A STUDY OF PERFORMANCE AND EFFORT EXPECTANCY FACTORS AMONG GENERATIONAL AND GENDER GROUPS TO PREDICT ENTERPRISE SOCIAL SOFTWARE TECHNOLOGY ADOPTION

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Social software technology has gained considerable popularity over the last decade and has had a great impact on hundreds of millions of people across the globe. Businesses have also expressed their interest in leveraging its use in business contexts. As a result, software vendors and business consumers have invested billions of dollars to use social software to improve business and employee productivity.

The purpose of this study was to provide insights to business leaders and decision makers as they shaped their enterprise social software (ESS) delivery plans. A vast body of information exists on the benefits of ESS and its technical implementation, but little empirical research is available on employees' perceptions of ESS expectancy factors (i.e. usefulness and ease of use). This study focused on IT managers' perceptions of ESS expectancy factors to understand their behavioral intent to adopt ESS technology. Additional research was performed to uncover relationships and differences between IT Managers' adoption intentions and employee age, gender, and generational groups.

Survey results were analyzed using a correlation research design and demonstrated significant relationships were found between IT managers' expectancy factors and their behavioral intent to adopt ESS technology. Differences were also demonstrated between IT managers' age, gender, and generational cohort groups. The results of this research should help business leaders gain insights into technology adoption factors among IT managers. Lastly, the practical applicability and opportunities for future research are discussed.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Social software technology has had a great impact on hundreds of millions of people across the globe. Web sites based on social software technology, such as Facebook and Wikipedia, provide a medium for users to interact with each other and with groups of individuals. While social software technology is not new, it has gained considerable popularity in the last decade. Businesses have also expressed their interest in leveraging social software to support employee and organizational productivity. As a result, software vendors and business leaders have invested billions of dollars in developing their social software applications, infrastructure, and presence aimed at enhancing business and employee productivity.

Market demand for social software developers and vendors is expected to increase at a compounded rate of 13.7% through 2014 (Gartner, 2010). This indicates increased market potential for its sales and the value it can bring to business productivity and organizational results. Given that social software technology is relatively young and rapidly evolving at the time of this study, little research literature exists on its adoption factors.

Background

Social software technology has attracted hundreds of millions of people across the globe to the technology by facilitating collaboration among people and groups. While it can be argued that the concept has existed since the first two modern-day computers were networked, its implementation in major Web formats began appearing just over a decade ago, in 1997 (Boyd & Ellison, 2008), and has since gained considerable popularity. For

example, Facebook was launched in 2003, and as of December 2011, the site had more than 800 million active users, 50% of whom were logged in on any given day (Facebook, 2011). Wikipedia was launched in 2001, and just over a decade later it had over 16 million registered users with over 53,000 Web-requests, on average, per day (Wikipedia, 2011). Modern-day political movements – the 2011 Arab Spring revolutions and Occupy Wall Street demonstrations – leveraged social software technologies such as Twitter and Facebook to further communications among demonstrators and protesters (Howard et al., 2011).

This study focused on information technology (IT) managers' perceptions of social software usage in the enterprise; that is, the use of social software in business contexts. Regardless of the context of its use, personal or business, social software is an enabling tool or set of tools that facilitates collaboration through "the creation and exchange of user generated content" (Kaplan & Haenlein, 2010, p. 61) built on Web 2.0 patterns (Boyd & Ellison, 2008). These Web 2.0 patterns provide a technology framework upon which collaborative applications can be built for Internet and intranet communication among businesses, employees, business partners, vendors, families, friends, and other groups and individuals.

Social software provides a network-based application platform enabling users to interact with each other and with groups of individuals. It allows individuals to invite friends and colleagues to join their personal or group networks and share information profiles with others (Boyd & Ellison, 2008). By providing the means to interact and collaborate, the software itself furthers collaboration toward user-generated content (Kaplan & Haenlein, 2010; Shirkey, 2003). For example, Wikipedia had over 26 million

wiki pages in 2011; over 3.8 million of those wikis were almost completely written/edited by its users and volunteers on the Internet who contributed their intellectual capital without payment.

Andrew McAfee of Harvard Business School coined the term *Enterprise 2.0* in 2006, which is essentially built on the Web 2.0 technology framework. McAfee defined Enterprise 2.0 as the "use of emergent social software platforms by organizations in pursuit of their goals" (A. McAfee, 2009; A. P. McAfee, 2006). It has since gained considerable acceptance by industry experts and researchers (A.P. McAfee, 2006; Cook, 2008; van Zyl, 2009; Warr, 2008) and is now commonly referred to as the business platform for collaboration over the intra/Inter-net. With the shift and trend toward Web 2.0-enabled technology, industry leaders and researchers have sought to identify applications of social software in business (Gartner, 2010; Traudt & Vancil, 2011).

Enterprise 2.0 has many names – E2.0, Enterprise Web 2.0 and social business – among other variations. The terminology this study used to describe Enterprise 2.0 software technology was enterprise social software (ESS). That is, software application(s) used in business contexts whose capabilities include the collaborative nature inherent to Web 2.0 consumer-based social software such as Facebook, Blogger, and Wikipedia, but are used by companies and their employees toward improving business results or meeting goals set by the organization (A. McAfee, 2009). Several examples of ESS tools include wikis, social bookmarking, virtual communities, blogs, forums, mashups, and social profiles (Cook, 2008; A. McAfee, 2009). ESS technologies can be leveraged in organizations across any industry toward improving the sharing and visibility of ideas, expertise, and content across an organization (Cook, 2008; A. McAfee, 2009; A. P. McAfee, 2006).

Within the firewalls of business, user computing and spending on IT has steadily increased, prompting businesses to investigate the impact of innovations in IT and employee acceptance toward increases in productivity and effectiveness (Igbaria & Tan, 1997; Klaus, Wingreen, & Blanton, 2007). As a result, many ESS vendors have developed packaged and/or customized offerings comprised of one or more ESS technologies.

Need for the Study

In 2011, International Data Corporation reported, "The rise in consumer-oriented social networking applications and platforms over recent years has drawn curiosity from enterprises both large and small" (Traudt & Vancil, 2011, p. 1). The trend had effectively blurred the lines between consumer use of social software and business use. Business professionals and executives noticed the potential for harvesting the knowledge of the masses within their organizations to create business value, and in 2007, Gartner recommended that businesses develop and evolve their social software business plans. Research performed by Skeels and Grudin (2009) found that the use of social networking software by professionals in the corporate environment had increased dramatically. This trend was reiterated in 2011 when Gartner stated that social software "will replace e-mail as the primary vehicle for interpersonal communications for 20 percent of business users by 2014."

This shift is unlikely to occur automatically. A key ingredient necessary for this change is centered on employee adoption and usage of the enterprise social software systems. Technology adoption is a critical success factor for successful IT implementation and rollout (Saleem, 1996), and this is especially true in the case of ESS (A. P. McAfee,

2006). Decreased adoption, in turn, had the potential to also decrease the level of success sought from a given ESS implementation.

Of the research and material available, much of the information focused primarily on describing social networking, its workings and relevance (van Zyl, 2009). While the benefit and value statements concerning social networking and social software often appealed to business leaders, many companies expressed skepticism on the collaborative impact that ESS might have in their organization. Numerous studies have shown that merely making technology available will not necessarily produce changes in established employee collaboration practices unless employees find it to be a useful tool in their jobs (Davis, 1989; Mithas, Costello, & Tafti, 2011; Traudt & Vancil, 2011). In essence, if a technology is not useful or easy to use as perceived by users, adoption (actual usage) will be reduced (Davis, 1989).

Many studies and industry articles are focused on ESS benefits, its internal software workings, or its technical implementation, but little information exists on employee perceptions of ESS technology adoption factors. This study adds information to the field on IT managers' perceptions of ESS technology acceptance. It parallels a body of existing research related to software and systems technology acceptance in the consumer and business contexts; however, research related to managers' perceptions of social software and ESS technology adoption for use in the context of business was still lacking. This study can also provide insight into managers' perceptions of ESS technology acceptance factors based on differing employee generational groups and gender types.

McAfee identified six key features that comprise ESS technology and center on search, links, authoring, tags, extensions, and signals (A. McAfee, 2009). These features

(see Table 1) were tenets of Enterprise 2.0 and formed the foundational characteristics of ESS technologies as identified by McAfee (2006, 2009). They supported reciprocal information exchanges among employees in the direction of achieving common goals (Ferreira & Du Plessis, 2009; Green & Pearson, 2005).

Table 1

Enterprise Social Software Technology Examples and Core Framework of Features

ESS examples	Feature	Description
Blog, Wikis, RSS, Mashups, Social Bookmarking, Collaborative Filtering, Social Networking, Social Network Analysis	Search	Finding information through keyword search.
	Links	Connects information together into a meaningful information ecosystem using the model of the Web
	Authoring	The ability to create and update content leads to the collaborative work of many rather than just a few web authors. In wikis, users may extend, undo and redo each other's work. In blogs, posts and the comments of individuals build up over time.
	Tagging	Categorization of content by users adding semantic tags to facilitate searching, without dependence on pre-made categories
	Extensions	Software that is extensible and allowing the network to act as an application platform and a document server
	Signals	The use of syndication technology such as Rich Site Summary (RSS) to notify users of content changes

Note. Adapted from A. P. McAfee (2006), A. McAfee (2009).

The single most important and distinctive feature of all Web 2.0 and ESSs was that value was derived and controlled through end-user-generated content and their behavioral action of using the software. That is, the more an ESS system was used, the more valuable it became, commonly referred to as the w*isdom of the crowds* or *knowledge of the masses*. In the context of ESS, this sharing and reciprocal information exchange assisted employees in achieving common goals (Ferreira & du Plessis, 2009; Green & Pearson, 2005).

As noted earlier, technology adoption was a critical success factor in maximizing the intended success sought from a technology implementation. But what motivated employees to adopt and use ESS technology? Kaiser, Müller-Seitz, Pereira Lopes, and Pina e Cunha (2007) argued that "individual motivation is a precondition for the active participation in practice" (p. 393) suggesting that employee motivation stems from the need to a) having a problem, b) solving the problem, and c) communicating the results. Gherardi (2003), on the other hand, believed that knowledge in itself motivates individuals to communicate their contributions, precluding the need for a problem. According to Ryyppo (2007), both of these effects can be amplified with ESS and its inherent characteristics of employee-driven, bottom-up dynamics (see Table 2). These motivations accounted for employee involvement in communities, collaboration, and knowledge distribution and acquisition.

Theoretical Framework

The theoretical framework was based on the technology acceptance model (TAM), as shown in Figure 1. TAM, as a model, was intended to provide predictive model of end-user uptake (acceptance) of information technology through three core constructs: (a) performance expectancy (usefulness), the degree to which an individual believes that using the system will help one attain gains in job performance; (b) effort expectancy (ease of use), the degree of ease associated with the use of the system; and (c) behavioral intention to use, the degree to which an individual has formulated conscious plans to perform or not perform some specified future behavior.

Table 2

Areas of Application and Implications for Using Social Software in an Organization

Area of application	Implications
Human networks and communities	Better support for relationships and joint activities Improved information sharing Increased accessibility to and availability of people Support and facilitation of informal networks and communities of practice
Communication and interaction	Accelerated and amplified communication flow Support for interaction processes Improved information sharing and learning Increased access to and awareness of a strong community Increased awareness and understanding of the importance of sharing in networking Increased understanding of use of information technology for interaction
Knowledge	Increased ability to effectively apply existing knowledge to create new knowledge and to take action Rapid mobilization of knowledge

Note. Adapted from Ryyppo (2007).

The overall framework for this study extended TAM, as illustrated in Figure 2, and described the relationship between TAM constructs, generational groups, and gender types. The proposed framework theorized that the technology acceptance factors differed between employee generational groups and gender types. The constructs of TAM reflected in this study included perceived usefulness (PU), perceived ease of use (PEOU), and behavioral intention (BI) to use ESS technology.

TAM was designed for the context of IT to measure employees' perceptions of a technology's usefulness, ease of use, and behavioral intention to use the technology as determinants of predicting actual system/technology adoption. It has been used to gain insights into employees' effectiveness (usefulness of the technology) resulting from the

introduction of IT tooling in their jobs. It has also assisted business leaders to better determine whether or not the consequences of IT acceptance added value to the business (Igbaria & Tan, 1997) through enhancements in employee effectiveness (Yi & Hwang, 2003).

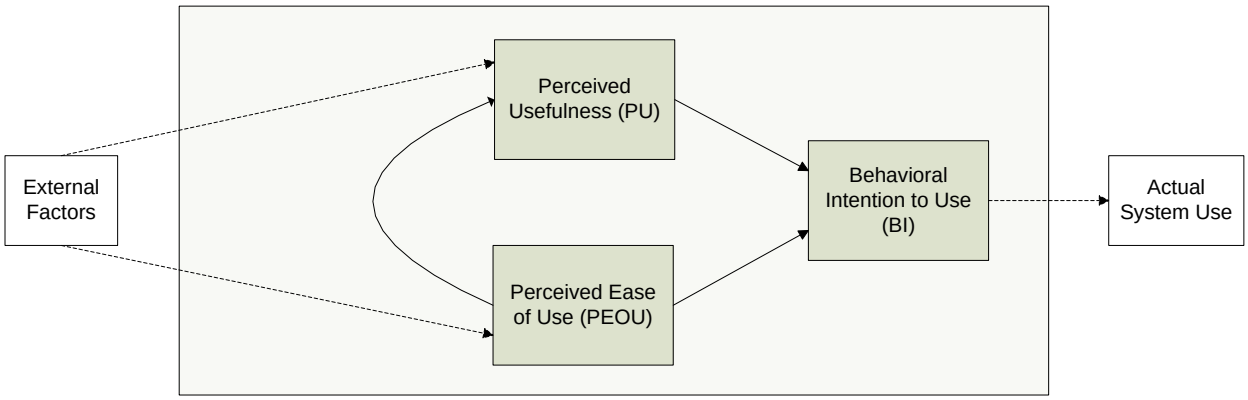

Figure 1. Technology acceptance model. Adapted from Davis and Venkatesh (1996), p. 20.

Technology Acceptance Factors (Research Question 1)

The theoretical framework of this study was based on the constructs of perceived usefulness (PU), perceived ease of use (PEOU), and behavioral intention (BI) to use a system. Davis (1989) described PU and PEOU as determinants impacting BI to use a system toward predicting actual system use. Actual system use was a direct function of perceived BI, where BI was a weighted function of PU and PEOU. Additionally, Davis suggested that PU was influenced by PEOU and that PU and PEOU were jointly influenced by external factors (antecedents).

