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# The development of technological management model: A conceptualization of computer technology in the workplace

Paul E. Madlock
*West Virginia University*

# The Development of Technological Management Model: A Conceptualization of Computer Technology in the Workplace

Paul E. Madlock

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Theodore A. Avtgis Ph.D., Chair
Melanie Booth-Butterfield, Ph.D.
Rebecca M. Chory, Ph.D
Mathew M. Martin, Ph.D.
David Westerman, Ph.D.
Andrew S. Rancer, Ph.D.

Department of Communication Studies

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ABSTRACT

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Paul E Madlock

The purpose of this dissertation was to develop a model that would serve to assist scholars, business professionals, and employees manage the influence of computer technology in the workplace. This study also focused on mandated use environments given the paucity of research in this area. In doing so, Technology Management Model (TMM) was developed. Actor Network Theory (ANT; Callon, 1986; Latour, 1987; Law, 1987) and Social Cognitive Theory (SCT; Bandura, 1986) provided support for the multifactor design of TMM. As a result, TMM was comprised of three latent variables of technological, personal, and organizational factors though to influence the attitudes employees hold toward computer technology in the workplace. Further, these attitudes held by employees were then hypothesized to be positively related to their work related attitudes of job satisfaction and organizational commitment. The results generally supported all of the correlational hypotheses and also indicated that the data fit the TMM. Implications for these findings are discussed with an emphasis on the value derived from the initial development of TMM including its simplicity, practicality, and its appeal to scholars, business professionals, and employees. Specifically, TMM appears to explain the influence technology has on the organization and its members in mandated use work environments.

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# CHAPTER I
## Introduction

Among communication scholars there appears to be a lack of consensus as to what constitutes communication. Some scholars argue that in order for communication to take place there must be intention, while others argue that communication takes place whether the sender intended to send a message or not. Similarly, another point of contention among communication scholars centers on the attribution of meaning; specifically, whether the meaning of a message should be evaluated from the sender's intention or from the receiver's interpretation. With that said, the primary author of the current study conceptualized communication in line with Watzlawick, Beavin, and Jackson's (1967) assertion that "one cannot not communicate" (p. 48), meaning that every action one engages in communicates something either verbally or nonverbally.

In following with this definition of communication (intentional and or unintentional), the primary author here also holds the position that the meaning ascribed to a message is ultimately receiver based. For example, the receiver of a message (sent intentionally or not) attributes meaning to the message based on his or her interpretations of verbal and nonverbal cues that accompany the message. Based on the construal of these messages, attitudes and perceptions are formed about the sender and the related topic. Under this framework, the following research study contends that ultimately communication interactions (primarily those taking place in the workplace) shape employees' attitudes and perceptions of reality (e.g., such as one's attitudes and perceptions of technology in the workplace), which in turn influences employees' work related attitudes (e.g., such as job satisfaction and organizational commitment). More succinctly, the current study intends to examine the role of communication in the

attitudes and perceptions employees hold toward computer technology. Based on the technological focus of this study, coupled with the prominence of computer technology in today's workplace, an investigation of computer technology through an organizational communication lens appears warranted.

After World War II at the pinnacle of America's industrial supremacy, computer technology began to make it possible to envision a new economy where information and knowledge, not durable goods, would become the nations most valued product (Wood & Smith, 2001). The ensuing influx of technology in the workplace provided both large and small organizations with the ability to compete on a global scale, while at the same time, also provided challenges to organizations, such as the ability to adapt to the changes in structure that accompanied the presence of technology (Trunk, 1999). For example, as a result of competitive pressures firms began to invest heavily in computer technology applications such as Enterprise Resource Planning (ERP), corporate intranets, and Enterprise Information Portals (EIP) to enable information sharing across business processes by integrating both internal and external publics through a standardized technological platform (Mabert, Soni, & Venkataramanan, 2003). Despite the enormous amount of time and money involved in ERP implementation, thousands of companies have put these systems into practice because it allows them a competitive advantage over their competition by streamlining operations, improving communication, and allowing seamless information sharing (Trunk, 1999). However, Intranets, ERP, and EPI applications by themselves may not achieve the desired results without a supportive organizational culture, a work climate that encourages the use of technology, and a workforce that is willing and able to adapt their work-lives to embrace technology

(Achterberg, 2001).

