & Stone, 2012). Therefore, organizations can neutralize the effects of technostress while simultaneously paving the way for a more proficient, satisfied workforce that is more willing to participate in ICT change events.

Tarafdar et al. (2011) created a framework of technostress inhibitors to moderate technostress. These inhibitors, described in Table 3, include "literacy support, technical support, technology involvement facilitation, and innovation support" (Tarafdar et al., 2011, p. 119). First, a literacy support inhibitor is characterized by organizational knowledge sharing and education to cope with and adapt to a new ICT (Tarafdar et al., 2011). Teamwork is emphasized as is end-user training prior to the launch of a new ICT.

Secondly, a technical support provision inhibitor is a mechanism to assist end users with the complexities and disruptions that arise with new ICTs (Tarafdar et al., 2011). Help desk support is assigned to assist employees with questions and requests. Next, a technology involvement facilitation inhibitor is the practice of motivating users through rewards to gain hands-on experience to familiarize and encourage them to use ICTs (Tarafdar et al., 2011). Finally, an innovation support inhibitor is the process of creating an environment of open communication so employees can learn about and accept ICT change more easily (Tarafdar et al., 2011).

Organizations that implement and promote widespread initiatives to address both individual and company-associated stressors at the workplace improve long-term stress prevention effects (Ispen & Jensen, 2012; Noblet & Lamontagne, 2006). Corporate stress prevention programs arm employees with the knowledge and skills to adapt to stressful situations using techniques including relaxation, meditation, time management, and goal setting. To design strategies that target those factors and circumstances inflicting company-associated stress, the organization must scan and monitor the environment (Bond, 2004). This process equips managers with the insight to recognize the signs and triggers of stress, and design initiatives to reduce or prevent stress. Individual-organizational stress prevention strategies include job redesign, peer support groups, participation with decision-making, and work-schedule modifications (Sapolsky, 2003).

Another organizational approach to the reduction of workplace technostress is the cultivation of high-quality relationships between managers and their direct reports. Research conducted by Thomas and Lankau (2009) examined the effects of social support at the workplace and discovered that employees cope more effectively with job demands and stress when a strong rapport exists between employees and their supervisors. The strength of the leader-follower alliance may serve as a support structure that enables improved adaptation to stress. Additionally, a supervisor with solid connections with their staff members may tend to recognize the symptoms of stress and take corrective action more quickly to reverse issues and prevent future hindrances (Erdogan & Enders, 2007; Erdogan & Linden, 2002).

Table 3

Technostress Inhibitors

Technostress Inhibitor	Method
Literacy support	Educate users so they can cope with ICT demands.
Technical support provision	Assist users by providing technical support and troubleshooting.
Technology involvement facilitation	Involve users in the implementation of new and upgrades to existing ICTs.
Innovation support	Create an environment of change acceptance through communications, learning, and support.

Note. Information from "Crossing to the Dark Side: Examining Creators, Outcomes, and Inhibitors of Technostress," by M. Tarafdar, Q. Tu, T. S. Ragu-Nathan and B. S. Ragu-Nathan, 2011, *Communications of the ACM, 54*(9), pp. 113-120.

This section synthesized the literature to explore technostress and its symptoms, causes, creators, inhibitors, antecedents, and consequences. Strategies to minimize its effects were presented. The following section delves into organizational management literature to explore leadership style, and in particular, the full-range leadership theory (FRLT) to evaluate its potential connection to technostress.

Leadership Theory and Technostress

ICTs are increasingly molding and shaping all aspects of human civilization, particularly at the workplace and within daily life. In this information-intensive economy, ICTs are continuously altering how businesses manage their operations. While companies may be reaping the rewards from technological innovations and developments, they, along with their workforce, continue to suffer the vast consequences of ICT-induced stress. Researchers have been relentless in their pursuit of the undiscovered factors that influence technostress. One area in particular that, until now, has remained an unexplored gap in the literature is leadership style and its capacity to influence technostress.

Theoretical Background

Leadership is a popular social sciences research topic and as such, an immense amount of literature surrounds this topic (Kirkbride, 2006). A search on the term "leadership" using the Summon research database returned over five million results.

A broad definition of leadership is the practice of motivating others to achieve a common goal (Chemers, 1997; Stogdill, 1948). Thousands of leadership studies have focused on a range of topics including personality traits, power, vision, values, charisma, situational factors, followers, teams, function, skills levels, behaviors, spirituality, and intelligence (Bono & Ilies, 2006; Dasborough, 2006; Fry, 2003; Howell, 2012; Nicholson, 2013; Sy, Cote, & Saavedra, 2005). Effective leadership has been described as paramount to organizational survival, success, and the achievement of strategic objectives (Bass, 1985; Bass, Avolio, & Atwater, 1996; Bass & Riggio, 2006; Burns, 1978; Orlando & Vasile, 2013; Stogdill, 1948). Leaders have vision, encourage, inspire, and support others to meet business objectives, identify and solve problems, and drive organizational change.

Leadership Style

Leadership style denotes the conduct and attitudes demonstrated by leaders as they influence others and interact with stakeholders (Dubrin, 2004). Often, leaders demonstrate a consistent pattern of behaviors that characterize and predict their style. Leadership style sets the tone of the corporate environment and shapes the attitude and performance of the workforce. An effective leadership style is key to motivating followers to achieve desired goals.

According to the literature, leadership style can have an impact on nearly every aspect of the business (Williams, Ricciardi, & Blackbourn, 2006). Affected areas may include productivity, performance, employee morale, job satisfaction, organizational commitment, retention, turnover, customer service, errors, quality, and profitability (Basch & Fisher, 2000; Bass, 1998; Lyons & Schneider, 2009; Offermann & Hellmann, 1996; Sosik & Godshalk, 2000; Yukl, 1998). Researchers have argued that leadership style can influence stress at the workplace (Lyons & Schneider, 2009; Syrek et al., 2013). Resulting from their leadership style, leaders, themselves, may even be a leading source of stress (Lyons & Schneider, 2009).

Full-Range Leadership Theory

This study focused on the FRLT. An extension of the transformational leadership theory, FRLT consists of three leadership style behavior typologies (a) transformational,

(b) transactional, and (c) laissez-faire (Avolio & Bass, 1991). These typologies are further deconstructed into nine distinct factors, as identified in Table 4. The Multifactor Leadership Questionnaire (MLQ) is the most extensively utilized and validated instrument to measure full-range leadership performance (Bass & Avolio, 2004; Hunt, 1999; Kirkbride, 2006; Lowe, Kroeck, & Sivasubramaniam, 1996; Yukl, 1999).

The FRLT originated from the transformational and transactional leadership model (Bass, 1985; Burns, 1978). This model consisted of seven components (a) charismatic leadership, (b) inspirational motivation, (c) intellectual stimulation, (d) contingent reward, (e) management by exception, (f) individualized consideration, and (g) non-transactional leadership (Bass, 1985). Further research concluded that two of these components could be further subdivided. Therefore, the existing FRLT model includes five transformational, three transactional, and one non-transactional leadership factors (Antonakis & House, 2002; Bass, 1985; Bass & Avolio, 2004).

The following section examines each of the three FRLT leadership style behavior typologies and their corresponding leadership factors. These behaviors are, then, dissected and evaluated against computer anxiety literature to pinpoint emergent relationships between leadership style and technostress.

Transformational leadership. Embedded in transformational leadership theory is the principle of the alignment of company interests with those of its members (Bass, 1985, 1987, 1998). Transformational leaders advance this principle through their abilities to inspire and motivate their followers beyond expectations to achieve common goals. Bass (1985, 1987, 1998) suggested that transformational leaders evoke respect, trust, and loyalty from their followers. Transformational leaders emphasize the needs of their followers, encouraging leadership skills development, and empowering participation in decision-making (Bass, 1985; Bass & Avolio, 1995, 2004; Bass & Riggio, 2006; Berger, Romeo, Guardia, Yepes, & Soria, 2012). Studies have shown that teams piloted by a transformational leader have higher levels of job performance and satisfaction as compared to those governed by other leadership styles (Bass, Avolio, & Atwater, 1996; Bass, Avolio, Jung, & Berson, 2003; Bass & Riggio, 2006; Hemsworth, Muterera, & Baregheh, 2013).

Table 4

MLQ-5X Leadership Constructs and Definitions

Leadership Construct	Definition
Transformational	
Idealized influence (attributed)	Demonstrates qualities that motivate
Idealized influence (behaviors)	Communicates values, beliefs, mission
Inspirational motivation	Displays enthusiasm to achieve goals
Intellectual stimulation	Exhibits critical thinking to solve problems
Individualized consideration	Emphasizes the development of followers
Transactional	
Contingent reward	Provides rewards for performance
Management-by-exception active	Takes preemptive remedial action
Management-by-exception passive	Takes reactive remedial action
Laissez-faire	Abdicates leadership involvement

Note. Information from “Re-examining the components of transformational and transactional leadership using the Multifactor Leadership Questionnaire,” by B. J. Avolio, B. M. Bass & D. I. Jung, 1999, *Journal of Occupational and Organizational Psychology, 72*(4), pp. 441-462.

Transformational leaders are anticipatory and understand the need for constant change (Brown, 1994). They accept risk as it relates to the achievement of organizational goals. As such, transformational leaders are well-adapted to changing environments. These leaders encourage a collective team environment and challenge their followers to take ownership for their work (Bass, 1985; Bass & Riggio, 2006).

Constructs. Transformational leadership consists of five core constructs (Bass & Avolio, 1995, 2004). These constructs are referred to as the "5 I's" because each begins with the letter, "I" (Bass & Avolio, 1995, 2004). Summarized in Table 4, these constructs, namely, idealized influence (attributed) (IIA), idealized influence (behaviors) (IIB), inspirational motivation (IM), intellectual stimulation (IS), and individualized consideration (IC), are next evaluated.

Idealized influence (attributed) (IIA). Idealized influence (attributed) (IIA) is the transformational leadership construct that refers to the attributes or traits of a leader that inspire followers (Bass & Avolio, 1995, 2004). IIA is exemplified by a leader who encourages follower trust, admiration, and commitment (Bass & Avolio, 1995, 2004).

Idealized influence (behaviors) (IIB). Idealized influence (behaviors) (IIB) are the actions or conduct exhibited by a leader that motivate followers (Bass & Avolio, 1995; 2004). IIB is embodied in leaders who communicate vision, mission, values, and goals in such a compelling way that followers are instilled with a sense of purpose and meaning (Bass & Avolio, 1995, 2004). IIB leaders garner the trust of followers through their high ethical and moral tenets.

Inspirational motivation (IM). Inspirational motivation (IM) is described as the proficiency of a leader to encourage and excite their followers to achieve organizational objectives by means of their captivating appeal, energy, passion, and conviction (Bass & Avolio, 1995, 2004). Inspired by their vision, followers emulate their actions of their leaders. Followers come to be more engaged, devote greater effort to complete tasks, and improve confidence in their abilities.

Intellectual stimulation (IS). Intellectually stimulating (IS) leaders promote innovation and critical, creative thinking to solve complex workplace problems (Bass & Avolio, 1995, 2004). They promote knowledge sharing and support mentoring and training efforts. Leaders characterized as intellectually stimulating (IS) encourage fresh ideas even if they differ from their own (Bass & Avolio, 1995, 2004). IS leaders do not openly criticize their followers for mistakes that occur in the implementation of new or modified concepts, designs, or approaches.

Individualized consideration (IC). Individualized consideration (IC) refers to the degree that leaders are mindful, respectful, and supportive of concerns and needs of their followers (Bass & Avolio, 1995, 2004). Leaders that display IC mentor followers, provide personal guidance, cultivate their skills and talents, and offer continuous feedback (Bass & Avolio, 1995, 2004).

Transactional leadership. The theoretical underpinning of transactional leadership is that leaders exchange in a series of transactions with their followers. The nature of the transactions are such that leaders promote follower compliance with established policies and procedures through rewards or punishments (Bass, 1985; Burns, 1978). This leadership style ignores the social and emotional needs of followers and their power to motivate (Maslow, 1943). However, transactional leadership is an effective management approach in times of crises or when tasks are straightforward.

Both reactive and directive, transactional leaders focus on standardizing practices that promote organizational stability. These leaders are concerned that the workplace runs smoothly and efficiently on a daily basis (Bass, 1985; Burns, 1978). Transactional leaders are less inclined to accept or promote ideas, innovation, or organizational change that disrupts workflow (Eagly et al., 2003). Further, transactional leaders do not promote follower innovative or creative thinking to find new solutions to solve organizational problems.

Transactional leaders are passive and provide a well-defined chain of command. Relationships with followers are impersonal and task-oriented (Bass & Avolio, 1990; Bono & Judge, 2004; Burns, 1978; Hooper & Bono, 2012). They monitor the work of their followers to confirm that expectations are met. Transactional leaders spend little or no time attending to the needs or developing the talents and abilities of their followers.

Constructs. Transactional leadership consists of three core constructs (Antonakis et al., 2003; Avolio & Bass, 1991; Avolio, Waldman, & Yammarino, 1991; Bass, 1998; Bass & Avolio, 1995, 2004; Burns, 1978; Hater & Bass, 1988). Identified in Table 4, the transactional leadership constructs are (a) contingent reward (CR), (b) management-by-exception active (MbEA), and (c) management-by-exception passive (MbEP).

Contingent reward (CR). Contingent rewards are used by transactional leaders to regulate compliance with policies and procedures and control outcomes. Rewards and punishments are rendered based on performance and the fulfillment of workplace expectations and objectives (Antonakis et al., 2003; Avolio & Bass, 1991; Bass, 1985). Furthermore, contingent incentives are employed by transactional leaders to motivate their followers.