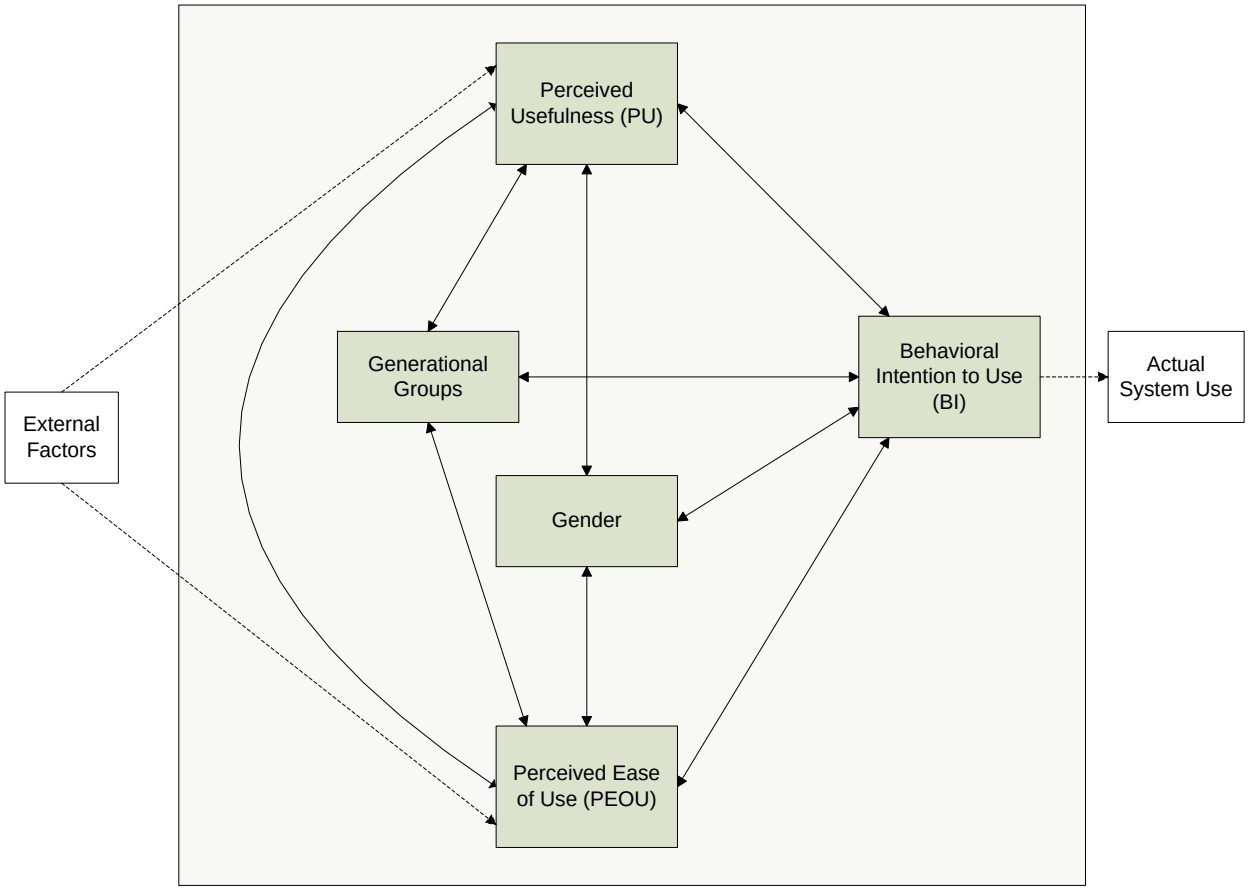

Figure 2. Theoretical framework – modified technology acceptance model. Adapted from Davis and Venkatesh (1996), p. 20.

Fishbein and Ajzen's (1975) theory of reasoned action (TRA) also supported "predicting information technology acceptance and usage on the job" (Venkatesh, Morris, Davis, & Davis, 2003, p. 428) although TAM constructs were "better suited to Internet technology" (C. Yang, Hsu, & Tan, 2010, p. 142). The key differences between TAM and TRA were that TAM did not include TRA's subjective norm component as a determinant of BI because it was difficult to decouple direct effects of the subjective norm (SN) on BI to use a given information technology system (Davis, Bagozzi, & Warshaw, 1989).

Age, Generation, Gender Factors (Research Questions 2, 3, and 4)

The TAM framework provided the basis for measuring other external variables as well. For example, experience, education level, income, and social influence could be added as antecedents impacting PU and PEOU. This study included the antecedents of employee age and gender. Morris and Venkatesh (2000) suggested that there was a "clear difference with age in the importance of various factors in technology adoption and usage in the workplace" (p. 392). Chung, Park, Wang, Fulk, and McLaughlin (2010) suggested that while PU, PEOU, and BI have been widely tested and accepted toward determining technology acceptance, moderators, such as age and gender, have remained largely untested. Moreover, it could be theorized that rapid enhancements and developments in IT led to increased disparity between generations, as purported by Chung et al. (2010).

Both age and gender have shown to be moderators to PU, PEOU, and BI as per previous studies as related to overall technology acceptance (Gefen & Straub, 1997; Gilroy & Desai, 1986; Jones & Fox, 2009; Morris & Venkatesh, 2000; Venkatesh & Morris, 2000). Gender differences indicated that PU had higher salience for males than females (Minton & Schneider, 1980), whereas PEOU had higher salience for females than males (Venkatesh & Morris, 2000). Morris, Venkatesh, and Ackerman (2005) found age and gender to be significant moderators of PU, PEOU, and BI while the Chung et al. (2010) findings indicated the potential danger of an increased digital divide between generations given the increased rate of technological evolution.

Purpose of the Study

This study examined IT managers' perceptions of ESS technology acceptance factors as determinants to predict ESS technology adoption. The research analysis added

information to the field on managers' perceptions of ESS technology's perceived usefulness and ease of use stratified by differing generational groups and gender types. It also provided insights to business leaders / executives as they shape ESS delivery plans based on findings from this study concerning potential differences in generational groups and gender types. The target population included IT managers in the United States where ESS technology was available to use or may have become available for use in their jobs.

Research Hypotheses

This study aimed to examine the following research questions and hypotheses:

Technology Acceptance Factors (i.e., Usefulness, Ease of Use, and Behavioral Intent)

1. Is there a relationship between variables of IT managers' behavioral intention to use ESS technology, perceived usefulness, and perceived ease of use?

   H_o1a: *There is no statistically significant relationship between IT managers' perceived behavioral intention to use ESS technology and variables of perceived usefulness and perceived ease of use.*

   H_o1b: *IT managers' perceived ease of use is not positively related to perceived usefulness.*

Generational Groups

2. Is there a relationship or difference between IT managers' age and generational groups and the variables of perceived usefulness, perceived ease of use, and behavioral intention to use ESS technology?

   H_o2a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, and age.*

   H_o2b: *There is no statistically significant difference between IT managers' generational groups and the variables of perceived ease of use, perceived usefulness, and behavioral intention to use ESS technology.*

Gender Groups

3. Is there a relationship or difference between IT managers' gender and the variables of perceived usefulness, perceived ease of use, and behavioral intention to use ESS technology?

   H_o3a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, and gender.*

   H_o3b: *There is no statistically significant difference between IT managers' gender and the variables of perceived ease of use, perceived usefulness, and behavioral intention to use ESS technology.*

All Constructs and Mediators

4. Is there a relationship or difference between IT managers' behavioral intention to use ESS technology and the variables of age, gender, perceived usefulness, and perceived ease of use?

   H_o4a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, age, and gender.*

   H_o4b: *There is no statistically significant difference between IT managers' generational groups and gender types and the variables of perceived usefulness, perceived ease of use, and behavioral intention to use ESS technology.*

Limitations

1. ESS technology that contains bugs impacting employee experience may differ between managers.
2. Company policies regarding appropriate use and restrictions on usage of enterprise social software may differ between companies and organizations.
3. Company culture, employee attitudes, and other subjective norms may differ between participants in this study.

4. The amount of functionality and capabilities are likely to differ among ESS vendor solutions.
5. Many combinations of ESS technologies can be implemented in an organization. This study focuses on IT managers who have access to or may in the future have access to ESS technology in their job.
6. The managers may or may not be tech-savvy.
7. Management perceptions of ESS technology acceptance, usefulness (on-the-job performance), or ease of use may or may not be actual effects of ESS technology.
8. Participant voluntary-use versus mandatory-use of ESS technology may differ between companies and participants.

Delimitations

1. Vendor software offerings may be custom built and vary among the companies. This study was based on employee perceptions of ESS technologies being used (or would be available to use) in business contexts.
2. This study examined generational differences between Baby Boomers, Generation X, and Generation Y. The Silent Generation and New Boomers are not covered in this study.

Definitions of Terms

Baby Boomers: A generation of individuals categorized as having been born between 1943-1960 (Strauss & Howe, 1997).

Effort expectancy: The "degree of ease associated with the use of the system" (Venkatesh et al., 2003, p. 450).

Enterprise 2.0: The "use of emergent social software platforms by organizations in pursuit of their goals" and objectives (A. McAfee, 2009; A.P. McAfee, 2006).

Enterprise social software (ESS): The terminology used to describe Enterprise 2.0-based social software technology.

Generation: Defined as "a cohort-group whose length approximates the span of a phase of life and whose boundaries are fixed by peer personality" (Strauss & Howe, 1994, p. 60; Strauss & Howe, 1997).

Generation X: A generation of individuals categorized as having been born between 1961-1981 (Strauss & Howe, 1997).

Generation Y: A generation of individuals categorized as having been born between 1982-2004 (Strauss & Howe, 1997).

Peer personality: Defined as "a generational persona recognized and determined by (1) common age location; (2) common beliefs and behavior; and (3) perceived membership in a common generation" (Howe, 2012).

Performance expectancy: The "degree to which an individual believes that using the system will help him or her attain gains in job performance" (Venkatesh et al., 2003, p. 447).

Theory of reasoned action: Fishbein's theory of reasoned action (TRA), a model "designed to explain virtually any human behavior" (Ajzen & Fishbein, 1980, p. 4).

Summary

This chapter provided background, significance of the study, and the theoretical framework describing how this study contributes to the existing body of knowledge. This study examined IT managers' perceptions of ESS technology acceptance factors as

determinants in predicting ESS technology adoption. The study also examined relationships and differences between technology acceptance factors and IT manager age, generational groups, and gender types. Chapter 1 in this study identified the research questions and hypotheses investigated and included limitations, delimitations, and definitions of important terms used throughout. Chapter 2 provides a review of research literature relevant to this study.

CHAPTER 2

LITERATURE REVIEW

Overview

This study examined information technology (IT) managers' perceptions of enterprise social software (ESS) technology acceptance factors as determinants in predicting ESS technology adoption. The study also examined relationships and differences between technology acceptance factors and IT managers' age, generational groups, and gender types. The literature review focused on technology acceptance factors of perceived usefulness (PU), perceived ease of use (PEOU), and behavioral intention (BI) to use as relevant to ESS technology adoption. Additionally, the review examined differences between these factors and differing employee generational groups and gender types. In the sections to follow, the review of existing research is presented to support the proposed framework factors as related to social software and ESS technology (see Figure 2).

The study of IT acceptance began in 1975 with the work of Robey and was refined by Davis (1989). Robey (1979) theorized that "a system that does not help people perform their jobs is not likely to be received favorably in spite of careful implementation efforts" (p. 537) and was more likely to result in decreased employee on-the-job performance and system usefulness. This was referred to as *performance expectancy*, otherwise stated as *usefulness*, or PU. In contrast, "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320) referred to *effort expectancy*, otherwise stated as *ease of use*, or PEOU.

Davis (1989) and Davis and Venkatesh (1996) suggested that individuals are more apt to use or not use technology to the extent that it would (a) be useful, thereby helping

them perform their job more effectively, and (b) be easy to use. Researchers have long argued that technology acceptance factors, PU and PEOU, when related to BI, perform as strong predictors of actual technology adoption (Davis, 1989; Davis & Venkatesh, 1996; Venkatesh et al., 2003).

Research Questions

The pace at which ESS evolved in the first years of the 21st century was profound. Several industry research and advisory firms emphasized the importance of ESS technology in supporting strategic business goals (Gartner, 2010; Koplowitz, 2011; Traudt & Vancil, 2011). Given this shift and software evolution, how do employees perceive ESS's usefulness and ease of use, and do employees intend to use it if ESS is (or were made) available in their jobs? Furthermore, how do these perceptions differ between employee age and gender when compared with ESS technology usage? This study provides insights into these areas by examining and answering the following research questions.

Technology Acceptance Factors

1. Is there a relationship between variables of IT managers' behavioral intention to use ESS technology, perceived usefulness, and perceived ease of use?

Generational Groups

2. Is there a relationship or difference between IT managers' age and generational groups and the variables of perceived usefulness, perceived ease of use, and behavioral intention to use ESS technology?

Gender Groups

3. Is there a relationship or difference between IT managers' gender and the variables of perceived usefulness, perceived ease of use, and behavioral intention to use ESS technology?

All Constructs and Mediators

4. Is there a relationship or difference between IT managers' behavioral intention to use ESS technology and the variables of age, gender, perceived usefulness, and perceived ease of use?

Technology Acceptance Factors

Several studies documented the use of PU, PEOU, and BI as factors measuring technology acceptance and its validity in the context of IT and social software (Adams, Nelson, & Todd, 1992; Davis, 1989, 1993; Davis et al., 1989; Davis & Venkatesh, 1996; Lou, Luo, & Strong, 2000; Mathieson, 1991; Szajna, 1994, 1996; Taylor & Todd, 1995a, 1995b; Venkatesh & Davis, 2000). In one such study, Lane and Coleman (2011) assessed the perceived usefulness and ease of use of social software technology in a university setting. This study found for validation of the technology acceptance factors (PU, PEOU, BI), and the authors found that "higher perceived ease of use leads to higher perceived usefulness and more intensity in the use of the social media" (p. 7). That is, the easier it was for students to use the social software, the more useful it became to perform tasks/activities, suggesting usefulness was a mediator as illustrated in Figure 3.

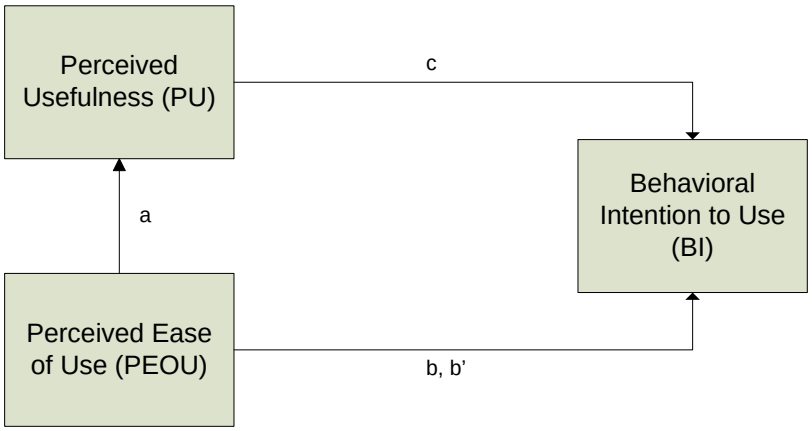

Figure 3. Mediation model. Adapted from Baron and Kenny (1986), p. 1176.

In voluntary-use settings, a similar mediator relationship was found when PEOU was the primary determinant of an individual's behavioral intention to adopt a system, with PU as a significant secondary determinant. This was aligned with many findings from prior research in voluntary-use settings where usefulness of IT emerged as the primary antecedent to BI (Davis, 1993; Venkatesh, 1999). In another study, conducted by Brown, Massey, Montoya-Weiss, and Burkman (2002) in the case of a mandatory-use setting, the researchers studied the mandatory adoption of new technology to replace an older system at a $5 billion multi-bank holding. The Brown et al. study also resulted in support of the relationships of PU and PEOU as determinants of BI. Similar to the study by Davis (1993) and Venkatesh (1999), PEOU was the primary determinant of BI, with PU as a significant secondary determinant.

There is potential, however, for a reverse relationship between PEOU and PU, contradicting PU as a mediating variable. Additionally, when individuals must perform specific behaviors, the importance of users' beliefs about an IT's ease of use and usefulness was more likely to be minimized, while the behavioral intention to use the system was

inflated, indicating that users may not have wanted to perform the mandated behavior but did it anyway (Brown et al., 2002). This further suggested that usefulness and ease of use measurements remained intact for both mandatory-use and voluntary-use environments, although the mediating factor may have differed between the two environments.