Similarly, Cheney and Dickson (1982) pointed out that the end user (the employee) is crucial to the success or failure of computerized communication systems. However, the rate of end users (persons who interact with a computer as part of their job but are not programmers or analysts) entering the workforce with little to no prior computer experience is extremely high (Turner & Reinsch, 2006). Computer technologies have also changed the way in which organizations interact and coordinate activities with customers, suppliers, and its members. These changes involve the substitution of everyday business activities involving paper, telephone, and fax-based communication with electronic information exchange through the use of computer technology (Straub & Watson, 2001). More recently, Herrmann (2006) argued that with the growth of computer technology in the workplace, mediated communication has become infused into nearly every business communication context, perhaps even coming to dominate certain areas such as public relations. The introduction of computer technology into the workplace has also brought about a number of changes to both the organization and its members by altering core elements of the organization, such as its structure, culture, and performance (Jackson, Poole, & Kuhn, 2002; Nardi & O'Day, 2000). Such changes are highlighted by the way in which organizational members react to, interact with, and perceive computer technology.

### *Statement of Problem*

According to the National Telecommunications and Information Administration (2002), 73% of employed people reported using computer technology as part of their daily work. Further, according to Greenwald (2006) more than 60% of new jobs require

some form of technology literacy, yet only 22% of new workers possess the appropriate skills to fill these jobs. With the rising use of computers in the workplace, researchers have also focused on the possible consequences of such use (see Brosnan, 1998; Murrell & Sprinkle, 1993; Smith & Caputi, 2001). However, this line of research has yielded mixed results, with some reporting negative characteristics associated with technology, while others report positive characteristics. For example, a perceived negative characteristic of technology was found in a study conducted by the American Management Association (2005). The results of this nationwide study found that more than three fourths of those companies surveyed monitored employees' Web site connections and email messages, while over one-half of the organizations surveyed use video surveillance to monitor their employees. With that in mind, many scholars whose work involves technology in the organizational setting often employ a panopticon metaphor to explain the pervasive and often unobtrusive character of organizational surveillance in an employee's working life (e.g., D'Urso, 2006; Sewell & Barker, 2006). This form of surveillance is also described as a form of power and control that subjugates workers through the use of technology (Barker & Cheney, 1994; Brannan, 2005).

Of particular interest here is the work of Berdays (2002) who made the association between Classical organizational forms and the use of technology in today's workplace such as that of panoptic surveillance. Specifically, Berdays argued that classical management theories that emphasized control are similar to the panoptic techniques that constitute modern organizational forms that rely extensively on technology to conduct business. Other studies that highlight the negative characteristics associated with computer technology have focused on user related conditions such as

anxiety, frustration, and computer-phobia (Brosnan, 1998). While others have focused on outcomes associated with these negative affective reactions toward computer technology, such as whether or not employees will use the computer technology and whether or not employees will use the computer technology effectively (Davis, 1989; Smith & Caputi, 2001).

Additional evidence highlighting the negative characteristics associated with technology in the organizational setting was found in the work of Edley (2001) who argued that technology has kept employees more tightly tethered to their work than ever before resulting in further blurring of work-life boundaries. For example, according to the United States Department of Labor (2002), in 2001 nearly 11 million Americans performed, on average, seven hours of job-related work per week at home without compensation. A large percentage, 79.6% of these people indicated that they relied on a computer or cell phone to continue their workday from home. Additionally, 57% of those workers who were performing unpaid job-related work from home identified finishing or catching up on their work as the leading cause for extending their workday, while 31% reported it was the nature of their job that required them to be continually connected to their work.