Management-by-exception active (MbEA). Transactional leaders are described as management-by-exception active when they take preemptive corrective action to safeguard that followers perform as expected and meet objectives (Antonakis et al., 2003; Avolio & Bass, 1991; Bass, 1985). These leaders actively monitor the environment and operations, administering rewards and punishments to encourage performance and promote expected outcomes.

Management-by-exception passive (MbEP). Transactional leaders are categorized as management-by-exception passive when they only intervene as followers fail to perform adequately or meet expectations (Antonakis et al., 2003; Avolio & Bass, 1991; Bass, 1985). Corrective action is applied, usually in the form of punishments, once followers perform below expectations or as managers learn of errors or problems. Transactional leaders assign full responsibility for the completion of a task or expectation to their followers. When mistakes occur or performance proves inadequate, lacking, or deficient, the follower is held personally liable and disciplined or penalized for their failure.

Laissez-faire leadership. Laissez-faire leadership, delegative, passive-avoidant, or non-transactional, is the style in which leaders are typically uninvolved or abdicate their management responsibilities to their followers (Avolio & Bass, 1991; Bass, 1985; Eagly et al., 2003). These hands-off leaders provide their followers with the complete freedom to make decisions and solve workplace problems. Laissez-faire leaders provide little or no direction to their followers and commonly do not use their authority. Typically operating in crisis mode, laissez-faire leaders often neglect to communicate goals and objectives or define a plan to achieve them if established (Hershey et al., 2000).

Laissez-faire leadership is not recommended in conditions where followers lack sufficient knowledge and experience to draw conclusions, make decisions, and complete tasks (Bass, 1985, 1987, 1988, 1990; Goodnight, 2011). This leadership style may not be appropriate in conditions where followers are incapable of working independently to manage projects, monitor deadlines, or solve problems. Followers that are dependent on the guidance and feedback of their supervisors to perform their jobs run a much higher risk of failure if active leadership is absent.

Although laissez-faire is deemed the most inert and unproductive of all leadership styles, this approach is relevant, if not ideal, in specific environments (Antonakis et al., 2003; Avolio, Bass, Walumbwa, & Zhu, 2004; Avolio, Reichard, Hannah, Walumbwa, & Chan, 2009; Bass, 1998). For instance, laissez-faire leaders may be effective when followers are independent, motivated, highly skilled, and able to work with minor guidance. Even though laissez-faire leadership implies an entirely detached approach, many leaders are accessible to followers for guidance, consultation, direction, and feedback.

Construct. Laissez-faire leadership is comprised of one construct, itself. A laissez-faire leader relinquishes their leadership authority to their followers. This leadership style is considered the most ineffective but this approach may be ideal in specific situations (Antonakis et al., 2003; Avolio et al., 2004; Bass, 1998).

Full-Range Leadership Theory and Technostress

Given the complexities of the FRLT, a variety of contradictory outcomes may be expected in determining if a leader, identifying with one leadership style, will experience more or less technostress than another leader identifying with a different leadership style.

Research surrounding the full-range leadership theory, their corresponding leadership style, and impact upon workplace stress have been evaluated and synthesized. These opposing findings, assessed through the lens of the technostress literature, are discussed below.

Transformational Leaders and Technostress

Transformational leaders encourage and empower their followers, placing their needs before their own (Bass, 1998; Yukl, 1998). These supportive leaders inspire positive, enthusiastic emotions from their followers (Bono & Ilies, 2006; Lyons & Schneider, 2009). The support structure that transformational leaders provide has been shown to improve follower cohesiveness and ease workplace stress (Lyons & Schneider, 2009; Rajnandini & Williams, 2004). With a less stressed workforce, the transformational leader may indirectly experience less stress. Resulting from a less stressed work environment, the potential of reduced technostress among transformational leaders as compared to their FRLT counterparts, is plausible.

Transformational leaders elicit a high level of motivation, commitment, productivity, and satisfaction among their followers (Omar & Hussin, 2013). An ambitious staff, encouraged to be innovative and resourceful, is more likely to find improved and enhanced ways to perform their jobs or solve workplace problems (Bass, 1985; Bass & Riggio, 2006; Shin & Zhou, 2003). Followers led by a transformational leader may be more inclined to explore and learn about ICTs to use them to their fullest potential. With a more efficient, tech-savvy team of followers driven to be innovative, the climate surrounding ICTs may be less concerning. Therefore, the transformational leader may experience less technostress.

Transformational leaders foster a climate of growth for their followers, challenging them to develop new skills and find better ways to perform their jobs (Bass, 1985; Bass & Riggio, 2006). Researchers have determined that empowered followers experience less exhaustion and role stress, resulting in an improved work-life balance (Corrigan, Diwan, Campion, & Rashid, 2002; Hetland, Sandal, & Johnson, 2007; Munir, Mielsen, Garde, Albertsen, & Carneiro, 2012). When role stress is moderated, technostress is reduced (Tarafdar et al., 2007). This same result may translate to the transformational leader as they may be more inclined to practice what they preach.

In contrast, transformational leaders challenge not only their followers but also themselves to reach beyond expectations to achieve organizational objectives. This commitment can increase time pressures, upset the work-life balance, and intensify work and role stress (Bakker & Demerouti, 2007; Thompson, Beauvais, & Lyness, 1999). Researchers have discovered that as role stress increases, so does the incidence of technostress (Tarafdar et al., 2007). With reduced time to get acquainted with or maximize the use of ICTs, a surge in technostress may result.

Asserted by the FRLT, transformational leaders have more of a tendency to be innovative and implement change at an accelerated rate within their organizations as compared to transactional and laissez-faire leaders (Bass, 1985; Bass & Avolio, 2004). In this era of technology, the probability that innovation and change involves greater or improved ICT use is high (Volkoff, Strong, & Elmes, 2007). More of an incidence of organizational change coupled with greater ICT use may result in increased role stress. As a consequence of increased role stress, a rise in technostress may result (Tarafdar et al., 2007).

Transactional Leaders and Technostress

The nature of a transactional leader, as per the FRLT, is to interact with their followers on an as-needed rewards and punishment basis, spending little time to develop employee talent (Bass, 1998). Transactional leaders provide less support and guidance to their followers as compared to transformational leaders. Employees in environments that are less supportive of and sympathetic to their needs are found to experience more work stress (Bass, 1998, Cohen & Wills, 1985, Sargent & Terry, 2000). Without the supervisory buffer to help employees cope with stress, additional role stress may occur. Role stress has been shown to increase the incidence of technostress (Tarafdar et al., 2007).

Transactional leaders are less inclined to be innovative, creative, or promote new ideas or approaches to perform tasks (Bass, 1998; Shin & Zhou, 2003). These leaders prefer a consistent, smooth-running operational environment and can be reluctant to impose change. Likely, a leader that prefers order, balance, and stability as opposed to change and innovation may introduce fewer ICT advances within an organization. As a result, transactional leaders may experience less role stress and technostress than their transformational leader colleagues. However, if innovative and change adverse transactional leaders are forced to adopt new technologies outside of their decision-making authority, they may experience more technostress.

Laissez-Faire Leaders and Technostress

Laissez-faire leaders may experience less technostress than transformational and transactional leaders due to the hands-off approach inherent with this specific leadership style (Avolio et al., 2004; Avolio & Bass, 1991; Bass, 1985; Eagly et al., 2003). Laissez-faire leaders delegate their authority and job responsibilities to their subordinates. As a result, their staff may be forced to deal with the mounting workplace pressures stemming from ICTs. Meanwhile, the laissez-faire leader may remain unaffected and underexposed to the same strain and stress afflicting their followers.

Conversely, laissez-faire leaders may experience more technostress at times of crisis, such as a system breakdown, or during the implementation of new ICTs. If their staff if unable to handle the workload resulting from a network failure or launch of a new technology, the laissez-faire leader may need to become more involved to offer support and relief, an all-hands-on-deck approach. Because this level of involvement is not their usual practice, role stress may result (Avolio et al., 2004; Avolio & Bass, 1991; Bass, 1985; Eagly et al., 2003). An increase in role stress may lead to an escalation in technostress (Tarafdar et al., 2007).

This study investigated the role of leadership style and its influence upon the perceived level of technostress in information technology managers. Each of the leadership styles described by the FRLT has been evaluated in context of the literature surrounding both leadership and the technostress phenomenon. Evaluated next is the potential for technostress among information technology managers.

Information Technology Managers and Technostress

Although a growing body of research is accumulating to detect and understand those factors that influence the effects of technostress, studies within the information technology field are limited. Likewise, to date, researchers have overlooked the potential relationship that leadership style may have on the incidence of technostress. Further, no one study has incorporated information technology manager subjects to determine if leadership style influences the perceived level of technostress. This study not only filled a literature gap but also introduced the importance of research related to ICTs, the information technology field, leadership style, and the impact upon organizational technostress.

Information technology managers may experience less technostress because of their advanced knowledge and sophisticated use of ICTs. According to Brod (1984) and Weil and Rosen (1997), technostress is a disease that inflicts the inexperienced user. The skill set of the information technology manager is such that they may be more adept at managing the complexities of ICTs as compared to a non-IT manager or employee. When new technologies are launched or technical issues arise, the ICT manager may feel less pressured by change events due to their familiarity with technology and what is required for the implementation or fix.

IT managers with greater job autonomy may experience less technostress as a result of reduced role stress (Liu, Spector, & Jex, 2005; Soderfeldt, Soderfeldt, & Warg, 1995; Tarafdar et al., 2007). Alternative work arrangements are common to the information technology field (U.S. Bureau of Labor Statistics, 2014). IT managers may not always have the option to work remotely or from a virtual office by nature of their supervisory role. However, as an IT manager, the probability of having more autonomy by virtue of the position itself, is higher.

IT managers and their staff may experience less technostress as their non-IT peers become more knowledgeable of and comfortable with ICTs. By gaining the knowledge to more effectively use ICTs, non-IT employees may impose less troubleshooting and training requests and pressures upon the IT manager. The IT manager may acquire more time in the workday and encounter less of a work-life imbalance. The IT manager may experience less role stress and technostress as a result (Tarafdar et al., 2007).

By comparison, IT managers may experience more technostress as a result of the fast-paced, change-oriented nature of the industry in which they work. Technostress occurs when end users are unable to acclimatize to ICT change (Weil & Brod, 1997). Even with advanced technical abilities or knowledge regarding ICTs, IT managers may lack the social and emotional skills and experience to cope with change.

Moreover, IT managers may feel an incredible pressure to stay connected to the workplace during non-business hours. Because many organizations are highly reliant upon ICTs to run their operations, serve customers, and provide vital time-sensitive information, a period of downtime caused by ICTs may be devastating. The IT manager may believe they have to remain “plugged in” in real-time to prevent or resolve any ICT issues that can impose workplace problems (Agervold, 1987; Ayyagari et al., 2011; Kinman & Jones, 2005; Korunka & Vitouch, 1999; Straub & Harahanna, 1998). This work-life imbalance may prompt role overload and an increase in technostress (Tarafdar et al., 2007).

The demand for IT workers in increasing, however the number of qualified applicants for these positions are declining (U.S. Bureau of Labor Statistics, 2014). As a result, IT staff are required to do more with less. Role overload can be brought about by the increased workplace expectations and pressures resulting from the shrinking availability of human capital talent. As a consequence, technostress may be more prevalent in information technology occupations (Tarafdar et al., 2007).

IT managers working in companies where non-IT staff are less tech-savvy may experience more technostress. If the workforce is less knowledgeable about ICTs and how they function, more support, training, and dependency upon IT resources may be required. As a result, IT managers and their staff may experience role overload. An increased incidence of role stress may amplify perceived levels of technostress (Tarafdar et al., 2007).

Finally, despite the magnitude of available ICTs, and their vast complexities, non-IT peers and colleagues may misguidedly assume that IT managers and their staff are experts concerning all IT matters. This inference may spill into the corporate culture and increase the expectancy of the IT manager to support all things IT. Increased role stress may result as can the prevalence of technostress (Tarafdar et al., 2007).

Research Variables

As described by the full-range leadership theory (FRLT), this study examined the effect that FRLT leadership styles have on the levels of perceived technostress in information technology managers. The dependent variable, technostress, was measured using the technostress instrument (Tarafdar et al., 2007). Technostress is a single variable construct composed of equally weighted constructs for the inferential model. These constructs consisted of technostress creators. Technostress creators included techno-overload, techno-complexity, techno-invasion, techno-insecurity, and techno-uncertainty factors (Tarafdar et al., 2007). Survey questions asked were related to the daily use of technology at the workplace, including but not limited to, computer-based systems and applications, e-mail, database systems, application development tools, business enterprise systems, and the Internet, to assess the perceived level of technostress.

The independent variables consisted of FRLT theory leadership styles, i.e. transformational, transactional, and laissez-faire. The independent variables were quantified via the Multifactor Leadership Questionnaire 5X short rater survey instrument (MLQ-5X) (Bass & Avolio, 1990, 1995, 2004). Transformational leadership style included five constructs (a) idealized influence attributed (IIA), (b) idealized influence behavior (IIB), (c) inspirational motivation (IM), (d) intellectual stimulation (IS), and (e) individualized consideration (IC). Transactional leadership style included three constructs (a) contingent reward (CR), (b) management-by-exception active (MbEA), and (c) management-by-exception passive (MbEP). Laissez-faire leadership style included the laissez-faire (LF) construct. Survey questions asked were related to the information technology manager and their leadership style as they perceive it.