Employee effectiveness and ESS

Employees' effectiveness remains a key concern for businesses and is unlikely to decrease in importance. In the context of computing technology, if business value is not derived from a system, why invest in acquiring it? This was a driving factor in Lehr and Lichtenberg's (1999) study to address IT and its impact on business and employee productivity. The data set analyzed consisted of U.S. firm-level computer assets and financial data for non-agricultural firms during the period 1977-1993. Their findings showed that personal computers contributed positively to productivity growth and "yielded excess returns" (p. 335) relative to other types of capital investment over the 16-year period. A report released by Forrester research, Koplowitz (2011, p. 2) stated the following:

> [Sixty-four percent] of senior business leaders say that growing overall company revenue is their top priority in 2011. How do they intend to do it? More than half point to new customer acquisition; acquiring and retaining top talent ranks third on their list; and one in three look to improve overall customer relationships.
>
> These lofty business goals often trickle down to IT initiatives that use enterprise social technologies. In fact, Forrester's technology adoption surveys point to a shift in software investment growth from more mature software categories — like enterprise resource planning (ERP), human capital management (HCM), and supply chain management (SCM) — to more people- or network- centric software. Consider that 37% of IT decision-makers plan to implement or expand the use of collaboration tools in 2011 compared with 25% or less who are planning investments in ERP, HCM, product life-cycle management (PLM), and SCM app categories. The client interest in social platforms is fueled by three factors:
>
> - The desire to capture and re-use knowledge.

- The need to maintain human connections across a disparate workforce.
- The pressure to modernize systems to meet new workforce demands. (p. 2)

In the case of ESS, International Data Corporation (Traudt & Vancil, 2011) and Gartner (2010) also conducted market research, finding that social software technology had the potential to create significant business returns through a positive impact on employee productivity.

Generational Differences in Technology Acceptance

Generational differences in the workplace have been studied for decades. Strauss and Howe (1994) theorized that there are patterns to each new generation. They defined a generation as "a cohort-group whose length approximates the span of a phase of life and whose boundaries are fixed by peer personality" (p. 60). They also defined a peer personality as "a generational persona recognized and determined by (1) common age location; (2) common beliefs and behavior; and (3) perceived membership in a common generation" (p. 64). The generations included in this study are shown in Table 3 alongside their associated characteristics. These strata indicated that employees can be grouped according to characteristics of generation and that motivations on usage of IT differed among generational groups.

Research continued in an attempt to determine how businesses and individuals responded to different generations. Based on a study conducted by Morris and Venkatesh (2000) on age difference in technology adoption decisions, there is a "clear difference with age in the importance of various factors in technology adoption and usage in the workplace" (p. 392). This suggested that when introducing new technology, training programs should be structured with generational groups in mind because each group's traits were different.

That is, a one-size-fits-all approach to marketing the new application needed to be tailored based on differing generational audiences.

Table 3

Comparison of Generations

Generation	Birth year	Identifying traits and values	Influential worldly situations
Silent Generation	1925-1942	Security (high priority) Risk avoidant, responsible Hardworking, dependable Fiscally conservative	Great Depression World War II
Baby Boomer	1943-1960	Value teamwork, group work Company commitment, loyalty Individualistic, competitive High work ethic Need to succeed	"Period of unprecedented prosperity and affluence that followed WWII" (Parker and Chusmir, 1990)
Generation X	1961-1981	Value autonomy Independence Open communication Balanced work/life Personal goals and values rather than career Skeptical, reluctant to take on leadership roles	"Periods of economic prosperity and distress (early 1980's recession and downsizings) and family disruption (high divorce rate for parents) during formative years" (Kupperschmidt, 2000)
Generation Y	1982-2004	Tech savvy Embraces change Collaborative Strong work ethic Entrepreneurial spirit	September 11 / war in Iraq and Afghanistan Economic recession

Note. Adapted from Whitman (2010).

In numerous surveys and studies, the aging workforce remained a key topic of discussion. In 2003, Workforce Management included 3 of its 25 key forecasted trends which were directly related to the retirement of Baby Boomers. The Society for Human Resource Management's SHRM Workplace Forecast (2008) report stated as its number 2 trend: "large numbers of Baby Boomers (1943-1960) retiring at around the same time" (p. 6). This trend was at the core of numerous forecasts and reports. For example, the U.S. Census Bureau estimated Baby Boomers to be almost 83 million individuals (L'Allier & Kolosh, 2007). As this shift of retirement occurs, businesses need to consider the differing needs and/or requirements of the new demographic(s) entering the workforce, as suggested by Morris and Venkatesh (2000); for example: (a) increased use of technology for new generation of workforce; (b) more hands-on performance simulations, and (c) coaching/ mentoring as a form of employee development and career growth.

Gender Differences and Technology Acceptance

Several studies have examined gender difference as related to technology acceptance factors (Chung et al., 2010; Gefen & Straub, 1997; Morris et al., 2005; Terzis & Economides, 2011; Venkatesh & Morris, 2000; Wattal, Racherla, & Mandviwalla, 2009). Little empirical evidence existed, however, on the topic of gender differences in the context of IT or information systems technology adoption. One of the first studies conducted on the influence of gender on technology acceptance was performed by Gefen and Straub in 1997. They suggested that the effects of gender differences on usefulness and ease of use were well established in areas other than IT, and they therefore hypothesized that gender could have similar differences in the case of e-mail technology adoption. The results of their

1997 study suggested that gender differences existed on the acceptance of e-mail technology.

A longitudinal study conducted by Venkatesh and Morris (2000) explored the role of gender in initial technology acceptance decisions. They posited that gender differences existed and that even "during the earliest stages of technology introduction, users are making an acceptance decision" (p. 117), which has been known to differ from usage decisions over a longer period of time (Davis et al., 1989). Their findings also supported previous literature indicating that men are more task oriented than women (Minton & Schneider, 1980) and therefore usefulness of a technology has greater salience to men than to women (Venkatesh & Morris, 2000; Venkatesh et al., 2000; Wattal et al., 2009). On the other hand, ease of use was found to be more salient to women. Minton and Schneider (1980) also found that men's assessment of ease of use of the system went up somewhat with time/experience and further highlighted that usefulness is more salient to men; however, women's ease of use of technology went down with more time/experience. The same pattern held true for long-term technology acceptance decisions as well, thus providing "compelling evidence for the notion that gender plays a vital role in shaping initial and sustained technology adoption decisions" (Venkatesh & Morris, 2000, p. 129).

Summary

The aim of this study was to examine employees' perceptions of technology acceptance of ESS technology as a determinant to technology adoption. It also examines how employees of differing generational and gender groups perceive the impact on their on-the-job performance. This chapter provided a review of the literature to gain greater insight into (a) information technology acceptance, adoption, and impact on employee

effectiveness, and (b) generational and gender differences as related to technology acceptance factors. Chapter 3 provides the research methodology of this study.

CHAPTER 3

METHODOLOGY

Overview

The purpose of this study was to examine information technology (IT) managers' perceptions of enterprise social software (ESS) technology acceptance factors (PU, PEOU, and BI) as determinants in predicting ESS technology adoption. The study also examined how employees of differing generational groups and gender groups perceived ESS usefulness, ease of use, and the behavioral intention to use ESS technology. This chapter provides the research questions, research design, target population, instrumentation, data collection procedures, and data analysis process.

Research Questions

This study examined the following research questions and hypotheses:

Technology Acceptance Factors

1. Is there a relationship between variables of IT managers' behavioral intention to use ESS technology, perceived usefulness, and perceived ease of use?

   H_o1a: *There is no statistically significant relationship between IT managers' perceived behavioral intention to use ESS technology and variables of perceived usefulness, and perceived ease of use.*

   H_o1b: *IT manager perceived ease of use is not positively related to perceived usefulness.*

Generational Groups

2. Is there a relationship or difference between IT managers' age and generational groups and the variables of perceived usefulness, perceived ease of use, and behavioral intention to use ESS technology?

H_o2a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, and age.*

H_o2b: *There is no statistically significant difference between IT managers' generational groups and the variables of perceived ease of use, perceived usefulness, and behavioral intention to use ESS technology.*

Gender Groups

3. Is there a relationship or difference between IT managers' gender and the variables of perceived usefulness, perceived ease of use, and behavioral intention to use ESS technology?

   H_o3a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, and gender.*

   H_o3b: *There is no statistically significant difference between IT managers' gender and the variables of perceived ease of use, perceived usefulness, and behavioral intention to use ESS technology.*

All Constructs and Mediators

4. Is there a relationship or difference between IT managers' behavioral intention to use ESS technology and the variables of age, gender, perceived usefulness, and perceived ease of use?

   H_o4a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, age, and gender.*

   H_o4b: *There is no statistically significant difference between IT managers' generational groups and gender types and the variables of perceived usefulness, perceived ease of use, and behavioral intention to use ESS technology.*

Research Design

This study used a correlation research design and gathered information from the target population over a single period of time. The survey methodology described views of

employees across generational groups and gender types on their perceptions of ESS technology usefulness, ease of use, and behavioral intention to use ESS technology as determinants in predicting adoption, or actual system use. The survey instrument gathered data on variables of perceived usefulness (PU), perceived ease of use (PEOU), behavioral intention (BI) to use the system, employee age, and gender.

This research study included six variables during analysis. Given the research design and model selected in this study, PU and PEOU were perceived determinants of BI. Two additional variables included age and gender, which acted as control variables. The sixth variable was generational group, a categorical variable made up of Baby Boomers, Generation X, and Generation Y, which was calculated using the age variable during data analysis. Table 4 identified the variable types, measurements, and hypothesis mapping.

The research design used in this study was similar to a cross-sectional research design which allowed data to be collected in a shorter period of time versus a longitudinal study (Gall, Gall, & Borg, 2003). This design fit well by contributing a snapshot of IT managers' perceptions of ESS technology acceptance. Given that the data collection occurred within a short timeframe, sample attrition was not an issue. However, there were other threats to consider, such as threats to internal and external validity. Internal validity refers to the extent to which extraneous variables are controlled such that any changes to the dependent variable are attributed solely by the independent variable or treatment (Gall et al., 2003). External validity refers to the generalizability of research findings to other settings and populations. Campbell, Stanley, and Gage (1963) provided 12 factors affecting internal validity and 10 factors affecting external validity.

The correlation research design used in this study was anticipated to have more success than other research designs toward achieving greater generalizability given the study's similarity to the cross-sectional design (De Vaus, 2001). DeVaus (2001) stated the following:

> Experiments encounter problems with representativeness for two main reasons. They often ask more of people than do one-off cross-sectional studies. They also involve active interventions and therefore have to rely on volunteers and availability samples. They consequently lack representativeness. Even where representative samples are obtained initially this can be lost as people drop out over the course of the experiment. (p. 184)

According to Gall et al. (2003), one major problem is the effect of changes that occur in the population over a period of time. However, this was not an issue for this study given that all data were collected within 7 days. Despite the correlation research design's advantages, it had exposure on internal validity (Babbie, 1973) due to the potential confounding effects of extraneous variables. However, this risk was controlled and minimized by having selected a homogeneous population (Reynolds, Simintiras, & Diamantopoulos, 2003).

The correlation research design was selected for this study because it was the most effective way to obtain descriptive data in a short timeframe. With the similarity to a cross-sectional design, it was also the best way to determine prevalence (Mann, 2003, p. 57). Experimental research designs were considered but not selected given that (a) this study did not intend to perform causal analysis and (b) generalizability might be decreased due to the highly controlled nature of experimental research designs.

Sampling

The target population for this study included IT managers in the United States. According to the U.S. Department of Labor, Bureau of Labor Statistics (2011), the total estimated population of workers in management occupations exceeds 6 million workers

across all industry sectors in every state and the District of Columbia. Of these workers, 288,660 are classified as computer and information systems (CIS) managers and account for almost 5% of all management occupations in the United States. Chief executives as defined by the Bureau of Labor Statistics were not included in the 288,660 worker count given the following: (a) They were tracked separately from CIS managers, and (b) a breakdown of chief executives in IT versus chief executives in other industry segments was unavailable.

This study's target population included IT managers (and executives) in the United States where ESS technology was available to use or had the potential to become available for use. Given that there were over 288,660 CIS jobs alone (not including chief executives), the minimum sample size, according to Krejcie and Morgan (1970), was 384, based on factors of alpha set to .05; power set to .80. The sample was obtained through an online panel research survey firm via a Web survey. The study required a response rate of less than 1% of the population, which was likely attainable through methods outlined in the Data Collection section.

Instrumentation

This study was based on a correlation research design and utilized the Perceived Usefulness and Ease of Use instrument originally developed by Davis (1989) and later revised by Davis and Venkatesh (1996). The instrument was designed to predict and explain user acceptance of IT and was widely used by researchers and practitioners for many areas of software, hardware, and Web (network) technologies. It included three constructs/variables, perceived usefulness (PU), perceived ease of use (PEOU), and behavioral intention (BI) to use. PU and PEOU were significantly correlated with BI and

acted as determinants in actual technology acceptance (Davis & Venkatesh, 1996). This study used a modified version of this instrument.

The original scale was developed by Davis in 1989 through a process that included two studies consisting of (a) pretesting and scale refinement, (b) retesting in a study with further refinement, (c) pretesting and scale refinement, and (d) retesting in another study. The same pattern of correlations was found in both studies where different technologies were tested for user acceptance. The instrument was further revised by Davis et al. (1989), resulting in a 10-item instrument. Reliability and validity remained consistent compared to Davis's original instrument (1989) as evidenced through numerous replication studies (Adams et al., 1992; Davis et al., 1989; Igbaria & Iivari, 1995; Hendrickson, Massey, & Cronan, 1993; Segars & Grover, 1993; Subramanian, 1994; Szajna, 1994). The revisions to the instrument preserved reliability and validity as was evident in the original instrument. Further research was performed on the instrument to determine whether item grouping had an effect on reliability and validity, and results showed that item grouping did not artificially inflate or deflate reliability or validity (Davis et al., 1989; Davis & Venkatesh, 1996). This study used the instrument as published by Davis and Venkatesh in 1996, with minor modifications to reflect the technology (i.e. ESS) surveyed by this study.

Reliability

Numerous replication studies have shown the Perceived Usefulness and Ease of Use scale to have high reliability (Adams et al., 1992; Davis, 1989; Davis et al., 1989; Davis & Venkatesh, 1996; Hendrickson et al., 1993; Igbaria & Livari, 1995; Segars & Grover 1993; Subramanian, 1994; Szajna, 1994). Cronbach's alpha in these studies has remained at over .90, indicating the high reliability of the instrument. Davis et al. (1989) performed a

study to assess differences in grouped versus intermixed ordering of items and found that Cronbach's alpha exceeded .95 in both groups for both scales. In the 1996 study performed by Davis and Venkatesh, reliability of intermixed versus grouped constructs based on three separate experiments also resulted in high Cronbach alpha's of .95, .90, and .90, respectively. In this study, reliability of the instrument was measured with Cronbach's alpha.

Validity

The Perceived Usefulness and Ease of Use scale also exhibited high discriminant and factorial validity (Adams et al., 1992; Davis, 1989; Davis et al., 1989; Davis & Venkatesh, 1996; Hendrickson et al., 1993; Igbaria & Livari, 1995; Segars & Grover 1993; Subramanian, 1994; Szajna, 1994). Based on Davis's 1989 study, PU was significantly correlated with both self-reported current usage and self-predicted future usage (r =.85), and PEOU was also significantly correlated with current usage and future usage (r =.59) at $p < .01$.