Additional independent variables collected for the purposes of this study were related to the individual characteristics of the information technology manager including age, gender, education, and industry experience. The Person-Environment (P-E) fit theory conceptualizes that individual characteristics and perceptions may influence the perceived level of technostress (Baslogu & Fuller, 2007; French et al, 1982; Hancock & Szalma, 2008; Lazarus, 1999; Pervin, 1968). Individual characteristics may serve as coping mechanisms to either impede or moderate the effects of computer-induced stress (Bandura, 1982; Compeau & Higgins, 1995; Darowski et al., 1982). In previous studies, age, gender, education, and industry experience have been identified as factors that influence the perceived level of technostress (Tarafdar et al., 2007, 2011). Therefore, as part of this study, individual characteristics were observed to determine their influence upon the observed level of technostress in information technology managers.

Conclusion

Information and communication technologies have inundated the globe and radically changed the business environment. Advantageously, information is instantaneously available, worldwide productivity has climbed, and international markets are easily accessible. However, competition is more intense and technological change is rapid and constant. Automation has reduced the workforce and as a result, employees are pushed to work harder, faster, and longer than ever before. Technostress, or the inability to cope with or adapt to rapid changes in technology, has become a disconcerting phenomenon not only to the sufferers that are inflicted but also the organizations that employ them (Brod, 1984; Weil & Rosen, 1997).

The annual worldwide spend on ICTs is estimated to be $3.7 trillion (Gartner, 2013). Researchers estimate that technostress costs organizations $300 billion each year resulting from reduced job satisfaction, commitment, productivity, and absenteeism, and increased health care and insurance costs (American Institute of Stress, 2007). This figure does not take into account the value of workplace errors resulting from multitasking, lost productivity due to the interruptions imposed by ICTs, and unrecoverable personal time from work-life imbalances. The cost, however, to the health and well-being of those using ICTs at the workplace, as a result of technostress, is incalculable.

This study evaluated the impact of technostress on information technology managers working in U.S. companies. No prior research to this point has considered the impact of leadership style upon the incidence of technostress in information technology managers. Considering the immense impact that technostress has on ICT users and organizations, an investigation of this topic to uncover factors that influence the incidence of technostress is vital to inform both scholarship and practice.

CHAPTER 3. METHODOLOGY

Introduction

The purpose of this quantitative survey research study was to investigate the relationship between the full-range leadership theory (FRLT) and the technostress theory to determine if leadership style influenced the level of technostress (Antonakis & House, 2002; Bass, 1985; Bass & Avolio, 1990, 1995, 2004; Burns, 1975; Tarafdar et al., 2007). The independent variable of the study was leadership style with constructs defined as transformational, transactional, or laissez-faire. The dependent variable, technostress, included the overall technostress construct and the sub-constructs consisting of technostress creators (Tarafdar et al., 2007). Demographic information was collected including age, gender, education, and industry experience, serving as additional independent variables.

The population incorporated all information technology managers aged 18-65 working in U.S. organizations. The research study sample was randomly selected from the population. A quantitative survey instrument was used to collect data, electronically administered using Internet-based survey service, SurveyMonkey. Chapter 3 presents the research methodology, research questions and hypotheses, research and sampling design, measures and instrumentation, reliability and validity, field study results and remarks, data collection, ethical considerations, data analysis, and the limitations of this study.

Research Methodology: Selection and Justification

The selection of a methodological approach is largely influenced by the nature of the research question under study along with the proficiency of the researcher and the availability of resources (Tashakorri & Teddlie, 2010). A quantitative research methodology is preferred when evaluating the relationships between variables in a population to predict outcomes, test hypotheses, and explain phenomena (Babbie, 2010). For this particular study, a quantitative, non-experimental, explanatory research methodology was selected. The research question and associated variables under investigation were well suited for a quantitative research methodology given that variables were numerically measurable and well-established theories were present in the literature. A quantitative methodology enabled the identification of the level of technostress experienced by information technology managers and their leadership style, the implications of which predicted how leadership style served to influence perceived technophobia.

Regression is a statistical technique used to measure the relationships between variables through the development of a model to fit observed data (Field, 2009). Multiple regression is an analytical tool used to explore and predict the relationships between one dependent variable and two or more independent variables (Berry, 1993; Chatterjee & Simonoff, 2013; Field, 2009; Tabachnick & Fidell, 2007; Vogt, 2007). In multiple regression, several principal assumptions including linearity, normality, reliability, homoscedasticity, and multicollinearity must be met and the dependent variable is required to have a quantifiable level of measure (Achen, 1982; Field, 2009; Mertler & Vannatta, 2005; Myers, 1990; Pedhazur, 1997; Tabachnick & Fidell, 2007). In this study, a multiple regression statistical model was implemented to explore the relationships between several independent variables including leadership style, age, gender, education, and industry experience and a single, summated dependent variable, technostress. The research question and variables in this research study satisfied the multiple regression requirements and, therefore, aligned with the use of this research methodology.

Research Questions and Hypotheses

To facilitate an improved understanding of how leadership style influences the level of perceived technostress of information technology managers, the following research question must be answered:

Research Question: What effect does transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience have on the level of technostress experienced by information technology managers in the U.S.?

Omnibus Null Hypothesis H_o: There is no relationship between transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience and the level of technostress experienced by information technology managers in the U.S.

Alternative Hypothesis H_a: There is a relationship between transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience and the level of technostress experienced by information technology managers in the U.S.

Follow-up hypotheses examined each of the independent variables (i.e., FRLT styles comprised of transformational, transactional, and laissez-faire, controlling for age, gender, education, and industry experience), this model has no predictive or explanatory value. H_1: For the independent variables (i.e., FRLT styles comprised of transformational, transactional, and laissez-faire, controlling for age, gender, education, and industry experience), this model does have statistical significance.

H_o1: There is no relationship between transformational leadership style and the level of technostress experienced by information technology managers in the U.S.

H_a1: There is a relationship between transformational leadership style and the level of technostress experienced by information technology managers in the U.S.

H_o2: There is no relationship between transactional leadership style and the level of technostress experienced by information technology managers in the U.S.

H_a2: There is a relationship between transactional leadership style and the level of technostress experienced by information technology managers in the U.S.

H_o3: There is no relationship between laissez-faire leadership style and the level of technostress experienced by information technology managers in the U.S.

H_a3: There is a relationship between laissez-faire leadership style and the level of technostress experienced by information technology managers in the U.S.

H_o4: There is no relationship between age and the level of technostress experienced by information technology managers in the U.S.

H_a4: There is a relationship between age and the level of technostress experienced by information technology managers in the U.S.

H_o5: There is no relationship between gender and the level of technostress experienced by information technology managers in the U.S.

H_a5: There is a relationship between gender and the level of technostress experienced by information technology managers in the U.S.

H_o6: There is no relationship between education and the level of technostress experienced by information technology managers in the U.S.

H_a6: There is a relationship between education and the level of technostress experienced by information technology managers in the U.S.

H_o7: There is no relationship between industry experience and the level of technostress experienced by information technology managers in the U.S.

H_a7: There is a relationship between industry experience and the level of technostress experienced by information technology managers in the U.S.

Research Design

Web-based, quantitative surveys are frequently utilized in scientific research. Internet surveys are a flexible, effective, and inexpensive approach to amass an immense amount of relevant research data (Babbie, 2010; Mrug, 2010). These surveys, nearly devoid of geographic boundaries, can reach a vast number of participants. Data sets gathered from a web-based survey can be readily imported into statistical software packages, thereby eliminating inaccuracies that arise from manual entry. Therefore, for the purpose of this study, a web-based quantitative survey was chosen as the research design.

Data was collected via a multiple-choice Likert-scale survey combining questions from both the technostress and Multifactor Leadership Questionnaire 5X short rater form

(MLQ-5X) instruments (Bass & Avolio, 1990, 1995, 2004; Brennan, 1983; Cozby, 2009; Tarafdar et al., 2007). These instruments, in conjunction with supplementary demographic questions, facilitated the exploration of the relationships between technostress creators, individual characteristics, and the leadership styles perceived by information technology managers employed by U.S. companies. The survey was administered via Internet-based survey service, SurveyMonkey. All questions and their corresponding multiple choice answers were thoroughly reviewed prior to the electronic distribution of the survey to ensure they accurately reflected those as published within the technostress and leadership instruments.

SurveyMonkey provided a panel of information technology managers employed by U.S. companies between the ages of 18 to 65. A quantitative survey was administered to a random sample selected from the panel. By gathering information from a representative, indiscriminate sample, inferences could be extracted from the data and applied to the survey population or an identical one (Hade & Lemeshow, 2008). Grounded by the literature, a multiple regression model was developed to evaluate the significance of the relationships between the variables. Further information related to the survey instrument used in this study is supplied in the Measures and Instrumentation section. The survey instrument is provided in Appendix B.

Sampling Design

The population of the study consisted of information technology managers employed by companies from various industries within the U.S. between the ages of 18 to 65. The sampling frame, constructed from the SurveyMonkey panel, included information technology managers from U.S. companies in various industries aged 18 to

65. Information technology managers working outside of the U.S. or the specified age range were excluded from the sample frame. Information technology personnel not employed in a leadership position were excluded from the sample frame. Respondents were recruited by SurveyMonkey via an electronic invitation to participate in the study. The survey was made available for two weeks.

Sample Size

Combs (2010) and Nunnally (1978) recommended a minimum sample size of N = 100 when conducting multiple regression with 9 or fewer predictor variables. Green (1991) argued that a multiple regression sample size should equal 50 + 8*k*, or, in this particular study, 106.

A minimum sample size of 103 was estimated using G*Power 3.1.2, assuming an *a priori* power analysis, $\alpha = .05$, $\beta = .80$, and a medium effect size (Faul, Erdfelder, Lang, & Buchner, 2007). An *F* test served as the test family for the Omnibus Hypothesis using a fixed, multiple linear regression model with an R^2 deviation from zero statistical test (see Figure 2). An analysis of the individual sub-hypotheses was conducted using a *t* test. Therefore, a minimum sample size of 103, which is well within or close to the expected range, was required for this study (see Figure 2).

Measures and Instrumentation

Data was collected combining questions from both the technostress and Multifactor Leadership Questionnaire (5X) short rater form instruments (Bass & Avolio, 1990, 1995, 2004; Brennan, 1983; Cozby, 2009; Tarafdar et al., 2007). All questions associated with the technostress creators and transformational, transactional, and laissez-faire leadership style constructs were integrated into the study. To identify and describe the individual characteristics of survey participants, demographic questions including age, gender, level of education, and years of experience, were incorporated into the instrument. Those technostress questions related to productivity were not relevant to the study and excluded from the data collection instrument (Tarafdar et al., 2007).

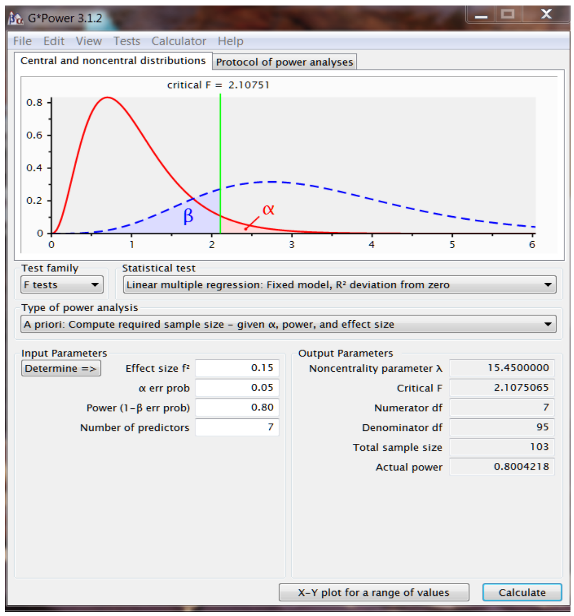

Figure 2. Minimum Sample Size Established by G*Power 3.1.2

The survey instrument was divided into three sections (see Appendix B). Section one prompted respondents for demographics data. Section two included all questions from the MLQ-5X to measure the transformational, transactional, and laissez-faire leadership style constructs (Bass & Avolio, 2004). Transformational leadership style constructs included inspirational motivation (IM), idealized influence attributed (IIa), idealized influence behavior (IIb), intellectual stimulation (IS), and individualized consideration (IC). Transactional leadership style constructs consisted of contingent reward (CR), management-by-exception active (MbEA), and management-by-exception passive (MbEP). Non-leadership or laissez-faire leadership style was defined by one construct, laissez-faire (LF). Section three included both technostress creator constructs (Tarafdar et al., 2007). Technostress creators included techno-overload, techno-complexity, techno-invasion, techno-insecurity, and techno-uncertainty. The dependent variable was technostress and the independent variables were transformational, transactional, and laissez-faire leadership styles and individualized characteristics including age, gender, education, and industry experience.

Leadership style and technostress survey questions were posed using a Likert-scale with an ordinal level of measure. Responses were assumed to be and converted to an interval level of measure in order to apply parametric tests during data analysis. The leadership style rating scale used was as follows 1 - *Not at All*, 2 - *Once in a While*, 3 - *Sometimes*, 4 – *Fairly Often*, 5 - *Frequently, if Not Always*, and 6 – *Don't Know or Not Applicable*. The technostress rating scale included 1 – *Strongly Disagree*, 2 – *Disagree*, 3 – *Neutral*, 4 – *Agree*, 5 – *Strongly Agree*, and 6 – *Don't Know or Not Applicable*.

Reliability and Validity

A research instrument is deemed reliable when results are repeatable and consistent (Carmines & Zeller, 1979; Trochim, 2006). Correspondingly, a valid research instrument accurately measures an intended outcome (Cozby, 2009; Trochim, 2006). A quantitative instrument can be reliable but not valid or vice versa. Therefore, to produce robust results that those from the scientific arena are more likely to acknowledge and accept, a research instrument must be both reliable and valid.

Reliability

To be considered reliable, an instrument is expected to produce a Cronbach's alpha of .70 or greater (Babbie, 2010).

Technostress instrument. The technostress instrument used as part of this study was based on the research conducted by Tarafdar et al. (2007). The study integrated the overall technostress construct. The inferential model of the technostress construct is composed of the technostress creator sub-constructs (Ragu-Nathan et al., 2008; Tarafdar et al., 2007). The technostress instrument has been validated with a reliability ranging between a Cronbach's alpha of .71 and.91, with an average of .84 (Ragu-Nathan, 2008; Tarafdar, 2007). To evaluate the influence of the individual characteristics of research participants in the interaction process with information and communication technologies, demographics questions were added to the instrument (Ayyagari et al., 2011).

Leadership instrument. The MLQ-5X is recognized worldwide as a reliable and valid measure of transformational, transactional, and passive-avoidant or laissez-faire leadership style (Antonakis et al., 2003; Avolio et al., 1999; Berger et al., 2012, Kanste et al., 2009; Muenjohn & Armstrong, 2008). The total item reliability for each leadership factor scale measured by the MLQ-5X ranges from a Cronbach's alpha of .74 to .94 (Bass & Avolio, 1995, 2000, 2004).

Validity

Threats to validity can be imposed by internal and external sources (Babbie, 2010; Creswell, 2009; Trochim, 2006). Internal validity refers to the quality and accuracy of a study whereas the external validity describes the extent to which the results of a study can be projected to the population (Babbie, 2010; Lavrakas, 2008). These sources are influenced not only by the research design but also the methodology utilized in a study. The internal and external threats specific to this particular study are discussed below.

Internal validity. Two primary categories of internal validity, statistical regression and selection, were determined to pose a potential threat to this study (Babbie, 2010; Cook & Rumrill, 2005). Statistical regression validity is associated with the risk that outliers, scores positioned outside of the range of the group under study, influence the overall mean score and the prediction accuracy of the outcome upon the dependent variable (Babbie, 2010; Cook & Rumrill, 2005). To minimize the threats related to statistical regression internal validity and the influence that outliers have on the accuracy of prediction, a statistically large sample was used.

Selection can negatively impact the internal validity of a study if subjects are either biased or atypical as compared to those in the group (Babbie, 2010; Cook & Rumrill, 2005; Creswell, 2009). To reduce the risk of selection internal validity, the sample was randomly selected from a large population. Moreover, participants were selected from a sample frame assuming an equal likelihood in experiencing the technostress phenomena. Other threats to internal validity were not applicable to this quantitative research study.

External validity. Threats to external validity relevant to this study included the characteristics of the sample and attrition or low-response rates (Lavrakas, 2008). To avoid a problem where the results of the study were applicable only to the sample under study, the sample was randomly selected. A large sample was used to minimize the effects of attrition and electronic reminders were forwarded to improve response rates. Further threats to external validity were not pertinent to this quantitative research study.

Field Study Results

The technostress and leadership instruments used in this study have demonstrated a high degree of reliability and validity in previous research (Antonakis et al., 2003; Avolio et al., 1999; Berger et al., 2012; Kanste et al., 2009; Muenjohn & Armstrong, 2008; Ragu-Nathan, 2008; Tarafdar, 2007). However, because the technostress and leadership instruments were used in conjunction with one another for the first time in research, implemented in a distinctive population, and given that demographic questions were employed, a field study was performed. The field study was conducted with five experts from a range of professional and academic backgrounds. The panel consisted of three senior information technology managers, one with a dual doctorate and one completing a doctorate, and two business practitioners, both with a doctorate.

The experts evaluated the logical flow, readability, and relevance of the survey questions. Furthermore, the panelists assessed the accuracy and clarity of the questions related to the technostress and leadership disciplines. Panelists were encouraged to critique the content, appropriateness, and phrasing of the questions. Recommendations included the elimination of two open-ended questions, one asking for the name of the organization for which the respondent was employed and the other to describe the industry of employment, in addition to changing the multiple choice question categories so the answers did not overlap. The specific changes made to the data collection instrument resulting from the field study are discussed in the next section.

Field Study Remarks

The expert panel provided a number of suggestions to improve the survey questions. Prior to the field study, Questions 1, 2, and 3 asked survey respondents to supply the name of their organizations, their current job title, and the industry in which they operate. The expert panel recommended the removal of these questions due to the anonymity and confidentiality concerns they pose to participants. A review of the literature determined that these questions were not critical to the study and were subsequently eliminated from the survey.

Question 4 of the original survey instrument was an open-ended question that asked participants to provide their actual age in years. Instead, panelists advised the use of a multiple choice age range to moderate data entry error or item nonresponse from this potentially sensitive survey question. Upon further consideration and examination of previous research, the question was revised to prompt for a selection among a multiple choice range of ages.

Moreover, as part of the preliminary survey instrument, Questions 7 and 8 called for participants to select, from a multiple choice range, the number of years of experience in information technology management and within their current industry. The panelists pointed out that the ranges overlapped in terms of years and would cause confusion to the participants and probable response error if not corrected. The ranges were consequently amended.

One panelist suggested the use of check boxes or some other means to easily select the answers to the multiple choice questions. The field study was forwarded to the panelists via e-mail in a Word document. This document was not formatted in the same manner as was presented to survey participants vis-à-vis the SurveyMonkey website. The web-based survey was designed to enable participants to simply click on the desired answer.

Finally, one panelist recommended phrasing changes to the technostress and leadership data collection instrument questions. Because these instruments have been shown to be highly valid and reliable in historic research, these suggestions were not implemented.

Data Collection

Data was collected via web-based survey service, SurveyMonkey. E-mail addresses for potential information technology manager participants that met the sample frame criteria were randomly selected and provided to the researcher. Using the SurveyMonkey website e-mail manager, invitations were forwarded to the prospective respondents via e-mail to request their participation. The e-mail described the rationale and significance of the research study in addition to the expectations and the potential risks involved in participating. Further, the e-mail explained that consent to participate in the survey would begin prior to clicking on the hyperlink to the survey and that a signature was not required to provide consent.

All research subjects were notified that survey participation was strictly optional and voluntary, compensation would not be provided for their participation, and that they may exit the survey at any time without penalty. To begin the survey, participants were directed to click on an embedded hyperlink, accessible on the encrypted SurveyMonkey website (www.surveymonkey.com). Participants were provided with researcher, mentor, and Capella Research Integrity Office (RIO) contact information to discuss their rights as a research participant, ask questions about or seek clarification regarding the survey, make suggestions to improve the participation experience, or lodge concerns or complaints.

Potential participants were presented with the options to decline the invitation and delete the e-mail upon receipt, consent to and enter the survey but exit without completion, or consent to, complete, and submit the survey. If respondents elected to participate in the study, additional instructions regarding the survey questions and how to respond to them were provided. Because participation was strictly voluntary, respondents were reminded that at any stage, they could exit the survey without submission of their responses. If any respondents decided to opt out of the survey prior to completion, their responses were not included in the results.

The survey opened with selection criteria questions as the sample frame required that participants were information technology managers aged 18 to 65 employed by U.S. companies. Demographics questions followed to acquire the age, gender, years of experience as an information technology manager, years of experience at their current place of employment, and highest level of education of the survey participants. Leadership style and technostress questions from both the Multifactor Leadership Questionnaire 5X short rater form (MLQ-5X) and technostress instruments followed (Bass & Avolio, 1990, 1995, 2004; Brennan, 1983; Cozby, 2009; Tarafdar et al., 2007).

The survey was accessible for 14 days and data was retrieved at the close of the survey. A reminder e-mail was distributed on day 12, not only to express appreciation to those who had completed the survey but also to remind those who had not yet responded that the deadline to participate in the survey was soon to expire. One response per participant was allowable. At the conclusion of the survey, SurveyMonkey accumulated and forwarded the data to the researcher absent of any information that could potentially identify participants. Data was deleted by SurveyMonkey once distributed to the researcher. To protect the confidentiality and anonymity of participant survey responses, the researcher will store the data, devoid of identifiers, on a secured USB drive for seven years. Data will be destroyed by the researcher upon the conclusion of the seven year retention period.

Ethical Considerations

This research study and the related subject matter did not pose any specific ethical concerns, negative implications, or known risks to the survey participants. Various procedures were implemented to mitigate any potential risks or harm to the participants. Information was provided to the participants prior to the inception of the study including the purpose of the research, what is required as a participant, the potential risks involved in participating, the voluntary nature of the participation, and the ability to withdraw from the study at any time. Research participants were informed that their responses were strictly voluntary and that they could discontinue their participation at any time without penalty. The information was written in such a way as to be comprehensible to participants.

All efforts were made to protect respondents during all phases of the study. Confidentiality of data was maintained at all times, data records were stored on a secured, password protected computer not connected to a network, and in any written reports or publications, survey participants were not identifiable. All participants were treated equitably and fairly, randomly selected based on the sample frame criteria, receiving equal opportunity access to the proposed remedies, treatments, or interventions derived from the research.

To comply with human subject research standards, Institutional Review Board (IRB) approval was received in advance of research study launch. Furthermore, an eleven-module human subject research course provided by the Collaborative Institutional Training Initiative (CITI) was completed prior to conducting dissertation research.

Data Analysis

Data analysis is the process whereby raw data is assembled, examined, evaluated, and shaped into information that can be interpreted to make conclusions or draw inferences (Lavrakas, 2008). Survey data was analyzed using the IBM© SPSS® Statistics version 22 software program. Survey responses collected by SurveyMonkey were imported into SPSS from a Microsoft Excel file.

Prior to conducting multiple regression, the dataset was explored for abnormalities and assumptions were tested to ensure sufficient conditions existed to utilize this particular multivariate statistical approach. A listwise deletion approach was employed to manage missing data prior to performing multivariate analysis. A listwise approach removes all data for cases with one or more missing values. A pairwise approach removes only the missing values from each case. Although the pairwise approach attempts to minimize data loss, its use promotes unequal sample sizes between variables. Therefore, a listwise deletion approach was preferred for use in this study to manage missing data abnormalities (Field, 2007; Tabachnick & Fidell, 2007).

Table 5 identifies each variable within the study, its specific level of measure, and the hypothesis that was tested and the corresponding survey question. The dependent variable, technostress, composed of techostress creator sub-constructs for the inferential model, was assumed to be related to the independent variables age, gender, education, industry experience, and leadership style (Tarafdar et al., 2007). The study incorporated the overall technostress construct. The technostress construct is composed of the following technostress creator sub-constructs for the inferential model.

Table 5

Variables, Levels of Measure, Hypothesis, and Related Survey Questions

Variable	Level of Measure	Hypothesis	Survey Question(s)
Technostress (DV)	Interval	All	51-73
Leadership Style (IV)			
Transformational	Interval	H_1	6-50
Transactional	Interval	H_2	6-50
Laissez-Faire	Interval	H_3	6-50
Age (IV)	Interval	H_4	1
Gender (IV)	Nominal	H_5	2
Education (IV)	Interval	H_6	3
Experience (IV)	Interval	H_7	4-5

Nominal variables were coded with dummy variables prior to conducting the analysis. Outliers were analyzed using residuals and Cook's distance (Dunning & Freedman, 2008; Hampel, Ronchetti, Rousseeuw, & Stahel, 1986; Howell, 2007; Mertler & Vannetta, 2005).

The assumptions that were tested prior to conducting multiple linear regression analysis included (a) normality, variables are distributed normally; (b) linearity, the relationship between the independent and dependent variables is linear; (c) reliability, independence of observations; (d) homoscedasticity, the error variance is stable and spread consistently across the independent variables; and (e) multicollinearity, an absence of correlation between the independent variables (Obsorne & Waters, 2002; Field, 2007; Tabachnick & Fidell, 2007).

To test for normality, descriptive statistics were generated and normality plots such as P-P, Q-Q and histograms were examined. To test for linearity, scatterplots and a histogram were produced and evaluated. To test for homoscedasticity, a scatterplot was produced and Levene's test was evaluated at $p > .05$. To test for reliability, Cronbach's alpha was calculated. To test for multicollinearity, Variance Inflation Factors were generated and reviewed. To perform parametric tests on Likert-scale responses, data was converted into an interval scale level of measure assuming equal variances between measures. A bootstrapping method would have been implemented if the assumptions of multiple regression seemed untenable.

Limitations

This section outlines the limitations of the research methodology. For one, underlying causal relationships between the dependent and independent variables cannot be drawn using a multiple regression statistical method (Cox, 2010; Morgan & Winship, 2007). Secondly, the sample frame is limited to a population with similar demographics, those employed in the information technology field in a management role, in a U.S. company. Those outside of this sample frame may perceive technostress differently.

Thirdly, although surveys are widely accepted and considered more accurate than many other data collection instruments, measurement error and bias can result from their use (Heerwegh, 2005; Holtgraves, 2004; Tourangeau & Smith, 2004; Wouters, Maesschalck, Peeters, & Roosen, 2014).