Instrument Description and Usage

The survey instrument data used in this study were comprised of 12 items. The first 10 items measured PU, PEOU, and BI. The remaining 2 items captured age and gender. Additional items were included in the instrument and data collected for future use. Construct items were kept intact to preserve instrument reliability although multiple studies have previously indicated that grouped items versus intermixed items did not affect the PU, PEOU, and BI constructs validity/reliability (Davis et al., 1989; Davis & Venkatesh, 1996). Construct items for PU, PEOU, and BI were measured with a 7-point Likert scale ranging from +3 (*strongly agree*) to -3 (s*trongly disagree*). The instrument was accessible on the Internet for the sample population who participated in the study.

Data Collection

Data were collected using a secure online survey application, Qualtrics.com. The online panel research service firm used was ResearchNow. ResearchNow was provided the requirement criterion of selecting only respondents currently employed as IT managers in the United States whose education minimally included a high school diploma or GED. Once the survey and respondent list were prepared, ResearchNow sent an invitation email to their panel member participants requesting voluntary participation in this study. The emails contained a link to the survey hosted on Qualtrics.com by the University of North Texas. Participants who accessed the link were presented with the information on the study and the informed consent notice (see Appendix B). Those who consented and agreed to participate in the study clicked through with their agreement, allowing respondents to continue to the survey items.

Many online panel research services indicated turnaround times of 10 days for approximately 400 valid responses. The data in this study were collected in 6 days, after which the survey was closed and the data were downloaded for analysis. In total, 402 valid responses were received and used to continue the study.

Over the prior decade, there was much discussion and debate on the use and advantages / disadvantages of online panel research as a means of data collection (Ayyagari, Grover, & Purvis, 2011; Braunsberger, Wybenga, & Gates, 2007; Duffy, Smith, Terhanian, & Bremer, 2005; Evans & Mathur, 2005; Spijkerman, Knibbe, Knoops, Van De Mheen, & Van Den Eijnden, 2009). On the key aspect of representativeness, Scholl, Mulders, and Drent (2002) stated that when most of a society has Internet access and is capable of using relevant technology (i.e., the Internet) the drawback of the lack of representativeness

of online panel research disappears. This appeared to hold true for IT managers since the target population of this study had received an adequate amount of exposure to computer and software technology.

Data Analysis

This study used a correlation research design and collected data to examine IT manager perceptions of PU, PEOU, and BI to predict ESS technology adoption. This study was based on the theoretical underpinnings of TAM. External variables refer to variables that may have potential impact on PU and PEOU, such as experience, job relevance, social image of using the system, and so on. Actual system use refers to actual technology adoption (see Figure 4). This study focused on PU, PEOU, BI, age (generational group), and gender types.

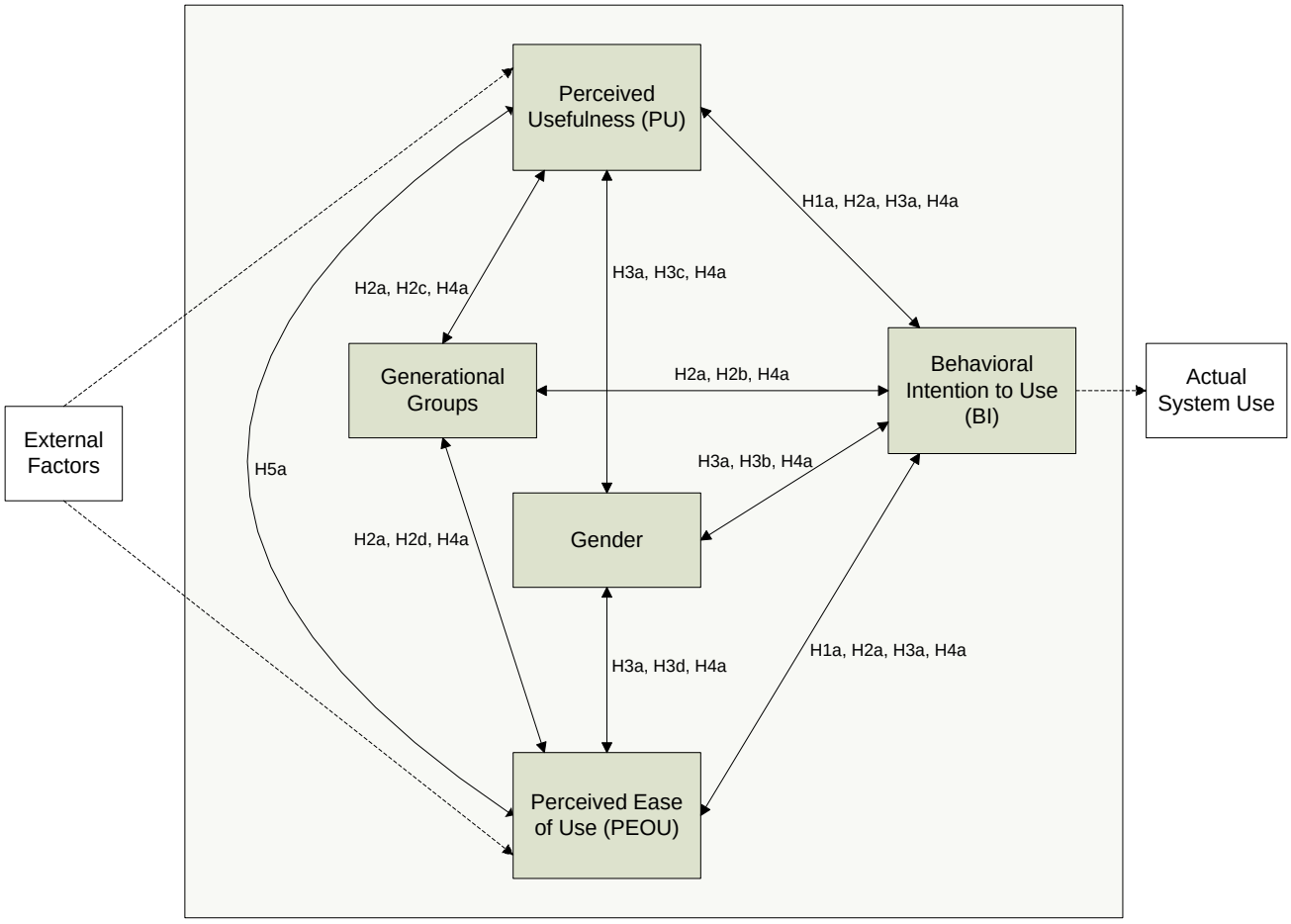

Figure 4: Modified technology acceptance model. Adapted from Davis and Venkatesh (1996), p. 20.

Once the data were collected, analysis was performed using Statistical Package for the Social Sciences (SPSS) version 15.0. Based on the research design and hypotheses in this study, data analysis included multiple regression and MANOVA. See Table 4 for a detailed mapping of the research hypotheses, data analysis, variables, and related construct items.

Table 4

Research Hypotheses Analysis, Variable Types, and Measurements

Hypothesis	Data analysis	Variable	Type	Items
H_o1a	Multiple regression	PU	IV	1,2,3,4
		PEOU	IV	5,6,7,8
		BI	DV	9,10
H_o1b	Mediation Analysis	PEOU	IV	5,6,7,8
		PU	Mediator	1,2,3,4
		BI	DV	9,10
H_o2a	Multiple regression	PU	IV	1,2,3,4
		PEOU	IV	5,6,7,8
		Age (continuous)	IV	15
		BI	DV	9,10
H_o2b	One-way MANOVA	Generational Groups	IV	15*
		BI	DV	9,10
		PU	DV	1,2,3,4
		PEOU	DV	5,6,7,8
H_o3a	Multiple regression	PU	IV	1,2,3,4
		PEOU	IV	5,6,7,8
		Gender	IV	16
		BI	DV	9,10
H_o3b	One-way MANOVA	Gender	IV	16
		BI	DV	9,10
		PU	DV	1,2,3,4
		PEOU	DV	5,6,7,8
H_o4a	Multiple regression	PU	IV	1,2,3,4
		PEOU	IV	5,6,7,8
		Age (continuous)	IV	15
		Gender	IV	16
		BI	DV	9,10
H_o4b	Two-way MANOVA	Generational Groups	IV	15*
		Gender	IV	16
		BI	DV	9,10
		PU	DV	1,2,3,4
		PEOU	DV	5,6,7,8

Note. * Generational groups are computed based on Age (item 15).

The following research questions provide a description of the analysis performed in Chapter 4.

Research Hypothesis H_o1a

H_o1a: *There is no statistically significant relationship between IT managers' perceived behavioral intention to use ESS technology and variables of perceived usefulness and perceived ease of use.*

Hypothesis H_o1a examined whether a statistically significant relationship existed between IT managers' perceived behavioral intention (BI Items 9, 10) to use ESS technology and variables of perceived usefulness (PU Items 1,2,3,4) and perceived ease of use (PEOU Items 5,6,7,8). Multiple regression analysis was performed to test whether there was a relationship between independent and dependent variables. Variables to test included 1 DV (behavioral intention) and 2 IVs (perceived usefulness and perceived ease of use). Since each of the variables' constructs contained multiple items, composite means were computed for each of the variables' constructs.

The null hypothesis would be rejected if the regression analysis results in a p-value significant at the $p < .05$ level for PU and PEOU on BI. Null hypothesis rejection would indicate IT managers' perceived intentions to use/adopt ESS technology if it was (or would be) available to use in his or her job. Retaining the null hypothesis would indicate that a strong enough relationship does not exist to statistically indicate IT managers' behavioral intentions to use/adopt ESS technology.

Research Hypothesis H_o1b

H_o1b: *IT managers' perceived ease of use is not positively related to perceived usefulness.*

Hypothesis H_o1a examined whether a perceived ease of use (PEOU Items 5,6,7,8) had a statistically significant positive relationship to perceived usefulness (PU Items

1,2,3,4) to determine whether PU performed as a mediator to behavioral intention (BI Items 9,10) to use ESS technology. Testing for mediation used both simple and multiple regression through the following four steps and as illustrated in Figure 5).

1. Conduct a simple regression analysis with PEOU predicting BI to determine the direct effect of (a). If a significant relationship exists, proceed to step 2.
2. Conduct a simple regression analysis with PEOU predicting PU to determine the direct effect of (b). If a significant relationship exists, proceed to step 3.
3. Conduct a simple regression analysis with PU predicting BI to determine the direct effect of (c). If a significant relationship exists, proceed to step 4.
4. Conduct a multiple regression analysis with PU and PEOU predicting BI. If PEOU (b') and PU (c) both significantly predict BI, there is partial mediation. However, if PEOU (b') no longer significantly predicts BI after controlling for PU (c), full mediation exists. Additionally, some form of mediation exists if the effect of PU (b) remains significant after controlling for PEOU (b').

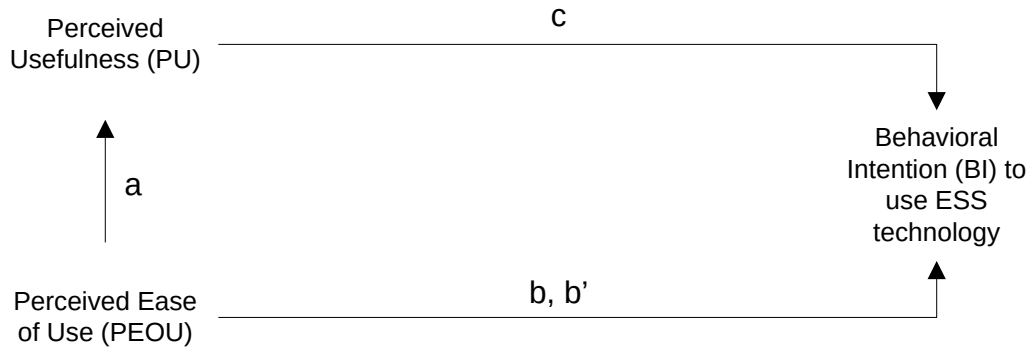

Figure 5. Mediation process methodology. Adapted from Baron and Kenny (1986), p. 1176.

The null hypothesis would be rejected if the regression analysis resulted in a p-value significant at the $p < .05$ level for PU on BI. This would indicate that some form of

mediation exists. If both PU and PEOU are significant at $p < .05$ level, partial mediation exists. Furthermore, if PEOU is no longer significant after controlling for PU, full mediation exists, although this scenario was not expected based on research literature findings.

A null hypotheses rejection would indicate that perceived ease of use does not significantly influence perceived usefulness. However, if there were a statistically significant negative relationship of PEOU to PU, it would have indicated that PEOU is the potential moderator.

Research Hypothesis H_o2a

H_o2a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, and age.*

Hypothesis H_o2a examined whether a statistically significant relationship existed between IT managers' perceived behavioral intention (BI Items 9,10) to use ESS technology and variables of perceived usefulness (PU Items 1,2,3,4) and perceived ease of use (PEOU Items 5,6,7,8) when interacted with age. Multiple regression analysis was used to test the relationships. Variables to test included 1 DV (BI) and 3 IVs (PU, PEOU, and age). Since the PU, PEOU, and BI variables' constructs contained multiple items, composite means were computed for each of the variables' constructs.

The null hypothesis would be rejected if the regression analysis resulted in a p-value significant at the $p < .05$ level for PU, PEOU, and age on BI. Null hypothesis rejection would indicate that a statistically significant relationship exists between IT managers' perceived intentions to use/adopt ESS technology and the variables of PEOU, PU, and age. Retaining the null hypothesis would indicate that one or more of the IVs was not significant to BI. Additionally, to avoid the possibility of a Type I or Type II error, the results of this test

required a comparison with H_o1a validating that both PU and PEOU were significant to BI regardless of age involved as an interacting variable.

Research Hypothesis H_o2b

H_o2b: *There is no statistically significant difference between IT managers' generational groups and the variables of perceived ease of use, perceived usefulness, and behavioral intention to use ESS technology.*

Hypothesis H_o2b examined whether a statistically significant relationship existed between IT managers' perceived behavioral intention (BI Items 9,10) to use ESS technology and variables of perceived usefulness (PU Items 1,2,3,4) and perceived ease of use (PEOU Items 5,6,7,8) for IT manager generational groups. A MANOVA analysis was used to test the relationships to determine whether there were any differences between generational groups on variables of BI, PU, and PEOU. Variables to test included 3 DVs (PU, PEOU, and BI) and 1 IV (generational groups). Because PU, PEOU, and BI variables' constructs contain multiple items, composite means were computed for each of the variables' constructs.

The null hypothesis would be rejected if the regression analysis resulted in a p-value significant at the $p < .05$ level for generational groups using Wilks's Lambda test statistic. Null hypothesis rejection would indicate that IT managers' perceived intentions to use/adopt ESS technology differ between generational groups. If the null hypothesis was retained, it would indicate that there was no difference between generational groups on variables of PU, PEOU, and BI. Additionally, to avoid the possibility of a Type I or Type II error, the results of this test required a comparison with H_o1a to validate that both PU and PEOU were significant to BI.

Research Hypothesis H_o3a

H_o3a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, and gender.*

Hypothesis H_o3a examined whether a statistically significant relationship existed between IT managers' perceived behavioral intention (BI Items 9,10) to use ESS technology and variables of perceived usefulness (PU Items 1,2,3,4) and perceived ease of use (PEOU Items 5,6,7,8) when interacted with gender. Multiple regression analysis was used to test the relationships. Variables to test include 1 DV (BI) and 3 IVs (PU, PEOU, and gender). Since the PU, PEOU, and BI variables' constructs contained multiple items, composite means were computed for each of the variables' constructs.

The null hypothesis would be rejected if the regression analysis resulted in a p-value significant at the $p < .05$ level for PU, PEOU, and gender on BI. Null hypothesis rejection would indicate that a statistically significant relationship existed between IT managers' perceived intentions to use/adopt ESS technology and the variables of PEOU, PU, and gender. If the null hypothesis was retained, one or more of the IVs was not significant to BI. Additionally, to avoid the possibility of a Type I or Type II error, the results of this test required a comparison with H_o1a validating that both PU and PEOU were significant to BI regardless of gender involved as an interacting variable.