Surveys may present additional data collection challenges including participation, item nonresponse, and data-processing errors (Biemer, 2010; Biemer & Lyberg, 2003; Groves & Couper, 1998; Saris & Gallhofer, 2007). To encourage the participation response rate and minimize nonresponse error, survey questions were concise, respondents were reminded of the confidentiality of their observations, a cut-off date was imposed for survey completion, and reminder e-mails were distributed to those who had yet to respond. To eliminate data-processing errors, data entry and coding was checked and re-checked. To reduce item nonresponse, survey questions were straightforward, closed-ended, and required little effort to answer (Dillman, Smyth, & Christian, 2009; Dixon & Tucker, 2010).

Web-based surveys impose further challenges with respect to data collection such as accessibility issues and the protection of responses from unauthorized access. To avoid survey access problems, a reputable data collection service was used, the survey was thoroughly tested prior to launch to ensure functionality, and the survey was hosted using standard technical requirements and web pages (Baatard, 2012; Wright, 2005). To guard against web-based survey security breaches, SurveyMonkey incorporated several layers of sophisticated infrastructure and practices including encryption, authentication, and passwords. Even though the security threat of unauthorized access to survey responses is minor due to the mechanisms put into place by SurveyMonkey, the informed consent form explained the risk inherent in web-based surveys.

Closed-ended, multiple choice, and response-scale questions were used to gather data and open-ended questions were not accepted. Although structured questions can be easier to answer, are often less confusing, and respondents are more likely to answer sensitive questions, a number of limitations arise from their use (Smyth, Dillman, Chrisitan, & McBride, 2009). Closed-ended questions confine responses to a pre-determined answer, one that may not accurately represent the specific perspective of the participant. Structured questions limit the ability of participants to qualify or explain their responses. Closed-ended questions do not permit a researcher to expose a complete unrestricted understanding of the complex nature of a phenomenon under study.

CHAPTER 4. RESULTS

Introduction

Chapter 4 provides an in-depth examination of the results related to the research question under investigation: What effect does transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience have on the level of technostress experienced by information technology managers in the U.S.? The sample participants are described relative to demographic and individual characteristics. A synopsis of the results along with a comprehensive discussion of data preparation procedures, analysis methods, and research outcomes are presented. The chapter concludes with a summary of the analysis and results.

Sample Description

The sampling frame consisted of information technology managers between the ages of 18 and 65 working in the United States in a management role. SurveyMonkey was the Internet-based survey management service used to recruit study participants. An e-mail invitation was randomly sent to 800 information technology managers across the United States. The invitation included a hyperlink that directed the information technology managers to the survey hosted on the SurveyMonkey website. The survey was accessible for 14 days and during that time period, 129 surveys were collected, yielding an overall response rate of 16.1%.

Three screening questions were posed at the introduction of each survey to disqualify those potential participants who did not meet the age, geographic, and leadership role inclusion criteria as outlined by the study. Sample participants were provided with the opportunity to opt out of the survey at any time. Logic was added to the survey requiring a response for each multiple choice question. SurveyMonkey did not provide the statistics to identify the percentage of those surveyed that either did not meet the criteria to participate in the study or discontinued their participation before completion.

Demographics

To describe the sample with greater detail, demographic questions related to the individual characteristics of the participants were incorporated into the survey. Individual characteristics included age, gender, level of education, and industry experience. These characteristics were included in the regression model and analyzed, accordingly. A review of these individual characteristics is provided in the following sub-sections.

Individual characteristics. The majority (64.3%) of respondents were male ranging in age from 18 to 65 years old. One respondent preferred not to answer the individual characteristic question related to gender. For both male (28.9%) and female (31.1%) respondents, the most frequently observed age group was 34 to 44 years old. The next most prevalent age groups for male (25.3%) and female (24.5%) respondents were 55 to 65 and 25 to 33 years old, respectively. Table 6 identifies the cross-tabulated age and gender frequencies and percentages associated with the sample.

Table 6

*Cross-Tabulated Age and Gender Frequencies and Percentages (*N *= 129)*

	Female		Male		Not Provided	
Age	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
18-24	5	8.6%	5	4.5%		
25-33	11	25.7%	13	16.4%		
34-44	14	40.0%	24	32.8%		
45-54	6	14.3%	20	23.9%	1	100.0%
55-65	9	11.4%	21	22.4%		

Over 72% of respondents earned a bachelor's degree, the traditional standard educational requirement to secure a job in the information technology management field. Nearly 34% of respondents held an advanced degree. The highest level of education for 10.1% of respondents was a high school diploma. One respondent had not earned a high school diploma. The frequencies and percentages associated with the age, gender, and level of education of respondents are shown in Table 7.

Approximately 72% of males and 71% of females within the sample hold at least a bachelor's degree. More males (34.9%) than females (28.9%) hold advanced degrees. However, more females (28.9%) than males (27.7%) do not have a bachelor's degree.

Table 8 illustrates the cross-tabulated gender and level of education frequencies and percentages for the sample.

Table 7

*Gender, Age, and Level of Education Frequencies and Percentages (*N *= 129)*

Variable	Frequency	Percentage
Gender		
Female	45	34.9%
Male	83	64.3%
Not provided	1	.8%
Age		
18-24	10	7.7%
25-33	24	18.6%
34-44	38	29.5%
45-54	27	20.9%
55-65	30	23.3%
Level of education		
No high school diploma	1	.8%
High school diploma	13	10.1%
Associate degree	22	17.0%
Bachelor's degree	50	38.8%
Master's degree	37	28.7%
Doctorate or other	6	4.6%

Respondents reported a broad range of information technology management experience varying from less than 1 year to more than 20 years. A majority of respondents (28.7%) have logged between 6 to 10 years on the job while approximately

25% of respondents were fairly new to their roles. Over 45% have at least 10 years of experience with 17.1% of respondents exceeding 20 years in an IT management position. Similarly, 31.8% of respondents have been employed at their current workplace between 6 to 10 years, nearly 21% of employees are new to their companies, over 47% have at least 10 years of seniority, and 14.7% have at least 20 years of tenure. Observational frequencies and percentages related to years of information technology management and current organizational experiences are provided in Table 9.

Table 8

*Cross-Tabulated Gender and Level of Education Frequencies and Percentages (*N *= 129)*

	Gender					
	Female		Male		Not Provided	
Level of education	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
No high school	1	2.2%				
High school	5	11.1%	8	9.6%		
Associate degree	7	15.6%	15	18.1%		
Bachelor's degree	19	42.2%	31	37.4%		
Master's degree	9	20.0%	27	32.5%	1	100.0%
Doctorate/other	4	8.9%	2	2.4%		

Table 9

*Industry Experience Frequencies and Percentages (*N *= 129)*

Variable	Frequency	Percentage
Information technology management experience		
Less than 1 year	6	4.7%
1 - 5 years	27	20.9%
6 - 10 years	37	28.7%
11 - 15 years	24	18.6%
16 - 20 years	13	10.1%
More than 20 years	22	17.1%
Current organization experience		
Less than 1 year	3	2.3%
1 - 5 years	24	18.6%
6 - 10 years	41	31.8%
11 - 15 years	36	27.9%
16 - 20 years	6	4.7%
More than 20 years	19	14.7%

Nearly 76% of respondents were dominantly transformational leaders while 15.5% and 8.5% were primarily transactional and laissez-faire leaders, respectively (see Table 10). Transformational leadership was the most common style among those aged 45 to 54 (23.5%) and 55 to 65 (28.6%). Transactional leadership was prevalent among the 34 to 44 age group (40.0%). Laissez-faire leadership was the minority leadership style of all age categories. Both females (33.7%) and males (66.3%) were most commonly transformational. More males (55.0%) than females (40.0%) considered themselves a transactional leader. Similarly, more males (63.6%) than females (36.4%) were determined to be a laissez-faire leader.

Table 10

*Leadership Style Frequencies and Percentages (*N *= 129)*

Variables	Transformational Frequency	%	Transactional Frequency	%	Laissez-Faire Frequency	%
Age						
18-24	6	6.1%	2	10.0%	2	18.2%
25-33	15	15.3%	5	25.0%	4	36.4%
34-44	26	26.5%	8	40.0%	4	36.4%
45-54	23	23.5%	4	20.0%		
55-65	28	28.6%	1	5.0%	1	9.0%
Total	98	100.0%	20	100.0%	11	100.0%
Gender						
Female	33	33.7%	8	40.0%	4	36.4%
Male	65	66.3%	11	55.0%	7	63.6%
Not Provided			1	5.0%		
Total	98	100.0%	20	100.0%	11	100.0%
Level of education						
No high school diploma	1	1.0%				
High school diploma	9	9.2%	3	15.0%	1	9.0%
Associate degree	15	15.3%	3	15.0%	4	36.4%
Bachelor's degree	37	37.8%	10	50.0%	3	27.3%
Master's degree	31	31.6%	4	20.0%	2	18.3%
Doctorate or other	5	5.1%			1	9.0%
Total	98	100.0%	20	100.0%	11	100.0%
Information technology management experience						
Less than 1 year	5	5.1%	1	5.0%		
1 - 5 years	21	21.4%	4	20.0%	2	18.2%
6 - 10 years	23	23.5%	7	35.0%	7	63.6%
11 - 15 years	20	20.4%	4	20.0%		
16 - 20 years	11	11.2%	1	5.0%	1	9.1%
More than 20 years	18	18.4%	3	15.0%	1	9.1%
Total	98	100.0%	20	100.0%	11	100.0%
Current organizational experience						
Less than 1 year	3	3.1%				
1 - 5 years	15	15.3%	6	30.0%	3	27.3%
6 - 10 years	29	29.6%	7	35.0%	5	45.4%
11 - 15 years	27	27.5%	6	30.0%	3	27.3%
16 - 20 years	6	6.1%				
More than 20 years	18	18.4%	1	5.0%		
Total	98	100.0%	20	100.0%	11	100.0%

Nearly 75% of transformational leaders have earned a bachelor's degree, at minimum. Of those identifying as transactional, 50% have earned a bachelor's degree. Respondents considered predominantly laissez-faire (36.4%) have earned an associate degree. Nearly 40% of respondents with 6 to 10 years of information technology management experience identify with transactional and laissez-faire leadership styles, respectively. Those with 1 to 5 years of current organizational experience were transactional (25.0%) and laissez-faire (12.5%) leaders.

Data Preparation and Screening

Before multiple regression analysis was conducted, numerous procedures were implemented to prepare and screen the data and evaluate regression assumptions. The data set was coded in order to use the SPSS v. 22 statistical analysis software package. Skewness and kurtosis statistics were produced and analyzed to assess univariate normality. Linearity, homoscedasticity, and normality assumptions were tested. The results of the data preparation and screening activities are provided below.

Data Coding

Technostress creators. Participants responded to Likert-scale questions associated with technostress creator variables techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty. Technostress responses were coded and an aggregated score was computed for each creator variable using the following scale:

- 1 – *Strongly agree*
- 2 – *Agree*
- 3 – *Neutral (neither agree nor disagree)*

- 4 – *Disagree*
- 5 – *Strongly disagree*
- 6 – *Don't know or not applicable*

Based on the rating scale, a lower score suggested that a respondent experienced a greater level of technostress in the presence of a specific technostress creator whereas a higher score indicated a lower or non-existent level of technostress was perceived.

Leadership. Respondents answered Likert-scale questions taken from the Multifactor Leadership Questionnaire 5X short rater survey instrument to assess their leadership style. Transformational leadership style included five constructs (a) idealized influence attributed (IIA), (b) idealized influence behavior (IIB), (c) inspirational motivation (IM), (d) intellectual stimulation (IS), and (e) individualized consideration (IC). Transactional leadership style included three constructs (a) contingent reward (CR), (b) management-by-exception active (MbEA), and (c) management-by-exception passive (MbEP). Laissez-faire leadership style included the laissez-faire (LF) construct. Responses were coded using the scale that follows:

- 1 – *Not at all*
- 2 – *Once in a while*
- 3 – *Sometimes*
- 4 – *Fairly often*
- 5 – *Frequently, if not always*
- 6 – *Don't know or not applicable*

Leadership responses were coded and a mean composite score was calculated for each of the transformational, transactional, and laissez-faire leadership subscales, using the Mind Garden scoring key. The subscale scores were then, collapsed into a single leadership style variable to determine the most prevalent leadership style (transformational, transactional, and laissez-faire).

Missing Data

The study did not have any missing data. The electronic survey was designed so that all questions required a response.

Checking for Univariate Normality

Univariate normality was evaluated using the numeric skewness and kurtosis indices produced by SPSS. Field (2009) suggested that skew indices greater than three and kurtosis indices between 10 and 20 signify non-normality. Table 11 shows that the variables were not highly skewed or kurtotic. Therefore, all data was considered normally distributed.

Screening for Outliers

The variables were standardized into normalized *z*-scores to identify univariate outliers. According to Field (2009) and Tabachnick and Fidell (2007), those observations with an absolute value exceeding 3.29 should be considered outliers. One observation within the transformational leadership standardized variable exceeded this threshold and was excluded from the study. All other cases were preserved for subsequent exploration.

To identify multivariate outliers, a linear regression was conducted to regress technostress creators upon the various independent variables associated with the research study. Outliers were detected using Cook's Distance leverage technique. Cases with Cook's D values exceeding .049 (i.e., Cook's D mean + two SDs) were removed from the regression (Tabachnick & Fidell, 2013). Applying this benchmark, ten observations were removed from the analysis.

Table 11

*Skewness and Kurtosis Statistics for the Study Variables (*N *= 129)*

Variable	Skewness	Kurtosis
Technostress		
Techno-overload	-.16	.17
Techno-invasion	-.04	-.26
Techno-complexity	.36	-.50
Techno-insecurity	.37	-.56
Techno-uncertainty	-.64	.54
Leadership Style		
Transformational leadership	-.62	.50
Transactional leadership	-.38	-.08
Laissez-faire leadership	.54	-.86

Note. SE for skewness statistics = .21. *SE* for kurtosis statistic = .42.