Research Hypothesis H_o3b

H_o3b: *There is no statistically significant difference between IT managers' gender and the variables of perceived ease of use, perceived usefulness, and behavioral intention to use ESS technology.*

Hypothesis H_o3b examined whether a statistically significant relationship existed between IT managers' perceived behavioral intention (BI Items 9,10) to use ESS technology

and variables of perceived usefulness (PU Items 1,2,3,4) and perceived ease of use (PEOU Items 5,6,7,8) for IT manager generational groups. A MANOVA analysis was used to test the relationships to determine whether there were any differences between genders on variables of BI, PU, and PEOU. Variables to test included 3 DVs (PU, PEOU, and BI) and 1 IV (gender). Since PU, PEOU and BI variables' constructs contained multiple items, composite means were computed for each of the variables' constructs.

The null hypothesis would be rejected if the regression analysis resulted in a p-value significant at the $p < .05$ level for generational groups using Wilks's Lambda test statistic. Null hypothesis rejection would indicate that IT managers' perceived intentions to use/adopt ESS technology differed between gender types. If the null hypothesis was retained, it would indicate that the there was no difference between gender types on variables of PU, PEOU, and BI. Additionally, to avoid the possibility of a Type I or Type II error, the results of this test required a comparison with H_o1a validating that both PU and PEOU were significant to BI.

Research Hypothesis H_o4a

H_o4a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, age, and gender.*

Hypothesis H_o4a examined whether a statistically significant relationship existed between IT managers' perceived behavioral intention (BI Items 9,10) to use ESS technology and variables of perceived usefulness (PU Items 1,2,3,4) and perceived ease of use (PEOU Items 5,6,7,8) when interacted with age and gender types. Multiple regression analysis was used to test the relationships. Variables to test include 1 DV (BI) and 4 IVs (PU, PEOU,

age, and gender). Because the PU, PEOU, and BI variables' constructs contained multiple items, composite means were computed for each of the variables' constructs.

The null hypothesis would be rejected if the regression analysis resulted in a p-value significant at the $p < .05$ level for PU, PEOU, age, and gender on BI. Null hypothesis rejection would indicate that a statistically significant relationship existed between IT managers' perceived intentions to use/adopt ESS technology and the variables of PEOU, PU, age, and gender. If the null hypothesis was retained, one or more of the IVs was not significant to BI. Additionally, to avoid the possibility of a Type I or Type II error, the results of this test required a comparison with H_o2a and H_o3a validating that both PU and PEOU were significant to BI regardless of age and gender involved as interacting variables.

Research Hypothesis H_o4b

H_o4b: *There is no statistically significant difference between IT managers' generational groups and gender types and the variables of perceived usefulness, perceived ease of use, and behavioral intention to use ESS technology.*

Hypothesis H_o4b examined whether a statistically significant relationship existed between IT managers' perceived behavioral intention (BI Items 9,10) to use ESS technology and variables of perceived usefulness (PU Items 1,2,3,4) and perceived ease of use (PEOU Items 5,6,7,8) for IT manager generational groups and gender types. A two-way MANOVA analysis was used to test the relationships to determine whether there were any differences between generational groups and gender types on variables of BI, PU, and PEOU. Variables to test included three DV's (PU, PEOU, and BI) and 2 IVs (generational groups and gender types). Since PU, PEOU, and BI variables' constructs contained multiple items, composite means were computed for each of the variables' constructs.

The null hypothesis would be rejected if the regression analysis resulted in a p-value significant at the $p < .05$ level for generational groups and gender types using the Wilks's Lambda test statistic. Null hypothesis rejection would indicate that IT managers' perceived intentions to use/adopt ESS technology differs between generational groups and gender types. If the null hypothesis was retained, it would indicate that there was no difference between generational groups and gender types on variables of PU, PEOU, and BI. Additionally, to avoid the possibility of a Type I or Type II error, the results of this test required a comparison with H_o2b and H_o3b validating that both PU and PEOU were significant to BI.

Summary

This chapter discussed the study's research design, sampling, instrumentation, data collection procedures, and the data analysis. The research carried out was based on the procedures outlined in this chapter. Chapter 4 discusses the findings of the study.

CHAPTER 4

FINDINGS

Overview

This study examined information technology (IT) managers' perceptions of enterprise social software (ESS) technology acceptance factors as determinants to predict ESS technology adoption. The research analysis intended to add information to the field on managers' perceptions of ESS technology's usefulness, ease of use, and their behavioral intention to use ESS. The study also intended to provide information on technology adoption factors across ages, generational groups, and gender types to provide insights to business leaders / executives as they shape ESS delivery plans.

This chapter documents the findings of the study through the examination and analysis of four research questions as outlined in Chapter 3. The first research question asked whether there were relationships between the variables of IT managers' behavioral intention (BI) to use ESS technology, perceived usefulness (PU), and perceived ease of use (PEOU). It also identified whether ease of use was a moderating factor to usefulness of ESS technology. The second research question asked whether there were relationships or differences between IT managers' age and generational groups and the variables of PU, PEOU, and BI. The third research question concerned the relationships or differences between IT managers' gender and the variables of PU, PEOU, and BI, and the fourth research question asked whether there were relationships or differences between IT managers' behavioral intention to use ESS technology when related with all variables (i.e., PU, PEOU, age, generation, and gender).

In the sections to follow, descriptive statistics analysis was performed to report sample characteristics; tests of normality to ensure normality and homoscedasticity; instrument analysis to report the reliability and validity of the survey instrument; and hypotheses analysis using multiple regression, mediation analysis, analysis of variance, and multivariate analysis of variance to report the results of the research questions and null hypotheses.

Data Validation and Descriptive Statistics

Sample Size

Survey questions / item data were collected by the online survey tool (Qualtrics) and stored immediately upon individual respondents' survey submissions. Respondent data were collected for 647 total survey submissions. The respondents were selected and identified by ResearchNow as IT managers in the United States using researcher-identified filters. These filters restricted study participants to those who were employed as an IT managers at the time of the survey and whose education minimally included having a high school diploma or equivalent. These filters resulted in eliminating 131 responses for those who did not self-identify as IT managers. Furthermore, 110 responses were determined invalid because the respondents selected / bubbled-in a straight-ticket response for the PU, PEOU, and BI questions. Finally, responses from those in the Silent Generation were removed from the study due to having received only four valid responses. The resulting sample size totaled 402 valid responses from IT managers, which exceeded the minimum required sample size of 384.

Descriptive Statistics

Of the valid survey completions, approximately 75% of the respondents were male and the remainder were female across the three generations of IT managers: Baby Boomers, Generation X, and Generation Y (see Table 5). The Silent Generation cohort group was removed because only four responses were received, all of whom were male. Therefore, only three generational groupings were used for analysis. As previously stated, age was used to determine a respondent's generational cohort group.

Data Distribution and Normality

The assumptions of normality were deemed acceptable to continue with parametric analysis. Both quantitative and visual (observational) methods were used to evaluate normality. Rule of thumb has held that a variable is reasonably normal if its skewness and kurtosis have values between –1.0 and +1.0. In this study, skewness for PU, PEOU, BI, Age, and Generation ranged from -.10 to .59; kurtosis ranged from -.76 to .14. Gender kurtosis was also within parameters at -.64 although skewness was 1.17; the skew was expected given the ratio of men to women who participated in the study (see Tables 5 and 6). Q-Q plots also supported the assumption of normal data. That is, the observation data were distributed closely around the resulting linear regression line.

Table 5

Descriptive Statistics: Gender and Generation Groups

	Generational groups			
	Baby Boomers	Generation X	Generation Y	Total
Male	155	129	18	302
Female	43	47	10	100
Total	198	176	28	402

Note. Silent generation excluded from sample.

Table 6

Descriptive Statistics: Variable Normality

Variable	Mean	Std. deviation	Variance	Skewness	Kurtosis
PU	3.797	1.685	2.840	.453	-.764
PEOU	3.199	1.313	1.724	.547	.137
BI	3.418	1.772	3.140	.553	-.665
Age	46.880	9.505	90.338	-.101	-.886
Generation	2.580	.620	.384	.588	-.583
Gender	1.250	.433	.187	1.167	-.642

It should be noted, however, that deviation from normality was indicated but given the skewness, kurtosis, and visual QQ-Plots, it was determined that the level of normality was acceptable for continuing with parametric tests as outlined in the study's methodology. Deviation from normality, including additional data analysis and support from previous research literature supporting continuance with parametric testing are discussed below.

Deviation from normality was indicated by the Shapiro-Wilks statistic. Analysis performed between generational groups and the variables of PU and BI indicated violations on the assumption of equal variance. As a result of the potential threats of non-normality, additional tests were performed to demonstrate equal variance (i.e., homoscedasticity) between Gender and Generation Groups. Evidence of normality was demonstrated by Levene's tests indicating nonsignificance to unequal variances, demonstrating support for continuing with parametric testing. This also precluded the need to perform log transformation of the data.

Previous research literature has also long held the t and F test's robustness to certain violations of normality. Boneau (1960) stated that t tests maintain robustness to certain violations of non-normality and further stated that, "since the *t* and *F* tests of

analysis of variance are intimately related, it can be shown that many of the statements referring to the *t* test can be generalized quite readily to the *F* test" (p. 63). Box (1953), and Boneau (1960) have also investigated the effects of normality violations, and the general conclusion drawn from the studies is that "for equal sample sizes, violating the assumption of homogeneity of variance produces very small effects" (Howell, 2007, p. 203). Additional research supporting continuing to use parametric analysis without performing log transformation was discussed in the reliability analysis section to follow.

Instrument Analysis

The survey instrument gathered data on variables of PU, PEOU, BI, Gender, Age, and Generation. The Generation variable was calculated with Age and grouped as one of either Baby Boomers, Generation X, or Generation Y. Composite means were computed for each of the three constructs: PU and PEOU constructs contained four items each, and BI contained two items - each were measured based on a 7-point Likert scale. Reliability, convergent validity, and discriminant validity were also evaluated.

Reliability

Reliability analysis was consistent with previous research studies, showing high reliability as measured by Cronbach's alpha. Specifically, Cronbach's alpha scores for PU, PEOU, and BI were .98, .92, and .97, respectively. Prior studies have reported Cronbach alpha scores greater than .90 for PU, PEOU, and BI. In one case, Davis et al. (1989) performed a study to assess differences in grouped versus intermixed ordering of items and found that Cronbach's alpha exceeded .95 in both groups for both scales. In another study, performed by Davis and Venkatesh (1996), reliability of intermixed versus grouped constructs based on three separate experiments also resulted in high Cronbach alpha's

of .95, .90, and .90, respectively. In addition, each of the following studies also showed similar, high Cronbach alpha scores: Adams et al. (1992), Davis et al. (1989), Hendrickson et al. (1993), Igbaria and Livari (1995), Segars and Grover (1993), Subramanian(1994), and Szajna (1994).

Additionally, Norris and Aroian (2004) posited that data transformation is not always needed or advisable when the Cronbach alpha or Pearson product-moment correlation is calculated for instruments with skewed or non-normal item responses. Norris and Aroian (2004) further stated:

> Regardless of sample size, neither the Cronbach alpha nor the Pearson product-moment correlation showed a difference between original and transformed data, with one exception. When items were transformed first before being summed in the calculation of the Pearson product-moment correlation, inconsistently higher (+.05) or slightly lower values (-.01) were observed relative to those created with the nontransformed data across the different sample sizes. [p. 1]

These comments were consistent with Dunlap, Chen, and Greer (1994), suggesting that when skewness is enhanced or minimized through log transformation, there is potential for introduction of artificially inflated reliability coefficients.

Table 7

Comparison of Cronbach's Alpha

Variable	Cronbach's alpha	N of items
PU	.98	4
PEOU	.92	4
BI	.97	2

Convergent Validity

The extent to which data converged on themselves within the constructs of PU, PEOU, and BI was examined to demonstrate evidence of convergent validity. The resulting

analysis indicated strong correlations between items in their respective constructs. All constructs and items had correlations significant at the $p < .01$ level. Correlations for each of the constructs are provided in Table 8.

Table 8

Convergent Validity Analysis (1 of 2)

Measure	PU1	PU2	PU3	PU4	PEOU1	PEOU2	PEOU3	PEOU4
PU1	1							
PU2	.93**	1						
PU3	.94**	.93**	1					
PU4	.92**	.90**	.94**	1				
PEOU1	.58**	.58**	.59**	.60**	1			
PEOU2	.42**	.42**	.45**	.45**	.70**	1		
PEOU3	.47**	.44**	.49**	.48**	.71**	.77**	1	
PEOU4	.52**	.53**	.55**	.54**	.71**	.73**	.82**	1
BI1	.80**	.81**	.82**	.82**	.58**	.48**	.53**	.59**
BI2	.80**	.80**	.81**	.83**	.56**	.48**	.53**	.56**

Note. ** Correlation is significant at the 0.01 level (2-tailed).

Table 9

Convergent Validity Analysis (2 of 2)

Measure	BI1	BI2
BI1	1	
BI2	.94**	1

Note. ** Correlation is significant at the 0.01 level (2-tailed).

Convergent validity exhibited good inter-item correlations, with ranges between .92 to .94 for PU; and .70 to .82 for PEOU. BI was .94 since its construct consisted of two items.

Discriminant Validity

Evidence of discriminant validity was demonstrated by examining correlations among the constructs, thus ensuring that the constructs measured unique dimensions. As a

rule of thumb, a .85 correlation or larger indicates poor discriminant validity (Davis, 1998), whereas a correlation lower than .85 indicates an adequate validity. The correlation between PU, PEOU, and BI constructs are shown in Table 10.

The correlation with PU and BI at .85, $p < .01$, indicated possible multicollinearity. Further analysis with collinearity diagnostics resulted in a tolerance factor of .66 and a variance inflation factor (VIF) of 1.51. According to Garson (2012), it is acceptable to have a high correlation so long as the tolerance factor is greater than .20. Furthermore, a general rule of thumb is that VIF values less than 10 are acceptable levels of proceeding without any serious threat of collinearity in the data. Since the tolerance factor and VIF scores were well within their respective thresholds, it was determined that a multicollinearity problem did not exist in the data.

Table 10

Discriminant Validity Analysis

	PU	PEOU	BI
PU	1		
PEOU	.58**	1	
BI	.85**	.61**	1

Note. ** Correlation is significant at the 0.01 level (2-tailed).

Hypotheses Analysis

This study used a correlation research design to examine IT manager perceptions of PU, PEOU, and BI to predict ESS technology adoption. Data were examined for eight hypotheses; results are summarized in Tables 11 and 12.

Table 11

Research Hypotheses Analyses, Results

Hypothesis	Result	Measure	Coefficient	Value	Sig.
H_o1a	Rejected	Multiple Regression	F	566.19	$p < .01$
H_o1b	Rejected	Sobel Simple Mediation	Z	12.23	$p < .01$
H_o2a	Rejected	Multiple Regression	F	376.58	$p < .01$
H_o2b	Rejected	MANOVA	Wilks's Λ	.97	$p < .05$
H_o3a	Rejected	Multiple Regression	F	378.48	$p < .01$
H_o3b	Rejected	MANOVA	Wilks's Λ	.97	$p < .01$
H_o4a	Rejected	Multiple Regression	F	283.16	$p < .01$
H_o4b	Retained	MANOVA - Generation	Wilks's Λ	.97	$p > .05$
		Gender	Wilks's Λ	.98	$p > .05$
		Generation * Gender	Wilks's Λ	.99	$p > .05$

Table 12

Pearson Correlation Results

Variable	BI	PU	PEOU	Age	Gender
BI	1.00				
PU	.85**	1.00			
PEOU	.61**	.58**	1.00		
Age	.17**	.18**	.17**	1.00	
Gender	-.13**	-.09*	-.17**	-.11*	1.00

Note. * = $p < .05$, ** = $p < .01$. N = 402 for all analyses.

H_o1a: *There is no statistically significant relationship between IT managers' perceived behavioral intention to use ESS technology and variables of perceived usefulness, and perceived ease of use.*

Multiple regression analysis resulted in an F statistic of 566.19, $p < .01$. Therefore, null hypothesis H_o1a was rejected. Results indicated statistically significant correlations of PU and BI (r =.85, $p < .01$); and PEOU and BI (r = .61, $p < .01$), as referenced in Tables 12, 13, 14, and 15.

Table 13

H_o1a Analysis of Variance

	Sum of squares	df	Mean square	F	Sig.
Regression	931.18	2	465.59	566.19	$p < .01$
Residual	328.11	399	.82		
Total	1259.29	401			

Note. Predictors (Constant): PEOU, PU; Dependent: BI.

Table 14

H_o1a Regression Model Summary

R	R square	Adjusted R square	Std. error of the estimate
.86	.74	.74	.98

Note. Predictors (Constant): PEOU, PU; Dependent: BI.

Table 15

H_o1a Coefficients

	Unstandardized coefficients		Standardized coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	-.32	.13		-2.51	$p < .05$
PU	.78	.03	.74	23.70	$p < .01$
PEOU	.24	.04	.18	5.66	$p < .01$

Note. Dependent Variable: BI.

H_o1b: *IT manager perceived ease of use is not positively related to perceived usefulness.*

Null hypothesis H_o1b was rejected as results found for partial mediation. The regression process to test mediation examined whether perceived ease of use (PEOU) had a statistically significant positive relationship to PU to determine if PU was a mediator to BI. Results indicated statistically significant correlations of PEOU and BI ($r = .61$, $p < .01$); PEOU and PU ($r = .58$, $p < .01$); PU and BI ($r = .85$, $p < .01$) as outlined in Table 12. Further

analysis indicated that PU remained significantly related to BI after controlling for PEOU, thereby demonstrating evidence of partial mediation ($Z = 12.23$, $p < .01$).

The analysis also included analysis the indirect effect of PEOU on BI when PU was controlled. The indirect effect was calculated by multiplying the two regression coefficients obtained by two regression models identified by Sobel (1982) and analyzed using the Preacher and Hayes (2004) SPSS add-in. Complete results are provided in Tables 16 and 17.

Table 16

H_o1b Mediation Direct and Total Effects

Method	Coefficient	Std. error	t	Sig (two-tailed)
b (YX)	.82	.05	15.42	$p < .01$
b (MX)	.75	.05	14.29	$p < .01$
b (YM.X)	.78	.30	23.70	$p < .01$
b (YX.M)	.24	.04	5.66	$p < .01$

Note. Variables: Y = BI, X = PEOU, M = PU.

Table 17

H_o1b Mediation Indirect Effect and Significance Using Normal Distribution

	Value	Std. error	LL 95 CI	UL 95 CI	Z	Sig (two-tailed)
Effect	.58	.05	.49	.68	12.23	$p < .01$

H_o2a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, and age.*

Multiple regression analysis resulted in an F statistic of 376.58, $p < .01$. Therefore, null hypothesis H_o2a was rejected. Results indicated statistically significant correlations of PU and BI ($r = .85$, $p < .01$) and PEOU and BI ($r = .61$, $p < .01$). Age and BI were not found to

be significantly correlated ($r = .17$, $p > .05$) although the overall regression model did find for rejection of the null hypothesis. See Tables 18, 19, and 20.

Table 18

H_o2a Analysis of Variance

	Sum of squares	df	Mean square	F	Sig.
Regression	931.22	3	310.41	376.58	$p < .01$
Residual	328.07	398	.82		
Total	1259.29	401			

Note. Predictors: (Constant), Age, PEOU, PU; Dependent Variable: BI.

Table 19

H_o2a Regression Model Summary

R	R square	Adjusted R square	Std. error of the estimate
.86	.74	.74	.91

Note. Predictors: (Constant), Age, PEOU, PU; Dependent Variable: BI.

Table 20

H_o2a Coefficients

	Unstandardized coefficients		Standardized coefficients		
	B	Std. error	Beta	t	Sig.
(Constant)	-.37	.24		-1.52	$p > .05$
PU	.78	.03	.74	23.51	$p < .01$
PEOU	.24	.04	.18	5.62	$p < .01$
Age	.001	.01	.01	.22	$p > .05$

Note. Dependent Variable: BI.

H_o2b: *There is no statistically significant difference between IT managers' generational groups and the variables of perceived ease of use, perceived usefulness, and behavioral intention to use ESS technology.*

MANOVA resulted in Wilks's Lambda value of .97, $p < .05$. Therefore, null hypothesis H_o2b was rejected. PU, PEOU, and BI had also each contributed to the

significance of the overall effect. Partial eta squared value was .02; dependent variables of PU, PEOU, and BI had values of .03, .02, .03, respectively, as found in Tables 21 and 22.

Table 21

H_o2b Generational Multivariate Analysis

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta squared	Observed power
Wilks's Lambda	.97	2.32	6	794	$p < .05$	.02	.81

Note. Observed power calculated using alpha = .05.

Table 22

H_o2b Tests of Between-Subjects Effects

Source	Dependent variable	Type III sum of squares	df	Mean square	F	Sig.	Partial eta squared	Observed power[b]
Corrected Model	PU	33.11[a]	2	16.56	5.97	$p < .01$	.03	.88
	PEOU	10.55[c]	2	5.27	3.09	$p < .05$	.02	.59
	BI	32.64[d]	2	16.32	5.30	$p < .01$	.03	.84
Intercept	PU	2590.71	1	2590.71	934.77	$p < .01$	.70	1.00
	PEOU	1888.00	1	1888.00	1106.33	$p < .01$	.74	1.00
	BI	2153.57	1	2153.57	700.50	$p < .01$	.64	1.00
Generation	PU	33.11	2	16.56	5.97	$p < .01$	.03	.88
	PEOU	10.55	2	5.27	3.09	$p < .05$	.02	.60
	BI	32.64	2	16.32	5.30	$p < .01$	.03	.84
Error	PU	1105.83	399	2.77				
	PEOU	680.91	399	1.71				
	BI	1226.65	399	3.07				
Total	PU	6933.56	402					
	PEOU	4805.38	402					
	BI	5955.50	402					
Corrected Total	PU	1138.94	401					
	PEOU	691.46	401					
	BI	1259.29	401					

Note. [a]. *R* squared = .03 (Adjusted *R* squared = .02); b. Computed using alpha = .05; c. *R* squared = .02 (Adjusted *R* squared = .01); d. *R* squared = .03 (Adjusted *R* squared = .02).

Pairwise comparisons were also performed to determine the specific dependent variables that contributed to the significance of the overall effects between generational groups. For PU, results found for significance between generational groups of Baby Boomers and Generation X ($p < .05$) and Baby Boomers and Generation Y ($p < .05$). There was no finding of significance between Generation X and Generation Y. For PEOU, results found for significance between generational groups of Baby Boomers and Generation X only. For BI, results also found for significance between generational groups of Baby Boomers and Generation X only ($p < .05$). Complete results are provided in Table 23.

Table 23

H_o2b Pairwise Comparisons

Dependent variable	(I) Generation	(J) Generation	Mean difference (I-J)	Std. error	Sig.
PU	BB	GenX	.54	.17	$p < .01$
		GenY	.75	.34	$p < .05$
	GenX	BB	-.54	.17	$p < .01$
		GenY	.21	.34	$p > .05$
	GenY	BB	-.74	.34	$p < .05$
		GenX	-.21	.34	$p > .05$
PEOU	BB	GenX	.30	.14	$p < .05$
		GenY	.42	.26	$p > .05$
	GenX	BB	-.30	.14	$p < .05$
		GenY	.11	.27	$p > .05$
	GenY	BB	-.42	.26	$p > .05$
		GenX	-.11	.27	$p > .05$
BI	BB	GenX	.57	.18	$p < .01$
		GenY	.55	.35	$p > .05$
	GenX	BB	-.57	.18	$p < .01$
		GenY	-.03	.36	$p > .05$
	GenY	BB	-.55	.35	$p > .05$
		GenX	.03	.36	$p > .05$

H_o3a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, and gender.*

Multiple regression analysis resulted in an F statistic of 378.48 with a p-value significant at the $p < .01$ level. Therefore, null hypothesis H_o3a was rejected. Results indicated statistically significant correlations of PU and BI ($r = .85$, $p < .01$); PEOU and BI ($r = .61$, $p < .01$); and gender and BI ($r = -.13$, $p > .05$), as referenced in Tables 12, 24, 25, and 26.

Table 24

H_o3a Analysis of Variance

	Sum of squares	df	Mean square	F	Sig.
Regression	932.45	3	310.82	378.48	$p < .01$
Residual	326.84	398	.82		
Total	1259.29	401			

Note. Predictors: (Constant), Gender, PU, PEOU; Dependent Variable: BI.

Table 25

H_o3a Regression Model Summary

R	R square	Adjusted R square	Std. error of the estimate
.86	.74	.74	.91

Note. Predictors: (Constant), Gender, PU, PEOU; Dependent Variable: BI.

Table 26

H_o3a Coefficients

	Unstandardized coefficients		Standardized coefficients		
	B	Std. error	Beta	t	Sig.
(Constant)	-.13	.20		-.68	$p > .05$
PU	.78	.03	.75	23.73	$p < .01$
PEOU	.23	.03	.17	5.43	$p < .01$
Gender	-.13	.11	-.03	-1.24	$p > .05$

Note. Dependent Variable: BI.

H_o3b: *There is no statistically significant difference between IT managers' gender and the variables of perceived ease of use, perceived usefulness, and behavioral intention to use ESS technology.*

MANOVA resulted in Wilks's Lambda value of .97, $p < .01$. Therefore, null hypothesis H_o3b was rejected. PU, PEOU, and BI had also each contributed to the significance of the overall effect. Partial eta squared value was .03; dependent variables of PU, PEOU, and BI had values of .01, .03, .02, respectively. Complete results are provided in Tables 27 and 28.

Table 27

H_o3b Gender Multivariate Analysis

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta squared	Observed power
Wilks's Lambda	.97	4.42	3	398	$p < .01$	.03	.87

Note. Observed power calculated using alpha = .05.

Pairwise comparisons were also performed to determine the specific dependent variables that contributed to the significance of the overall effects between gender groups (see Table 29).

Table 28

H_o3b Gender Tests of Between-Subjects Effects

Source	Dependent variable	Type III sum of squares	df	Mean square	F	Sig.	Partial eta squared	Observed power[b]
Corrected Model	PU	9.11[a]	1	9.11	3.23	$p > .05$	.01	.43
	PEOU	19.63[c]	1	19.63	11.69	$p < .01$	.03	.93
	BI	20.55[d]	1	20.55	6.64	$p < .05$	.02	.73
Intercept	PU	4134.16	1	4134.16	1463.65	$p < .01$	.79	1.00
	PEOU	2833.23	1	2833.23	1686.88	$p < .01$	.81	1.00
	BI	3245.71	1	3245.71	1048.07	$p < .01$	.72	1.00
Gender	PU	9.11	1	9.11	3.23	$p > .05$	.01	.43
	PEOU	19.63	1	19.63	11.69	$p < .01$	.03	.93
	BI	20.55	1	20.55	6.64	$p < .05$	.02	.73
Error	PU	1129.83	400	2.83				
	PEOU	671.83	400	1.68				
	BI	1238.74	400	3.10				
Total	PU	6933.56	402					
	PEOU	4805.38	402					
	BI	5955.50	402					
Corrected Total	PU	1138.94	401					
	PEOU	691.46	401					
	BI	1259.29	401					

Note. [a]. *R* Squared = .01 (Adjusted *R* squared = .01); [b]. Computed using alpha = .05; [c]. *R* squared = .03 (Adjusted *R* squared = .02); [d]. *R* Squared = .02 (Adjusted R squared = .01).

Table 29

H_o3b Pairwise Comparisons

Dependent variable	(I) Generation	(J) Generation	Mean difference (I-J)	Std. error	Sig.
PU	Male	Female	.35	.194	$p > .05$
	Female	Male	-.35	.194	$p > .05$
PEOU	Male	Female	.51	.150	$p < .01$
	Female	Male	-.51	.150	$p < .01$
BI	Male	Female	.52	.203	$p < .01$
	Female	Male	-.52	.203	$p < .01$

H_o4a: *There is no statistically significant relationship between IT managers' behavioral intention to use ESS technology and the variables of perceived usefulness, perceived ease of use, age, and gender.*

Multiple regression analysis resulted in an F statistic of 283.16 with a p-value significant at the $p < .01$ level. Therefore, null hypothesis H_o4a was rejected. Results indicated statistically significant correlations of PU and BI ($r = .85$, $p < .01$); PEOU and BI ($r = .61$, $p < .01$); Age and BI ($r = .17$, $p < .01$); and Gender and BI ($r = -.13$, $p < .01$) as referenced in Table 12. ANOVA, model summary, and coefficient details are provided in Tables 30, 31, and 32.

Table 30

H_o4a Analysis of Variance

	Sum of squares	df	Mean square	F	Sig.
Regression	932.46	4	233.12	283.16	$p < .01$
Residual	326.83	397	.82		
Total	1259.29	401			

Note. Predictors: (Constant), Gender, PU, Age, PEOU; Dependent Variable: BI.

Table 31

H_o4a Regression Model Summary

R	R square	Adjusted R square	Std. error of the estimate
.86	.74	.74	.91

Note. Predictors: (Constant), Gender, PU, Age, PEOU; Dependent Variable: BI.

Table 32

H_o4a Coefficients

	Unstandardized coefficients		Standardized coefficients		
	B	Std. error	Beta	t	Sig.
(Constant)	-.16	.29		-.54	$p > .05$
PU	.78	.03	.74	23.54	$p < .01$
PEOU	.23	.04	.17	5.40	$p < .01$
Age	.00	.01	.00	.12	$p > .05$
Gender	-.13	.11	-.03	-1.23	$p > .05$

Note. Dependent Variable: BI.

H_o4b: *There is no statistically significant difference between IT managers' generational groups and gender types and the variables of perceived usefulness, perceived ease of use, and behavioral intention to use ESS technology.*

MANOVA resulted in Wilks's Lambda values of .98, $p > .05$ for Generation; .98, $p > .05$ for Gender; and Wilks's Lambda value of .99, $p > .05$ for Generation and Gender correlation. Therefore, null hypothesis H_o4b was retained (see Table 33).

For tests of between subjects effects, only PU contributed to the significance of the effect, $p < .05$ for Generation; and had a partial eta squared of .02. For Gender, PEOU and BI contributed to the significance of the effect, $p < .05$; and both had partial eta squared values of .01. The Generation and Gender interaction resulted in PU and PEOU having no contribution to the significance of the effect, $p > .05$ (see Table 34).

Table 33

H_o4b Generation and Gender Interaction Multivariate Analysis

Effect	Wilks Lambda	F	Hypothesis df	Error df	Sig.	Partial eta squared	Observed power
Intercept	.27	364.76	3	394	p < .01	.74	1.00
Generation	.98	1.51	6	788	p > .05	.01	.59
Gender	.98	2.33	3	394	p > .05	.02	.58
Generation * Gender	.99	.45	6	788	p > .05	.00	.19

Note. Observed power calculated using alpha = .05. Reported statistic is Wilks's Lambda.