Testing Assumptions

In order to validate that, from a sample, inferences about a population can be made using multiple regression analysis, several assumptions must be met (Field, 2009). These assumptions include normality, linearity, homoscedasticity, independence of errors, and multicollinearity. The results of the multivariate assumption tests are next presented.

Normality. The normality assumption was evaluated via a normal probability plot and a histogram. When residuals are approximately normally distributed and data points are closely aligned with the diagonal shown on the plot, the normality assumption is satisfied (Field, 2009; Tabachnick & Fidell, 2007).

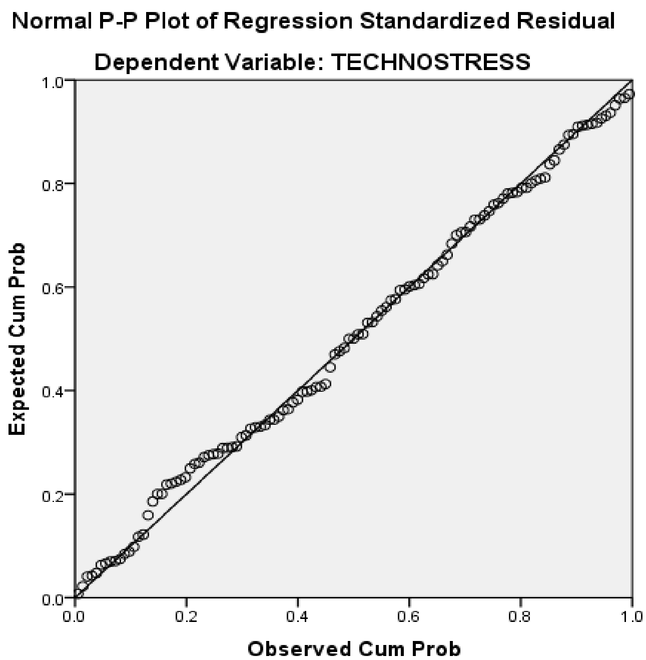

Figure 3. Normal Probability Plot of Residual Data

Figure 3 demonstrates that the data was normally distributed. Likewise, data is considered normally distributed when a bell-shaped curve with minor skewness and kurtosis is present (Field, 2009; Tabachnick & Fidell, 2007). In addition, Figure 4 represents normally-distributed data.

Linearity. A linear relationship suggests that the rate of change between the dependent and independent variables is constant (Field, 2009; Tabachnick & Fidell, 2007). To employ linear multiple regression, linearity is a prerequisite, otherwise the predictive nature of the model can be compromised. Linearity of the model was confirmed through the visual inspection of the relationships between each predictor variable and the dependent variable.

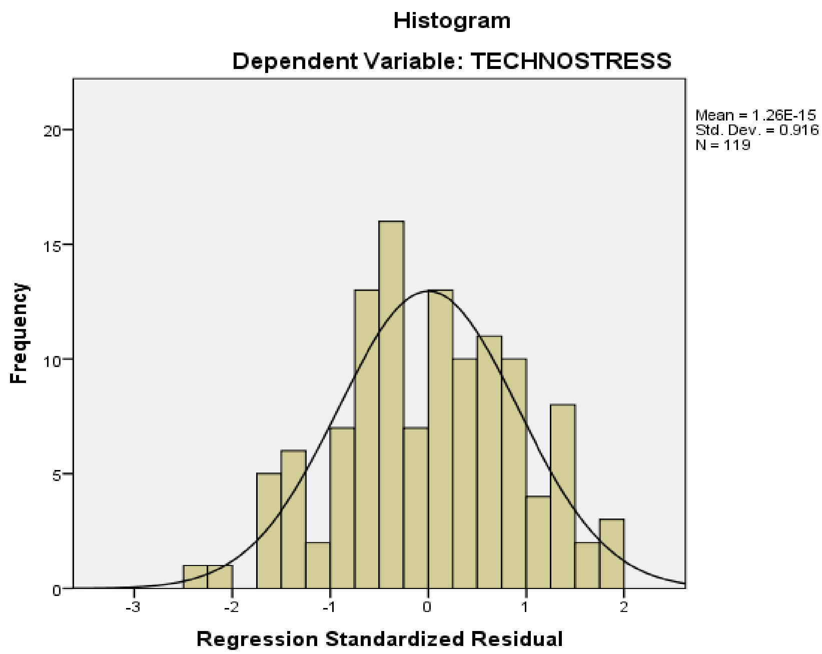

Figure 4. Residual Histogram of the Technostress Model

Homoscedasticity. Homoscedasticity, the condition categorized by the constant variance of residuals, was assessed through the review of a residuals scatterplot (Field, 2009). To fulfill the homoscedasticity assumption, the array of data points should be randomly distributed and evenly disbursed throughout the scatterplot diagram. Figure 5 exhibits that the data was homoscedastic.

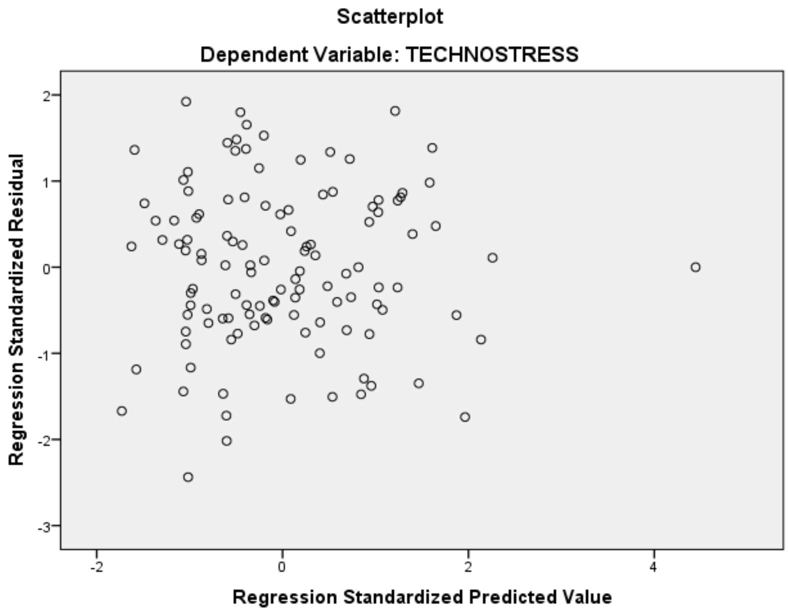

Figure 5. Scatterplot of Residual Data

Independence of errors. Independence of errors, or the absence of correlation between residuals, is measured through the Durbin-Watson test. A Durbin-Watson test result within the range of 1 to 3 typically indicates uncorrelated adjacent residuals (Field, 2009). With a Durbin-Watson test statistic for the model of 2.05, the data was considered independent of correlation errors between residuals.

Multicollinearity. The presence of multicollinearity can be so strong that the correlation between independent variables makes their predictive power redundant. To prevent the inclusion of redundant predictor variables in the technostress multiple regression model, multicollinearity was assessed. To evaluate multicollinearity, two scores were analyzed, Tolerance (TOL) and Variance Inflation Factor (VIF). Field (2009) suggested that TOL and VIF values less than .1 and greater than 10 respectively should warrant a cause for concern. Table 12 shows that none of the TOL values fell below .1 and all of the VIF values were less than 10. Therefore, the collinearity among predictors was regarded as acceptable for the technostress multiple regression model. Correlations between the predictor variables are presented in Table 13.

Table 12

*Collinearity Statistics (*N *= 129)*

Variables	Correlations			Collinearity Statistics	
	Zero-order	Partial	Part	TOL	VIF
TFORM	-.09	-.05	-.04	.74	1.35
TACT	.57	.19	.14	.40	2.48
LF	.67	.41	.33	.38	2.66
AGE	-.11	.11	.08	.67	1.49
GEN	-.05	-.01	.00	.93	1.08
ED	-.15	-.09	-.07	.84	1.19
EXP	-.07	.02	.01	.69	1.44

Note. Dependent variable: Technostress.

Table 13

*Correlations between the Study Variables (*N *= 129)*

Variable	AGE	GEN	EDUC	EXP	TFORM	TACT	LF
Age	1.00						
Gender	.16	1.00					
Education	.24**	.03	1.00				
Experience	.50**	.14	.34**	1.00			
Transformational	.15	-.17	.21*	.08	1.00		
Transactional	-.12	-.10	-.05	-.06	.18*	1.00	
Laissez-faire	-.32**	-.09	-.16	-.17	-.17	.71**	1.00

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Summary of Results

The research question for the study was evaluated using a linear multiple regression model and was presented as follows. What effect does transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience have on the level of technostress experienced by information technology managers in the U.S.?

Results showed a significant relationship between transactional or laissez-faire leadership styles and technostress. Those information technology managers with predominantly transactional or laissez-faire leadership styles experienced a significant increase in their perceived level of technostress. However, information technology managers characterized as primarily transformational in terms of their leadership style did not experience a statistically significant change in their perceived level of technostress. With respect to individual characteristics, research indicated that only those information technology managers without a high school diploma had a significant relationship with perceived levels of technostress but collectively, individual characteristics were not statistically significant in predicting technostress. Details of the multiple regression analysis and presentation of the results are subsequently reported.

Details of the Analysis

Linear multiple regression was conducted to test the research question and related hypotheses. The model summary is shown in Table 14. The R-square value ($R^2 = .58$) indicated that 58% of the variance in technostress was explained by the independent variables incorporated as part of this study (see Table 14).

Table 14

*Model Summary (*N *= 119)*

				Statistics				
R	R^2	Adjusted R^2	Std. Error of the Estimate	*F*	df1	df2	Sig. *F*	Durbin-Watson
.76	.58	.50	2.77	7.18	19	99	.00	2.05

Note. Dependent variable = Technostress.

The ANOVA established that the model was statistically significant, with *F*(119) = 7.18 at $p < .01$, for leadership styles and individual characteristics predicting technostress (see Table 15).

Table 15

*Analysis of Variance of the Regression Model (*N *= 119)*

	Sum of Squares	df	Mean Square	*F*	Sig.
Regression	1045.41	19	55.02	7.18	.00
Residual	758.29	99	7.66		
Total	1803.70	118			

Note. Dependent variable = Technostress.

Presentation of the Results

The Omnibus Null hypothesis (H_0) for the research question was as follows: There is no relationship between transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience and the level of technostress experienced by information technology managers in the U.S., or R-squared is equal to 0. With an overall model R^2 = .58, the Omnibus Null hypothesis was rejected since R^2 is not equal to 0. Therefore, the model exhibited a statistically significant predictive nature and relationship between the dependent variable (technostress) and the independent variables (i.e., leadership style, age, gender, education, and industry experience). The predictor variables explained over 58% of the technostress experienced by information technology managers.

Table 16 provides the multiple regression model of coefficient data. Conclusions regarding the statistical significance of the research sub-questions and hypotheses are drawn from this information. To be considered as significant, the *t* test must be significant at ($p < .05$). Hypotheses testing is discussed in detail as part of Chapter 5.

Table 16

*Multiple Regression Model Coefficient Data (*N *= 119)*

Variables	B	SE	β	*t*	Sig.
CONSTANT	7.81	2.60		3.01	.00
TFORM	-.07	.12	-.05	-.57	.57
TACT	.26	.13	.21	1.99	.049
LF	.41	.09	.53	4.75	.00
AGE	.31	.26	.10	1.18	.24
GEN	-.03	.58	.00	-.06	.95
ED	-.27	.28	-.07	-.96	.34
EXP	.04	.23	.01	.18	.86

Note. Constant (y-intercept). Overall model R^2 = .58, $F(19, 99) = 7.18$, $p = .001$. * $p < .05$. ** $p < .01$. ** $p < .001$.

Research Sub-Questions

RQ_1: What is the relationship between transformational leadership style and the level of technostress experienced by information technology managers in the U.S.? The model indicated that transformational leadership style had no significant relationship upon the technostress experienced by information technology managers working in the U.S. ($\beta = -.05$, $t(119) = -.57$, $p < .57$).

RQ_2: What is the relationship between transactional leadership style and the level of technostress experienced by information technology managers in the U.S.? The model indicated that transactional leadership style had a significant relationship upon the technostress experienced by information technology managers working in the U.S. ($\beta = .22$, $t(119) = 1.99$, $p < .049$).

RQ_3: What is the relationship between laissez-faire leadership style and the level of technostress experienced by information technology managers in the U.S.? The model indicated that laissez-faire leadership style had a significant relationship upon the technostress experienced by information technology managers working in the U.S. ($\beta = .53$, $t(119) = 4.75$, $p < .00$).

RQ_4: What is the relationship between age and the level of technostress experienced by information technology managers in the U.S.? The model indicated that age had no significant relationship upon the technostress experienced by information technology managers working in the U.S. ($\beta = .10$, $t(119) = 1.18$, $p < .24$).

RQ_5: What is the relationship between gender and the level of technostress experienced by information technology managers in the U.S.? The model indicated that gender had no significant relationship upon the technostress experienced by information technology managers working in the U.S. (β = -.00, $t(119) = -.06$, $p < .95$).

RQ_6: What is the relationship between education and the level of technostress experienced by information technology managers in the U.S.? The model indicated that education had no significant relationship upon the technostress experienced by information technology managers working in the U.S. (β = -.07, $t(119) = -.96$, $p < .34$).