Pairwise comparisons were performed to determine the specific dependent variables that contributed to the significance of the overall effects between generational and gender groups as a result of the interaction. For PU, results found for significance between generational groups of Baby Boomers and Generation X ($p < .05$); Baby Boomers and Generation Y ($p < .05$); and no finding of significance between Generations X and Y. There were no findings of significance between PU and gender groups. For PEOU, there were no findings of significance between generational groups although gender groups were found to be significant, $p < .01$. For BI, results found for significance between Baby Boomers and Generation X ($p < .05$); and findings for significance between gender groups, $p < .05$. Complete results are provided in Tables 34, 35, and 36.

Table 34

H_o4b Generation and Gender Tests of Between-Subjects Effects

Source	Dependent variable	Type III sum of squares	df	Mean square	F	Sig.	Partial eta squared	Observed power
Corrected	PU	39.89[a]	5	7.98	2.88	$p < .05$	.04	.84
Model	PEOU	28.25[c]	5	5.65	3.37	$p < .01$	.04	.90
	BI	52.46[d]	5	10.49	3.44	$p < .01$	.04	.91
Intercept	PU	2160.42	1	2160.42	778.43	$p < .01$	.66	1.00
	PEOU	1531.26	1	1531.26	914.31	$p < .01$	.70	1.00
	BI	1736.83	1	1736.83	569.91	$p < .01$	.59	1.00
Generation	PU	23.04	2	11.52	4.15	$p < .05$	.02	.73
	PEOU	5.81	2	2.92	1.73	$p > .05$	.01	.36
	BI	16.13	2	8.06	2.65	$p > .05$	.01	.53
GenderCode	PU	4.82	1	4.84	1.74	$p > .05$	.00	.26
	PEOU	8.40	1	8.40	5.02	$p < .05$	.01	.61
	BI	13.47	1	13.44	4.42	$p < .05$	.01	.56
Generation	PU	.18	2	.01	.03	$p > .05$	.00	.06
*	PEOU	.15	2	.08	.05	$p > .05$	.00	.06
GenderCode	BI	2.63	2	1.32	.43	$p > .05$	.00	.12
Error	PU	1099.05	396	2.78				
	PEOU	663.21	396	1.68				
	BI	1206.84	396	3.06				
Total	PU	6933.56	402					
	PEOU	4805.38	402					
	BI	5955.50	402					
Corrected	PU	1138.94	401					
Total	PEOU	691.46	401					
	BI	1259.29	401					

Note. [a]. *R* squared = .04 (Adjusted *R* squared = .02); b. Computed using alpha = .05; c. *R* squared = .04 (Adjusted *R* squared = .03); d. *R* squared = .04 (Adjusted *R* squared = .03).

Table 35

H_o4b Pairwise Comparisons

Dependent variable	(I) Generation	(J) Generation	Mean difference (I-J)	Std. error	Sig.[a]
PU	BB	GenX	.51	.20	$p < .05$
		GenY	.72	.36	$p < .05$
	GenX	BB	-.51	.20	$p < .05$
		GenY	.21	.36	$p > .05$
	GenY	BB	-.72	.36	$p < .05$
		GenX	-.21	.36	$p > .05$
PEOU	BB	GenX	.27	.16	$p > .05$
		GenY	.32	.28	$p > .05$
	GenX	BB	-.27	.16	$p > .05$
		GenY	.05	.28	$p > .05$
	GenY	BB	-.32	.28	$p > .05$
		GenX	-.05	.28	$p > .05$
BI	BB	GenX	.46	.21	$p < .05$
		GenY	.48	.38	$p > .05$
	GenX	BB	-.46	.21	$p < .05$
		GenY	.02	.38	$p > .05$
	GenY	BB	-.48	.38	$p > .05$
		GenX	-.02	.38	$p > .05$

Table 36

H_o4b Pairwise Comparisons

Dependent variable	(I) Generation	(J) Generation	Mean difference (I-J)	Std. error	Sig.
PU	Male	Female	.35	.19	$p > .05$
	Female	Male	-.35	.19	$p > .05$
PEOU	Male	Female	.51	.15	$p < .01$
	Female	Male	-.51	.15	$p < .01$
BI	Male	Female	.52	.20	$p < .05$
	Female	Male	-.52	.20	$p < .05$

Summary

This chapter provided the results from the data collected and the statistical tests performed. The analyses validated the instrumentation, data, and methodology used to answer the study's research questions to accept or reject the null hypotheses. Methods included reliability and validity analysis, correlation analysis, multiple regression, and MANOVA. Findings resulted in the rejection of seven of eight hypotheses outlined in previous chapters. Chapter 5 provides a summary of the study, discussion of its findings, and recommendations for future research.

CHAPTER 5

SUMMARY, IMPLICATIONS, AND, RECOMMENDATIONS

Overview

This chapter provides the summary of findings, implications for the field and inferences drawn from the results, and recommendations for future research. The summary provides an overview of the findings that helped answer the study's research questions and hypotheses. Next, implications for the field are discussed and inferences are drawn that have practical, research, and theoretical significance. Lastly, recommendations are provided for future research opportunities.

Summary of Findings

A driving premise for this study was the result of the steep rise in consumer use of social networking software technology for personal use (e.g. Facebook and Twitter) and the corresponding increase in interest from business leaders in adopting social software for their employees to improve business productivity. The purpose of this study was to examine information technology (IT) managers' perceptions of enterprise social software (ESS) technology acceptance factors to predict whether or not IT managers would adopt and use ESS in their own jobs. The study further examined the acceptance factors across IT managers' age / generational groups, and gender types.

The study was comprised of 402 IT managers in the United States. Data were collected with an online questionnaire in areas of perceived usefulness, ease of use, and behavioral intention to use / adopt ESS technology. Of the participants, 24.9% were female, indicating a representative sample of male / female IT management occupations when compared to the U.S. Department of Labor (2011), which stated that 25.3% of IT managers

were female. The data were then analyzed using multiple regression, mediation analysis, and multivariate analysis.

The results indicated that a significant relationship existed between an IT manager's behavioral intention to use enterprise social software based on their perceptions of the technology's usefulness and ease of use. Mediation analysis also found that usefulness was a partial mediator toward IT managers' intention to adopt ESS technology. That is, the usefulness of ESS was the leading factor toward an IT managers' decision on the intent to use / adopt the system. Ease of use also remained significantly correlated to intentions of adoption (see *Figure 6*).

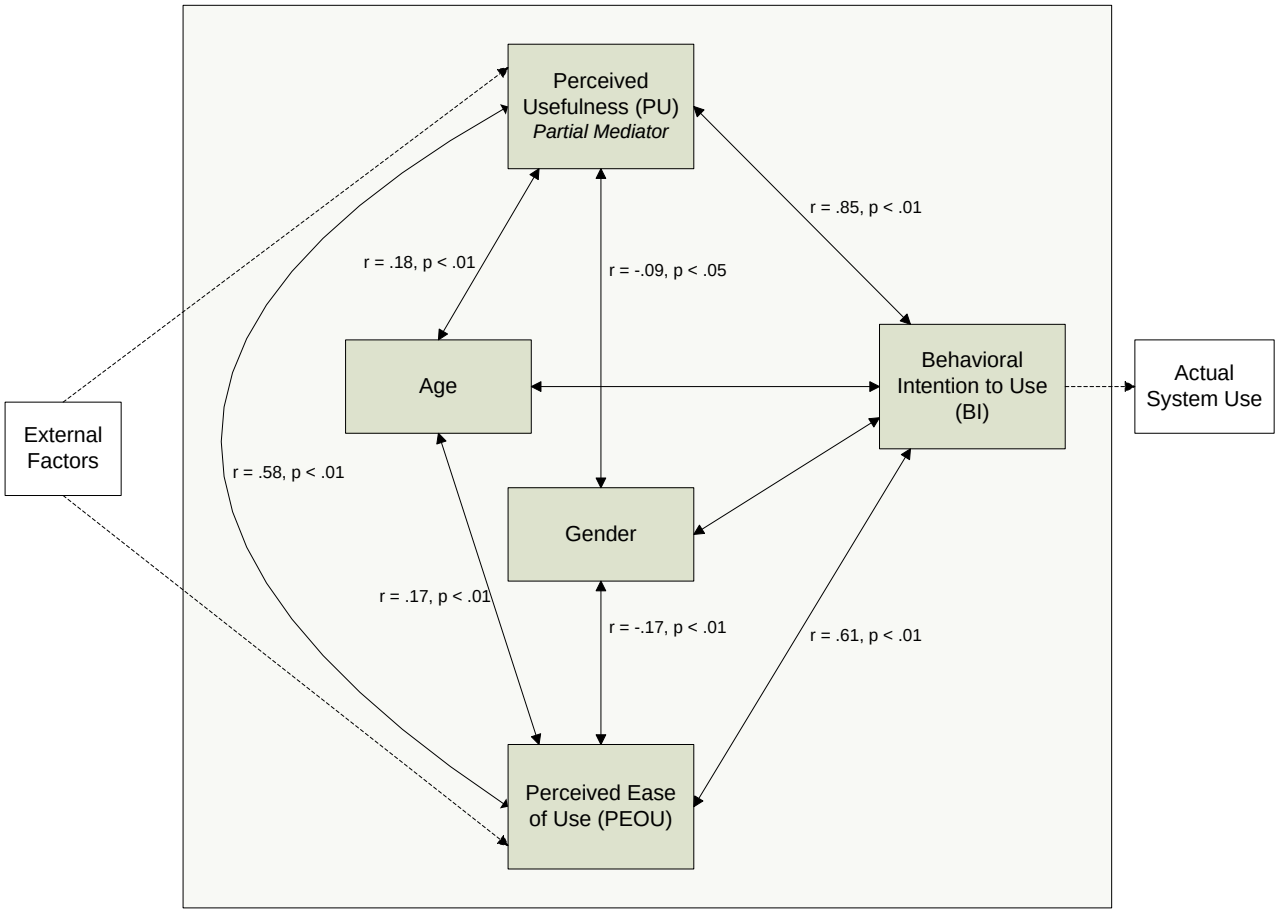

Figure 6: Correlation results. *Note*. Dependent variable: BI.

Results also found a significant difference between IT manager generational cohort groups and differences between IT manager gender types. Multivariate analysis suggested that IT manager age and generational cohort groups demonstrated having differing perceptions on their intent to use / adopt ESS technology. Evidence was also demonstrated on gender differences having an impact on the intent of ESS technology adoption.

These results were consistent with previous research literature using the constructs identified in the technology acceptance model (TAM) and support previous research performed by Adams et al. (1992), Davis (1989), Davis et al. (1989), Davis and Venkatesh (1996), Hendrickson et al. (1993), Igbaria and Livari (1995), Segars and Grover (1993), Subramanian (1994), and Szajna (1994). Reliability analysis indicated high internal consistency, having Cronbach alpha scores larger than .90 (see Table 7). According to Kline (1999), alpha scores larger than .90 are considered *excellent*. Evidence of instrument validity was also demonstrated, indicating consistency with prior research literature that leveraged the TAM constructs.

Discussion and Conclusions from Findings

This study examined four research questions aimed at examining IT managers' perceptions of ESS technology acceptance with the intent of providing insights to business leaders and executives as they shape their ESS business plans. The research questions and findings are focused on the technology acceptance factors and IT managers' age, generational groups, and gender types. Additional discussion includes the practical significance of the findings.

Conclusions from Findings

The first question addressed the foundational components of the technology acceptance model. As hypothesized, a statistically significant relationship was demonstrated between IT managers' behavioral intention to use enterprise social software technology and variables of perceived usefulness and perceived ease of use. The data suggested that both perceived usefulness and ease of use contributed significantly to an IT managers' intention of adopting and using ESS technology. The regression equation explained 73.9% of the variance in IT managers' intention to use ESS technology, suggesting the importance of usefulness as a leading factor in technology adoption decisions. Both, perceived usefulness and ease of use had significant correlations to BI, which was not surprising; researchers have long argued that technology acceptance factors (i.e. PU and PEOU related to BI), perform as strong predictors of actual technology adoption. This supports prior research conducted by Davis (1989), Davis and Venkatesh (1996), and Venkatesh et al. (2003). The findings also assert that the factors of usefulness and ease of use can be extended to enterprise social software to predict its adoption.

This study adds to the body of knowledge in the context of business use of ESS to predict technology acceptance. That is, the findings extend previous research on the applicability of TAM constructs used in nonbusiness contexts to its use in business contexts (Adams et al., 1992; Davis, 1989; Davis et al., 1989; Davis & Venkatesh, 1996; Hendrickson et al., 1993; Igbaria & Livari, 1995; Segars & Grover, 1993; Subramanian, 1994; Szajna, 1994).

Mediation analysis results found that perceived usefulness was a partial mediating factor toward IT managers' behavioral intention to use ESS technology. The finding also

supports previous research conducted by Davis (1989, 1996), and Davis and Venkatesh (1996), who found that usefulness is influenced by ease of use. Given the high correlation between perceived usefulness and ease of use ($r = .58$, $p < .01$), in addition to usefulness acting as a moderator to ease of use, it can be further suggested that ease of use amplified the effect of usefulness on the intent to adopt ESS technology in this study. This finding also supports the Lane and Coleman (2011) study, which assessed the perceived usefulness and ease of use of social software technology in a university setting and found that "higher perceived ease of use led to increased perceived usefulness and more intensity in the use of the social media" (p. 7). That is, the easier it was to use the social software, the more useful it became to perform tasks/activities.

In contrast, the Chung et al. (2010) study on perceptions of online community participation among non-users found that ease of use did not influence usefulness. This study did not support or refute the Chung et al. study although the contrast might be more readily explained given that non-users of online communities are not as likely to have had the knowledge of online communities. It could be purported that IT managers would have a stronger awareness and understanding of social software, regardless of their active use of it thus potentially explaining the difference in findings from Chung et al. (2010).

The second research question introduced IT managers' age and generational cohort groups and found a statistically significant relationship between IT managers' behavioral intention to use ESS technology and variables of perceived usefulness, perceived ease of use, and the IT managers' age. The data revealed that perceived usefulness, ease of use, and age contributed significantly IT managers' intentions of using ESS technology. The resultant regression model also demonstrated significance ($F = 376.58$, $p < .01$). Age was

found to have a significant relationship with behavioral intention to use ESS although the correlation was low ($r = .17$, $p < .01$). The regression model changed minimally with the addition of age ($B < .01$, standardized).

These findings support studies conducted by Morris and Venkatesh (2000), and Morris et al. (2005) on age difference in technology adoption decisions, suggesting a "clear difference with age in the importance of various factors in technology adoption and usage in the workplace" (p. 392). While the analysis resulted in a small effect size, it does not discount the importance of generational group characteristics. In fact, many researchers believe that regression interpretation should not be based solely on beta weights (Kraha, Turner, Nimon, Zientek, & Henson, 2012). There were also findings of differences between IT managers' generational groups. Partial eta squared value was .02, suggesting an overall small effect, which explains 2% of the difference between generational groups.

Pairwise comparisons identified the generational groups that differed when compared to variables of PU, PEOU, and BI (see Table 23). These results suggest that Baby Boomers' perceptions of usefulness of enterprise social software differs significantly from how Generations X and Y perceive its usefulness. Also, Baby Boomers' perceptions of ease of use differ only with Generation X. The results also suggest that Generation X and Y are similar given that both Generation X and Y were exposed for a larger percentage of their lives to the boom in IT and the Internet than were Baby Boomers, which is consistent with research performed by Morris and Venkatesh (2000), Morris et al. (2005), L'Allier and Kolosh (2007), Strauss and Howe (1994), and Whitman (2010).

The third research question focused on IT managers' gender. The study found a statistically significant relationship between IT managers' perceived behavioral intention

to use ESS technology and variables of perceived usefulness , perceived ease of use, and gender ($F = 378.48$, $p < .01$). Results suggest that perceived usefulness had the greatest impact on the predictive model ($B = .75$, standardized), although ease of use was also an important contributor ($B = .17$, standardized). Gender had a negative contribution to the predictive model ($B = -.03$, standardized).

The findings suggest that for every unit increase of a female IT manager, the aggregate BI score would decrease by .03, thereby suggesting that male IT managers are slightly more likely to adopt and use ESS technology than their female counterparts in the study. Additionally, correlation analysis indicated a negative relationship with PU ($r = -.09$), PEOU ($r = -.17$). This is consistent with research conducted by Venkatesh and Morris (2000) and Minton and Schneider (1980), who suggested that men are more task oriented and therefore the usefulness of the technology has greater salience to men than to women (Venkatesh & Morris, 2000; Venkatesh et al., 2000; Wattal et al., 2009). However, as related to ease of use being more salient to women, this study does not support or refute prior research conducted Venkatesh and Morris (2000), and Minton and Schneider (1980) because this study did not include additional factors such as time and experience.

Evidence also demonstrated findings of statistical differences between IT managers' gender groups. The results supported previous research studies which examined gender as related to technology acceptance factors. In particular, the results support Gefen and Straub's (1997) study, which found for existence of gender differences on usefulness and ease of use in the case of e-mail technology adoption. This study also supports other technology acceptance studies in which gender was found to be a significant contributing factor, which includes: Chung et al. (2010), Morris et al. (2005), Terzis and Economides

(2011), Venkatesh and Morris (2000), Wattal et al. (2009). The partial eta squared value in this study was .03, suggesting gender had an overall small effect.

The fourth research question intended to determine whether relationships existed and whether differences were identified when including age and gender in the regression and multivariate analyses. As expected, minimal changes were noticed in the regression model compared to the analyses performed to answer the first three research questions; that is, the study found that a statistically significant relationship exists between IT managers' perceived behavioral intention to use ESS technology and variables of perceived usefulness, perceived ease of use, age, and gender ($F = 283.16$, $p < .01$). Results indicated that PU had the greatest impact on the predictive model ($B = .74$), followed by PEOU ($B = .17$), and age ($B < .01$). Gender maintained a negative contribution to the predictive model ($B = -.03$).

The findings suggest that age as a continuous measurement variable has minimal impact / contribution to the predictive model. Gender has a similar minimal impact although every unit increase of female IT managers would result in a decreased aggregate BI score, suggesting that male IT managers are slightly more likely to adopt and use ESS technology than their female cohorts. It also supports previous research conducted by Morris and Venkatesh (2000), and Morris et al. (2005) on age difference in technology adoption decisions; results suggested that there was a "clear difference with age in the importance of various factors in technology adoption and usage in the workplace" (p. 392).

However, it should be noted that while the regression model found evidence of statistical significance ($F = 283.16$, $p < .01$), the multivariate analyses resulted in retaining null hypotheses H_o4b (Wilks's Lambda = .99, $p > .05$). This was the result of generational

groups and gender types being of different types of variables. The null hypotheses, if considered independently, would have resulted in rejection as performed in both H_o2b and H_o3b.

Implications

Practical Application

Successful deployment of enterprise social software is likely to rely on the success of its adoption. If it is not useful to enhancing business / job productivity, it is unlikely to exhibit the level of adoption desired. If the technology is not easy to use, usefulness will be reduced, thereby further reducing the overall desired level of adoption as demonstrated by this study. As an enterprise social software technology developer or vendor, it is necessary to help clients understand (directly or indirectly) how their social software technology is useful and easy to use. In contrast, a company considering providing employees with social software technology can use the results of this study to understand how employee perceptions support technology adoption and address areas of potential issues, such as helping employees understand how the software is useful, including training to facilitate ease of use for non-intuitive capabilities.

This study can be generalized to IT managers and leaders, and perhaps the overall IT organization as related to IT managers' perceptions on their intention to adopt ESS technology. It can further be asserted that the study could be generalized to the overall IT organization. However, the research conducted in this study can also be used as a tool to sell, market, and deploy ESS software beyond IT managers / organization. Consider the social and behavioral science presented in this study (and supported by prior research) highlighting that an employees' propensity to adopt technology is directly related to a

technology's usefulness and ease of use (i.e. performance and effort expectancies). These expectancy factors are tied to improvements in employee productivity as outlined in Chapters 1 and 2. Examples are provided below on how this study can support the sales and software deployment goals.

It is a long held belief that improved employee productivity drives greater business value and overall net results; and from the perspective of a business consumer considering the purchase of ESS, productivity gains remain a critical success factor sought from its implementation. Often, ESS sales opportunities have difficulty of achieving successful deal closure due to the complexity of quantifying the impact to employee productivity; and employee productivity gain is a key factor in customers' purchasing decisions. However, ESS is often delivered to employees in a voluntary-use environment, introducing an unknown factor that often negatively impacts successful deal closure. If the population of ESS users are IT managers the findings in this study can be generalized to that population and possibly also generalized to the overall IT organization. If the population differs (e.g. Marketing analysts), pre-sales activities might consider adding a quantification of the customers' employees' intentions of ESS technology adoption based on the methodology in this study presented in this study to support the sales process. For example, the customers' employee data revealed employee adoption intent is 80% explained by the level of the ESS solution usefulness, then the vendors' sales team could better determine areas to focus to maximize expectancy factors resulting in increased adoption intentions.

Companies that have already invested in ESS technology (post-sales) can use the data in this study to generalize understanding of IT managers (and quite possibly the overall IT organization's employees). It can be further asserted that the survey

methodology and instrument can be used to develop a predictive model of adoption intent for any given business unit (e.g. Marketing, Sales, Development). It also gives us insight about the end users (including barriers) to adoption intent. This can help us identify which tools on our belt would make the best sense as a next step (e.g. technology adoption session). However, additional factors should be considered as stated in the Recommendations section where further research is necessary.

Age and Gender Implications of IT Managers

Age and gender are important in the business context of ESS technology adoption. This study indicated statistically significant differences in age, generational cohort groups, and gender as impacting IT managers' intention to adopt ESS technology. However, it is important to note that the differences were minimal and do not necessarily warrant an inspection or customization to the usefulness or ease of use of a technology based on age and/or gender given the uniqueness of demographics of the IT organization. For example, while IT managers' perceptions differed between Generation X and Generation Y, the results of this study do not suggest nor validate a need to develop a training program (or other treatment) for differing generational groups, which consequently might also have legal implications.

Research Opportunities / Implications

This study provided quantitative research for the technology adoption factors of perceived usefulness and perceived ease of use, which are determinants of one's behavioral intention to adopt enterprise social software. In the case of this study, which included IT managers, ease of use had a positive influence to perceived usefulness. The research

implications presented includes support for these factors in the context of enterprise social software used in the context of business.

Additionally, age and gender have traditionally been deemed as critical factors in technology adoption decisions. This study supports findings in previous literature when compared with findings of statistical significance. The effect sizes, when considering age and gender, however, were minimal. For example, previous literature on technology adoption has indicated the need for providing employees greater access to differentiated training materials to bridge the skills gap and/or generational divides. As a result of the effect sizes noted in this study, including the generational similarities and differences with respect to factors in this study, there might be reason to indicate ubiquity of enterprise social software among IT managers, and can be purported to be generalized to other information and knowledge workers requiring regular access to information technology, the Internet, and network-based applications.

The amount of features and capabilities relevant to enterprise social software has risen dramatically. Collaborative capabilities have gone from one-way communication to multi-way, real-time collaboration, which complexity has steadily decreased. Given this study's findings as related to ease of use as amplifying perceived usefulness, IT usability research is poised to gain greater significance in the context of follow-on studies related to human networks, communities, collaboration, and communication / interaction media research.

Additional research implications include the expanding methods in which enterprise social software is delivered based on its ease of use, usefulness, and availability. For example, device agnostic computing has experienced dramatic growth which has

accelerated mobile applications providing enterprise social software capabilities. As a result, communication flow and knowledge sharing have the capability to span personal and business social networks. As ease of use grows in the context of driving business productivity, a greater potential for coalescence of the personal and business use of social software might be presented.

Recommendations for Future Research

1. As a result of the continual advances in technology (including ESS technology capabilities), further research is recommended in the context of business use of ESS on topics that include: a) determining whether ESS technology features and capabilities differ from one another based on technology adoption factors, and b) examining whether an introductory set of ESS features / capabilities, that if adopted ahead of another feature would support adoption of additional, follow-on advanced features.
2. Industry specialization, corporate culture, and other corporate characteristics may influence the employees' adoption of ESS technology. Additional research is recommended to determine whether these factors contribute to employee adoption of ESS technology.
3. Managers are often important influencers in subordinate employees' on-the-job behavior. Additional research is recommended to determine the extent to which IT managers influence their employees' adoption of ESS technology. Wattal et al. (2009) performed a study of a multinational electronics corporation and found that "employees' usage of blogs is positively associated with blog use by the employees' managers" (p. 7). Their case study and the results from this study provide a basis

for further research to generalize the results to IT managers across industries and the components that comprise ESS technology, although a greater generalization would be IT managers and non-IT managers.

4. This study was based on a cross-sectional survey research design capturing IT managers' perceptions of pre- and post-adoption of ESS technology at a single point in time. A limitation of this type of design is understanding and capturing data of an individuals' decision making processes on their journey of accepting or abandoning the use of a technology. Therefore, additional research is recommended via a longitudinal research design to capture data pre-use, during use, and post-adoption data to more thoroughly examine changes in an individuals' behavioral intention to adopt ESS technology and the factors involved in adoption decisions.
5. Additional research is recommended to more effectively determine if time and experience are factors that impact gender salience to PU, PEOU, and BI. Venkatesh and Morris (2000) and Minton and Schneider (1980) found that ease of use was more salient to women than to men. They also found that *men's ease of use* of the system went up somewhat with time and experience, although *women's ease of use* went down with more time and experience. This study did not examine these factors, which may have uncovered dynamics that could provide insight to application developers and usability experts when designing ESS applications.
6. This study did not distinguish between mandatory uses versus voluntary use of ESS technology. Additional research is recommended for studying whether there is a difference between the two adoption models. Brown et al. (2002) argued that users' beliefs about a technology's ease of use and usefulness are more likely to be

minimized in mandatory use environments, while the behavioral intention to use the system is inflated, and indicated that users may not want to perform the mandated behavior but will do it anyway. Additionally, there is potential for a reverse mediation relationship between PEOU and PU when individuals must perform specific behaviors in mandatory use situations.

7. This study focused on IT managers. Additional research is recommended to study other roles in the organization as related to experience and skill. For example, it is conceivable that IT managers would generally have a greater level of experience and skill with IT than their non-IT manager counterparts (e.g. marketing managers, sales managers, non-managers). Therefore non-IT users might differ in their behavioral intention to use ESS technology than their IT savvy counterparts.

Summary

A driving premise for this study was the result of the steep rise in consumer use of social networking software technology for personal use (e.g. Facebook and Twitter) and the corresponding increase in interest from business leaders to adopt social software for their employees to improve business productivity. The purpose of this study was to examine IT managers' perceptions of enterprise social software (ESS) acceptance factors to predict whether or not IT managers would adopt and use ESS in their own jobs. An additional focus of this study was the examination of generational and gender groups to determine whether differences existed between the groups and technology adoption factors. The results of the study were intended to provide insights to business leaders and executives as they shape potential ESS delivery plans for their own organizations. The

population selected for use in this study included IT managers in the United States where ESS technology was available to use or would become available for use in their jobs.

The results demonstrated the existence of strong relationships between the technology acceptance factors and an IT manager's behavioral intention to use ESS technology. That is, the easier the technology was to use, and the more useful it was, the greater the amount of behavioral intention to adopt and use the technology. Additionally, results indicated that perceived ease of use had a positive relationship to perceived usefulness, suggesting that the easier the technology was to use, the more useful it became. Results also found differences between generation and gender groups. Generational group comparisons suggested that Generation X and Y were similar and differed from Baby Boomers only in their behavioral intention to adopt ESS technology. This further suggests that the outcome was due to the fact that Generations X's and Y's exposure to technology involved a larger percentage of their lifespan when compared to Baby Boomers, given the factors included in this study. Furthermore, male and female genders were also found to differ. The results in this comparison suggested that female IT managers were slightly less accepting than their male IT manager counterparts.

Overall results indicated that ease of use and usefulness are important factors in determining one's behavioral intention to use ESS technology and that understanding differences in generational and gender groups might alter the use of ESS or how it is delivered in the workplace. Additional research is recommended to extend the results provided by this study to non-IT managers. However, the results presented in this study are anticipated to be generalizable to IT managers in companies throughout the United States.

APPENDIX A

IRB APPROVAL AND INFORMED CONSENT NOTICE

IRB APPROVAL

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April 19, 2012

Dr. Jeff Allen
Student Investigator: Sunil Patel
Department of Learning Technologies
University of North Texas
RE: Human Subjects Application No. 12-192

Dear Dr. Allen:

In accordance with 45 CFR Part 46 Section 46.101, your study titled "A Study of Performance and Effort Expectancy Factors among Generational and Gender Groups to Predict Enterprise Social Software Technology Acceptance" has been determined to qualify for an exemption from further review by the UNT Institutional Review Board (IRB).

Enclosed is the consent document with stamped IRB approval. Please copy and **use this form only** for your study subjects.

No changes may be made to your study's procedures or forms without prior written approval from the UNT IRB. Please contact Jordan Harmon, Research Compliance Analyst, ext. 3940, if you wish to make any such changes. Any changes to your procedures or forms after 3 years will require completion of a new IRB application.

We wish you success with your study.

Sincerely,

Patricia L. Kaminski, Ph.D.
Associate Professor
Chair, Institutional Review Board

PK:jh

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INFORMED CONSENT NOTICE

University of North Texas Institutional Review Board
Informed Consent Notice

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted.

Title of Study: A study of performance and effort expectancy factors among generational and gender groups to predict enterprise social software technology acceptance.

Student Investigator: Sunil Patel, University of North Texas (UNT) Department of Learning Technologies.

Supervising Investigator: Jeff Allen

Purpose of the Study: You are being asked to participate in a research study which involves examining technology acceptance of social software in business contexts.

Study Procedures: You will be asked to respond to questions examining the use and adoption of social software technology in the context of business. The survey that will take about 5-10 minutes of your time.

Foreseeable Risks: No foreseeable risks are involved in this study.

Benefits to the Subjects or Others: We expect this study will contribute to information to the field concerning managers' perceptions of social software technology acceptance factors in predicting its use/adoption in business contexts.

Compensation for Participants: The researcher is not offering compensation for your participation.

Procedures for Maintaining Confidentiality of Research Records: To help protect your confidentiality, the survey will not collect information that will personally identify you. All data will be stored in a password protected electronic format. The confidentiality of your individual information will be maintained in any publications or presentations regarding this study.

Questions about the Study: If you have any questions about the study, you may contact Sunil Patel at sunil.patel1120@unt.edu or Jeff Allen at jeff.allen@unt.edu.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Research Participants' Rights:
Your participation in the survey confirms that you have read all of the above and that you agree to all of the following:

- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You have had an opportunity to contact the researcher with any questions about the study. You have been informed of the possible benefits and the potential risks of the study.
- You understand you may print a copy of this form for your records.

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