RQ_7: What is the relationship between industry experience and the level of technostress experienced by information technology managers in the U.S.? The model indicated that industry experienced had no significant relationship upon the technostress experienced by information technology managers working in the U.S. (β = .01, $t(119) = .18$, $p < .86$).

Conclusion

Chapter 4 presented a comprehensive analysis of the statistical methods implemented to evaluate whether technostress can be predicted by leadership style and other individual characteristics including age, gender, level of education, and industry experience. SurveyMonkey was commissioned to electronically solicit participants from the population and collect data. Data was downloaded directly from the SurveyMonkey website and imported into SPSS v. 22 software. Data was cleaned, coded, and explored to satisfy normality, linearity, homoscedasticity, independence of errors, and multicollinearity assumptions.

With an $R^2 = .58$ for the overall model, the Omnibus Null hypothesis was rejected, indicating a normal, linear, and predictive relationship between the dependent variable, (i.e., technostress), and the independent variables, (i.e., leadership style, age, gender, level of education, and industry experience). The independent variables included in the model explained 58% of the technostress perceived by information technology managers working in the U.S., as evaluated via technostress creators and the MLQ-5X leadership questionnaire instruments.

Chapter 5 will provide further discussion regarding the results of the study. Hypotheses will be individually evaluated. Implications and limitations of the research study, along with recommendations for future research will be presented.

CHAPTER 5. DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

Chapter 5 provides a discussion of the research results and implications of the study. First, a summary of the results is presented followed by a discussion of the research outcomes. Next, the implications of the study and how they relate to research previously conducted in this particular field are discussed. Recommendations for future research are proposed and the limitations of the study are provided. The chapter ends with a conclusion that reviews the findings of the research study.

Summary of the Results

The purpose of this study was to obtain an improved understanding of technostress and those factors that influence it. This study evaluated whether individual characteristics (i.e., age, gender, education, and industry experience) and leadership style, as defined by the full-range leadership theory (FRLT), were related to the perceived level of technostress in information technology managers employed in the United States between the ages of 18 to 65. Two groups of independent variables were examined in this study (a) individual characteristics and (b) transformational, transactional, and laissez-faire leadership styles. Individual characteristics were captured via demographic survey questions. Dominant leadership styles were identified using the MLQ-5X leadership questionnaire (Bass & Avolio, 1990, 1995, 2004; Brennan, 1983; Cozby, 2009). The dependent variable, technostress, was measured by means of the technostress instrument (Tarafdar et al., 2007).

Previous research first described technostress as a syndrome or disease that precludes or inhibits an end user from coping with ICTs in a positive way (Brod, 1984). Originating from modern ICT use at home and at the workplace and the altered behaviors that result, technostress causes an inability to adapt with technology. Users feel compelled to stay connected, forced to take immediate action on work-related requests, and are driven to chronic multi-tasking to work faster due to the instantaneous availability of information (Agervold, 1987; Ayyagari et al., 2011; Kinman & Jones, 2005; Korunka & Vitouch, 1999; Straub & Karahanna, 1998; Wellman & Hampton, 1999).

A range of symptoms may be presented by technophobic ICT users, some of which are categorized as biological while others are considered more psychological in nature (Cox, Griffith, & Rial-Gonzalez, 2000; Mahalakshmi & Sornam, 2012). Most technostress symptoms have detrimental effects on the health and well-being of the inflicted (Knani, 2013; Wang et al., 2008). Researchers have attempted to isolate the various multidimensional causes of technostress. The consequences of technostress are extensive and costly and can have a profound impact not only on the individual and their organizational environment but also the economy as a whole.

A linear multiple regression analysis was performed to evaluate whether the individual characteristics and leadership styles of information technology managers influenced their perceived level of technostress. Individual characteristics and leadership style predicted 58% of the variance in technostress as perceived by the information technology managers evaluated as part of this study. Transformational leadership was not found to be a statistical predictor of technostress in information technology managers.

However, transactional and laissez-faire leadership styles were identified to statistically influence technostress within this population. Transactional and laissez-faire leadership style positively predicted technostress, meaning that as the leadership style becomes more dominant, the information technology manager will experience greater levels of technostress. Transformational leadership style, along with the individual characteristics of the respondents (i.e., age, gender, education, and industry experience), did not improve the predictive nature of the linear regression model.

Discussion of the Results

The purpose of this study was to determine the predictive nature of the relationship between two groups of independent variables (i.e., leadership style and the individual characteristics of information technology managers) and the dependent variable, technostress. This study investigated prior research related to leadership styles and technostress. However, this is the first research study that united both research subjects with the resulting research question. What effect does transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience have on the level of technostress experienced by information technology managers in the U.S.?

This study was grounded by and evolved from previous leadership style and technostress research, investigated without respect to the relationship of one area upon the other until now. This research expanded the current technostress literature by gauging the strength of the association between leadership style and technostress creators in information technology managers working in the United States between the ages of 18 to 65. To collect data, a quantitative survey incorporating the MLQ-5X and technostress instruments in conjunction with demographic questions was administered (Bass & Avolio, 1990, 1995, 2004; Brennan, 1983; Cozby, 2009; Tarafdar et al., 2007). SurveyMonkey randomly distributed the survey to 800 information technology managers between the ages of 18 to 65 working within the United States in a leadership role, resulting in the receipt of 129 surveys and an overall response rate of 16.1%.

Demographic questions were posed to identify the individual characteristics of the respondents. The majority of respondents were male (64.3%). Respondents ranged in age from 18 to 65 with the 34 to 44 age group most frequently observed (29.5%). With regard to level of education, approximately 72% of the sample had a bachelor's degree and of those, 32% had a terminal degree. Surprisingly, one respondent had not earned a high school diploma. Over 45% of the respondents had at least 10 years of IT management experience, the majority of which varied between 6 to 10 years (28.7%). While current workplace experience ranged from less than 1 year to more than 20 years, a predominance of the respondents reported a tenure of at least 10 years (47%).

Survey questions were incorporated to identify the dominant self-reported leadership style of the respondents. Most commonly reported in those between the ages of 55 to 65 (28.6%), a preponderance of the respondents (76%) were transformational leaders with a bachelor's degree at a minimum (75%). A majority of transformational leaders (74%) have at least 6 to 10 years of IT management experience. Comparably, over 80% of respondents revealed to be a transformational leader have no less than 6 to 10 years of experience with their current organizations.

A multiple linear regression was performed to test the Omnibus Null hypothesis and seven hypotheses. These null hypotheses are stated as follows.

Omnibus Null Hypothesis H_o: There is no relationship between transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience and the level of technostress experienced by information technology managers in the U.S.

H_o1: There is no relationship between transformational leadership style and the level of technostress experienced by information technology managers in the U.S.

H_o2: There is no relationship between transactional leadership style and the level of technostress experienced by information technology managers in the U.S.

H_o3: There is no relationship between laissez-faire leadership style and the level of technostress experienced by information technology managers in the U.S.

H_o4: There is no relationship between age and the level of technostress experienced by information technology managers in the U.S.

H_o5: There is no relationship between gender and the level of technostress experienced by information technology managers in the U.S.

H_o6: There is no relationship between education and the level of technostress experienced by information technology managers in the U.S.

H_o7: There is no relationship between industry experience and the level of technostress experienced by information technology managers in the U.S.

Before conducting multiple regression analysis, various procedures were employed to evaluate both the data and assumptions associated with a robust model. Missing data was not an issue as a result of how the survey was designed. Data showed reasonable levels of skewness and kurtosis (Field, 2009). When screening for univariate outliers, one observation within the transformational leadership standardized variable was excluded. Likewise, the assessment of multivariate outliers led to the removal of 10 observations from the analysis (Tabachnick & Fidell, 2013). The assumptions of normality, linearity, homoscedasticity, independence of errors, and multicollinearity were met (Field, 2009; Tabachnick & Field, 2007).

Using multiple linear regression, a model was developed to measure and evaluate the probability that the independent variables (i.e., individual characteristics and leadership style), predicted a change in the level of technostress experienced by information technology managers between the ages of 18 to 65 working in the United States. The overall model, $R^2 = .58$, $F(19, 99) = 7.18$, $p = .001$, was statistically significant, explaining 58% of the technostress experienced by information technology managers. Therefore, the *Omnibus Null Hypothesis* H_o was rejected and each of the seven hypotheses was evaluated for statistical significance. The assessment of these hypotheses is presented in Table 17.

Prior research identified age, gender, level of education, and industry experience as factors that potentially influence technostress (Ragu-Nathan et al., 2008; Tarafdar et al., 2007, 2010, 2011). Likewise, the Person-Environment (P-E) fit theory suggested that individual characteristics may influence organizational alignment (Dawis, 1992; Edwards, 2008; Edwards et al., 1998; Kristof-Brown et al., 2005; Muchinsky & Monahan, 1987; Schnieder et al., 1997). When a misalignment between individual characteristics and the organization occurs, stress can result (Edwards, 2008). Hypotheses 4, 5, 6, and 7 explored the dynamics of these individual characteristics. Unlike previous research, this study did not identify a significant relationship between individual characteristics (i.e., age, gender, education, and industry experience) and the level of technostress perceived by information technology managers working in the United States between the ages of 18 to 65. Therefore, H_o4 was not rejected ($\beta = .10$, $t(119) = 1.18$, $p < .24$) as were H_o5 ($\beta = -.00$, $t(119) = -.06$, $p < .95$), H_o6 ($\beta = -.07$, $t(119) = -.96$, $p < .34$) and H_o7 ($\beta = .01$, $t(119) = .18$, $p < .86$) (see Table 17).

Table 17

Summary of Hypothesis Testing Results

Hypothesis	Variable	*t* Value	Results
H_o1	Transformational		Not Rejected
H_a1	Transformational	.571	
H_o2	Transactional		Rejected
H_a2	Transactional	.049	
H_o3	Laissez-faire		Rejected
H_a3	Laissez-faire	.000	
H_o4	Age		Not Rejected
H_a4	Age	.239	
H_o5	Gender		Not Rejected
H_a5	Gender	.952	
H_o6	Education		Not Rejected
H_a6	Education	.337	
H_o7	Experience		Not Rejected
H_a7	Experience	.861	

Technostress was presumed to be influenced by individual user characteristics and perceptions. Hence, leadership style, as described by the FRLT, was assumed to perform as an individual characteristic, influencing the perceived level of technostress within the organizational environment (Ayyagari et al., 2011; Bass, 1985; Basoglu & Fuller, 2007;

Bass & Avolio, 2004; Dawis, 1992; Edwards, 2008; Edwards et al., 1998; French et al., 1982; Hancock & Szalma, 2008; Kristof-Brown et al., 2005; Lazarus, 1999; LePine et al., 2005; Muchinsky & Monahan, 1987; Pervin, 1968; Schnieder et al., 1997; Syrek et al., 2013; Walumbwa et al., 2008). Three leadership styles, namely transformational, transactional, and laissez-faire, were evaluated to determine their impact upon the perceived level of technostress experienced by information technology managers.

In this study, transformational leadership was not found to be a statistical predictor of technostress in information technology managers. However, transactional and laissez-faire leadership styles were identified to statistically influence technostress within this population. Consequently, H_o1 was not rejected ($\beta = -.05$, $t(119) = -.57$, $p <$ $.57$) and H_o2 ($\beta = .22$, $t(119) = 1.99$, $p < .049$) and H_o3 ($\beta = .53$, $t(119) = 4.75$, $p < .00$) were rejected (see Table 17). Transactional ($\beta = .21$, $p < .049$) and laissez-faire ($\beta = .53$, $p < .00$) leadership styles positively predicted technostress. Therefore, as transactional and laissez-faire leadership styles become more dominant or prevalent based on the FRLT sub-constructs, more technostress is experienced.

In using multiple linear regression, individual characteristics and leadership style predicted 58% of the variance in technostress as perceived by the information technology managers evaluated as part of this study. Transactional and laissez-faire leadership style positively predicted technostress, meaning that as the leadership style becomes more dominant, the information technology manager will experience greater levels of technostress. Transformational leadership style, along with the individual characteristics of the respondents (i.e., age, gender, education, and industry experience), did not improve the predictive nature of the linear regression model.

Implications of the Results

The next section presents the array of theoretical and practical implications derived from this research study. The academic implications are examined through the lens of technostress and leadership style theories and the landmark outcomes of the study are discussed. The implications of the results from the practitioner perspective are then provided.

Theoretical Implications

Few studies exist that have identified those factors that influence the effects of technostress on U.S. professionals. Far fewer studies have examined the impact of technostress upon information technology managers. The study of the phenomenon of technostress and the influence that leadership style is no longer a gap in the literature. This study extended the literature on leadership style and its effects on workplace stressors such as technostress (LePine, et al., 2005; Syrek et al., 2013).

The research question underpinning this study posed, "What effect does transformational, transactional, or laissez-faire leadership style, controlling for age, gender, education, and industry experience have on the level of technostress experienced by information technology managers in the U.S.?" An investigation of this question not only expanded the technostress literature by evaluating a population of information technology managers, but also the research surrounding leadership and, in specific, the full-range leadership theory (FRLT) (Bass & Avolio, 1990, 1995, 2004; Brennan, 1983; Cozby, 2009; Tarafdar et al., 2007). Therefore, one academic implication of this research study is that it contributed to the theoretical body of knowledge surrounding both technostress and leadership.

In addition, some of the findings from this study were not consistent with previous literature that identified individual characteristics (i.e., age, gender, education, and industry experience) as influencers of technostress (Ragu-Nathan et al., 2008; Tarafdar et al., 2007, 2010, 2011). It would appear that the age, gender, education, and industry experience of information technology managers do not impact the occupational stressors that produce technostress (Srivastav, 2010; Tarafdar et al., 2007). Perhaps, attributable to their advanced knowledge and extensive ICT expertise, management personnel employed in information-technology intensive fields are less impacted by technostress resulting from age, gender, education, and industry experience as compared to their non-IT complements.

Moreover, this study was the first in the academic literature to conclude that a statistically significant predictive relationship exists between technostress and leadership style, and in specific, transactional and laissez-faire leadership styles in information technology managers. Transactional leaders prefer stability, order, and efficiency and can be reluctant to introduce change into the work environment (Bass, 1998; Shin & Zhou, 2003). Laissez-faire leaders generally delegate their authority and job responsibilities to their subordinates. The ICT management field often compels managers to be more actively involved owing to the frequent transformational, fast-paced nature of the industry (Agervold, 1987; Ayyagari et al., 2011; Kinman & Jones, 2005; Korunka & Vitouch, 1999; Straub & Harahanna, 1998). As supported by the literature and the results of this study, information technology managers operating in a highly variable, change-oriented occupation, self-identifying with a predominantly transactional or laissez-faire leadership style were shown to experience greater technostress.

Practitioner Implications

The implications of these findings are critical to practitioners in various ways. For one, this study promotes the importance of understanding those factors that inflict technostress at the workplace. The consequences of technostress are immense, equating to 225 million lost workdays and $300 billion of lost productivity per year (American Institute of Stress, 2007). Technostress has been identified to reduced job satisfaction, involvement, organizational commitment, and creativity, increasing job burnout and turnover (Brillhart, 2004; Burke & Greenglass, 1995; Hung et al., 2011; Krinsky et al., 1984; Moore, 2000; Muir, 2008; Shropshire & Kadlec, 2012; Ragu-Nathan et al., 2008; Simmons, 2009; Tarafdar et al., 2007, 2010, 2011; Wolpin et al., 1991). Other destructive ramifications include decreased shareholder profits and value, weak internal communications, an escalation in workplace conflicts, reduced quality in products and services, and the inability to fill open vacancies (Moses, 2013). If organizational management is not currently aware of the impact that technostress has upon its staff and the company overall, this study has reinforced the value of developing approaches or systems to reduce or eliminate its effects.

Secondly, transactional and laissez-faire leaders in the information technology field may suffer from and display more of the adverse physical, mental, and emotional consequences of technostress when weighed against their transformational leader equivalents. These symptoms can have an exceedingly profound and caustic effect upon the health and well-being of the inflicted (Knani, 2013; Wang et al., 2008). As these toxic side effects intensify, so do their control over leadership success. Therefore, the effectiveness of transactional and laissez-faire managers can be more severely compromised than transformational leaders serving the same type of information technology leadership roles.

Thirdly, as feelings of technostress intensify, so do role conflict and overload (Tarafdar et al., 2011). Poor managerial performance is associated with these perceptions (Kahn et al., 1964; Lazarus, 1991). Because transactional and laissez-faire leaders may experience more technostress than transformational leaders, they may also encounter increased role conflict and role overload. This could result in a decline in their managerial performance unless measures are taken to neutralize the effects of technostress.

Lastly, by way of this innovative breakthrough, the research study informs management that the presence of a dominant transactional or laissez-faire leadership style can increase the incidence of technostress. This insight may prompt organizations to develop and adopt strategic techniques to prevent, manage, and reduce the influence of technostress resulting from these leadership styles. Accordingly, initiatives to counteract technostress can be tailored to align with the leadership style of the employee. The implementation of a personalized plan may be more effective in reducing technostress than a non-customized one.

Limitations

The purpose of this study was to examine the relationships between transformational, transactional, and laissez-faire leadership styles, individual characteristics, and technostress in information technology managers. One particular limitation of this study was the incorporation of a survey as the data collection tool. Because the questions were posed in a multiple choice format, respondents were not provided with the option to elaborate upon or explain their answers. Even though the data presented by this study was robust, information captured from qualitative interviews and questionnaires may expose more profound results regarding the feelings, beliefs, and opinions of the respondents.

An additional limitation of this study was related to the use of SurveyMonkey, the Internet-based survey collection company, to gather data. The survey was administered to only those information technology managers registered as members of the SurveyMonkey participant panel. Information technology managers who were not registered with SurveyMonkey may have different experiences than those surveyed for this study. Therefore, the research results are not generalizable to their entire population of information technology managers.

Moreover, by design, only information technology managers were surveyed as part of this research study. Respondents working in other professions and positions may not be as proficient with information and communication technologies as those employed in the information technology field. Users who are less proficient with technology may suffer more or less technostress. Hence, the research is limited to the perspective of those practicing in the information technology field.

The research was conducted to capture responses from information technology managers to determine if leadership style influences their perceived level of technostress. The leadership styles of managers operating in other industries may not be observed in the same distribution as those working in the information technology field. Likewise, managers employed in various industries may be more or less plagued by technostress as compared to those in the information technology field, despite being categorized with an equivalent dominant leadership style. Accordingly, the occupation investigated in this study limited the research results.

This study was limited to information technology managers employed in the United States. Managers working in countries other than the United States may be afflicted by technostress in a manner contrary to their domestic counterparts. In addition, international managers may not exhibit the same leadership styles or characteristics as those employed in the United States. Thus, the geographic location explored as part of this study limited the outcomes.

Theoretically, this research study was limited to the full-range leadership perspective, incorporating three explicit leadership styles (a) transformational, (b) transactional, and (c) laissez-faire. Numerous leadership theories unrelated to FRLT have been presented in the literature. Respondents were asked to categorize themselves as transformational, transactional, or laissez-faire when their foremost leadership style, personality, traits, or qualities may not be optimally reflected by the FRLT. As a consequence, the adoption of one leadership theory to quantify the relationship with technostress is a limitation of this study.

Recommendations for Future Research

This study expanded upon the current technostress literature by investigating a previously unexplored link that may impact its devastating effects, leadership style. As a result of conducting this particular research study and analyzing the findings, several recommendations for future research have emerged. The next section offers these prospective research suggestions in an effort to advance the scholarship surrounding this important topic.

This study considered only the creators of technostress in the evaluation of its effects upon respondents (Tarafdar et al., 2007). Technostress inhibitors were not incorporated into the research (Ragu-Nathan et al., 2008). The inclusion of both technostress creators and inhibitors may provide a better understanding of the relationship between leadership style and technostress. Therefore, a replication of this study integrating both technostress creators and inhibitors is recommended.

Similarly, this study examined the relationship between one leadership style theory, FRLT, and technostress. This study provided evidence that the presence of a dominant transactional or laissez-faire leadership style may influence the perceived level of technostress in information technology managers. Assessing the relationships between leadership style theories other than FRLT and technostress would provide a greater understanding of not only how leadership styles influence perceived levels of technostress but also which leadership styles may facilitate or impede it.

This study did not assess the impact of each individual FRLT or technostress creator sub-construct (see Tables 2 and 4). Research should evaluate the role that each sub-construct plays in the relationship between leadership style and technostress.

The sample frame was limited to information technology managers working in the United States. Additional research should be performed to include personnel employed by other non-information technology related industries, working in both leadership and non-leadership positions. Furthermore, the geography of this study should be expanded to include employees from countries other than the United States. Expanding the research scope may improve the generalizability of the results related to leadership style and technostress.

The influence that leaders have upon their followers is considerable. Researchers argue that leadership style impacts the job satisfaction, performance, creativity, citizenship, and organizational commitment of their subordinates (Bono & Judge, 2003; Deluga, 1995; Locke, 1976; Keskes, 2014; Shin & Zhou, 2007, 2003). If technostress impacts information technology managers with a transactional or laissez-faire leadership style, their followers may be indirectly affected as a result. Therefore, a future research recommendation is the evaluation of the impact of leadership style on technostress not only on leaders, themselves, but on their followers.

Research has linked the incidence of role stress to technostress and subsequently, to workplace productivity (Ragu-Nathan et al., 2008; Tarafdar et al., 2007). From this study, an association between transactional and laissez-faire leadership styles and technostress was discovered. Research could be taken one step further to determine if leadership style, a factor that influences technostress in information technology managers, may also impact productivity.

Causality could not be inferred because multiple regression was the statistical method incorporated in this study to analyze the data. Additional research is recommended using structural equation modeling as the quantitative analysis approach to evaluate and estimate the causal relationship between leadership style and technostress.

Another area of future research would consider the relationship between work-life balance and technostress in information technology managers and other non-IT professions. In this study, respondents were not asked to reveal whether they worked in a traditional corporate brick and mortar office, from home, or a combination of each. Likewise, data regarding the number of hours worked per day and week, the frequency of work interruptions, and the amount of paid time off taken over a defined time frame, was not collected. Moreover, additional information could be gathered regarding lost work time resulting from personal illness, the results of which could be correlated with the technostress instrument.

A final recommendation is to further advance the research on leadership style, the impact upon technostress, and the relationship with one physical symptom of technology use stress in particular, obesity. According to the Center for Disease Control and Prevention (2014), over 34.9% or one-third of Americans are obese, resulting in nearly $150 billion of medical costs annually. Additional research should be conducted to bridge the gap between those factors that produce or obstruct technostress not only to reduce the $300 billion that organizations pay each year as a result of technostress but also to better understand the impact that technostress has on the health, wellness, and the waistlines of its sufferers. As a result of this prospective groundbreaking research subject, a technutrition, technowellbeing, technoweight, technobese, or technoverweight measure or scale could be established to predict the prospective weight and subsequent health and wellness of technology users based on the level of technostress one perceives and experiences.

Conclusion

This research study was conducted to acquire an improved understanding of those factors that influence the perceived level of technostress in information technology managers. This study was the first in the literature to consider whether leadership style may play a role in influencing the perceived level of technostress experienced by information technology managers. Transformational, transactional, and laissez-faire leadership styles along with individual characteristics including age, gender, education, and industry experience were examined to determine their relationship with technostress. A quantitative, non-experimental research method was incorporated to measure and evaluate the relationship. An electronic survey tool was used to gather research data. This study was grounded in existing technostress and leadership research.

A multiple linear regression analysis identified that individual characteristics and leadership styles of information technology managers employed in the United States between the ages of 18 to 65 explained 58% of the variance in technostress. Individual characteristic and transformational leadership style statistics did not add any explanatory power to the regression model. However, transformational and laissez-faire leadership styles were found to be statistically significant in positively predicting technostress.

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APPENDIX A. STATEMENT OF ORIGINAL WORK

Academic Honesty Policy

Capella University's Academic Honesty Policy (3.01.01) holds learners accountable for the integrity of work they submit, which includes but is not limited to discussion postings, assignments, comprehensive exams, and the dissertation or capstone project.

Established in the Policy are the expectations for original work, rationale for the policy, definition of terms that pertain to academic honesty and original work, and disciplinary consequences of academic dishonesty. Also stated in the Policy is the expectation that learners will follow APA rules for citing another person's ideas or works.

The following standards for original work and definition of *plagiarism* are discussed in the Policy:

> Learners are expected to be the sole authors of their work and to acknowledge the authorship of others' work through proper citation and reference. Use of another person's ideas, including another learner's, without proper reference or citation constitutes plagiarism and academic dishonesty and is prohibited conduct. (p. 1)
>
> Plagiarism is one example of academic dishonesty. Plagiarism is presenting someone else's ideas or work as your own. Plagiarism also includes copying verbatim or rephrasing ideas without properly acknowledging the source by author, date, and publication medium. (p. 2)

Capella University's Research Misconduct Policy (3.03.06) holds learners accountable for research integrity. What constitutes research misconduct is discussed in the Policy:

> Research misconduct includes but is not limited to falsification, fabrication, plagiarism, misappropriation, or other practices that seriously deviate from those that are commonly accepted within the academic community for proposing, conducting, or reviewing research, or in reporting research results. (p. 1)

Learners failing to abide by these policies are subject to consequences, including but not limited to dismissal or revocation of the degree.

APPENDIX A. STATEMENT OF ORIGINAL WORK AND SIGNATURE

I have read, understood, and abided by Capella University's Academic Honesty Policy (3.01.01) and Research Misconduct Policy (3.03.06), including the Policy Statements, Rationale, and Definitions.

I attest that this dissertation or capstone project is my own work. Where I have used the ideas or words of others, I have paraphrased, summarized, or used direct quotes following the guidelines set forth in the APA *Publication Manual*.

Learner name and date: Stacy Boyer-Davis 10/20/2014

Mentor name and school: Martha Hollis, Ph.D., School of Business and Technology

APPENDIX B. SURVEY INSTRUMENT

Demographic Questions

1. What is your age?
2. What is your gender?
    a. Male
    b. Female
    c. I do not want to respond to this question.
3. Please select the highest level of education completed.
    a. Less than High School
    b. High School Diploma
    c. Associate Degree
    d. Bachelor Degree
    e. Master's Degree
    f. Doctorate or other advanced degree
    g. Other (please describe)
4. Please select the years of experience in information technology management.
    a. Less than 1 year
    b. 1 to 5 years
    c. 6 to 10 years
    d. 11 to 15 years
    e. 16 to 20 years
    f. More than 20 years
5. Please select the years of experience at your current organization.
    a. Less than 1 year
    b. 1 to 5 years
    c. 6 to 10 years
    d. 11 to 15 years

e. 16 to 20 years

f. More than 20 years

Technostress and MLQ-5X instruments are not reproduced as part of this appendix due to copyright regulations.

Demographic survey designed by Boyer-Davis, 2014.