In support of this extended workday many organizations have created an environment that requires its employees to work more than 40 hours per week and are prepared to equip them with an array of technology to do so (Venkatesh & Vitalari, 1992). These same organizations then directly or indirectly link rewards, promotions, and other incentives for work performance that can only be delivered by the extension of the typical workday (Higgins, Duxbury, & Irving, 1992; Venkatesh & Vitalari). This

anytime-anywhere connectedness of employees to their work has redefined the traditional boundaries that have customarily separated work from home (Marsan, 2001).

From a different perspective, positive characteristics associated with technology in the workplace centers on the roles computers have taken that go beyond being merely tools. For example, Clarke and Smyth (1993) pointed out that computers now serve as cooperative partners, while Johnstone, Berry, and Nguyen (1994) referred to computers as partners who partake in cooperative dialogues with users. Other researchers highlighting the positive characteristics of technology was found in the work of Desmarais, Girous, and Larochelle (1993) who used the metaphor of coach when describing computers because of their capacity to assist and motivate users to reach their goals. Additionally, Bocionek (1995) described computers as secretaries and assistance acting and interacting seamlessly with users to the extent that computers are no longer machines but more like human counterparts.

Continuing with research highlighting the positive characteristics of technology, Moon (2003) and Moon and Nass (1998) point out that computer technology now serves as decision-makers that can be held morally responsible for errors, such as those serving as automated pilots and decision support advisors that provide users with the best available solutions to a myriad of problems. Bocionek (1995) also highlighted the interactive nature of computers such as those with the ability to observe the user's actions, develop an understanding of the user's needs, learn the user's behaviors, and then provide the user with advice. Additional research findings indicate that individuals tend to personify and respond to computer technologies socially (Reeves & Nass, 1996), use social rules when addressing computers (Nass, Steuer, Henriksen, & Dryer, 1994), apply

human stereotypes to computers (Nass & Moon, 2000), and the more human computers appear to be the greater the likelihood users will respond to and interact with computers as if they are actually human (Nass & Moon). With the presence of computers and other communication technologies (such as the Internet) in the workplace, many researchers now describe technology as the conduit that has allowed organizations to compete on a global scale (Marcuse, 2007). As a result of technology, organizations have experienced advances in communication and information carrying capacity that have facilitated the exchange of information across international borders (Marcuse).

In addition to the lack of consistency among researchers as to the positive or negative characteristics associated with technology, inconsistencies are also present with respect to the attitudes and perceptions employees hold about technology. For instance, Morrow, Prell, and McElroy (1986) found that prior experience with computers was associated with more favorable attitudes toward computers, while others have found that gender, age, and race also influence users' attitudes toward computer technology (Campbell, 1990; Gilroy & Desai, 1986). Additional research findings point to either structural or external factors such as the type of computer system or strategies employed by top-level management (e.g., computer surveillance) as important factors that influence users' attitudes about computer technology (Martin, 1985).

Also relevant here is the lack of research examining the relationship between employees' attitudes toward computers and their work-related attitudes of job satisfaction and organizational commitment. For example, Appelbaum's (1990) research found that employees' negative attitudes about computer technology were associated with their fear of change, fear of failure, fear of isolation, and fear of job displacement, while Rafaeli

(1986) found that job involvement moderated the relationship between computer use and the attitudes employees held toward technology. Despite the value of the previous examples, researchers have yet to determine whether the attitudes employees hold toward technology impact their work-related attitudes of job satisfaction and organizational commitment. From what we know, it could be extrapolated that multiple factors influence the attitudes employees' hole toward computer technology; in turn, these attitudes then influence the work-related attitudes of job satisfaction and organizational commitment.

In addition to the gaps in the research pointed out thus far, there also appears to be a shortage of research focused on computer technology in mandated use work environments. These work environments are described as jobs that require employees to use technology as a job requirement (Kiesler, Siegel, & McGuire, 1987). Of the limited number of research studies on mandated use work environments, Kiesler et al. found that such work environments tend to isolate employees by restricting their communication interactions to those mediated by technology. According to Mann (1999), technology generated isolation is the result of new organizational structures (e.g., working from home) that detach its members from the organization and their fellow colleagues. Mann continued by pointing out that these isolating conditions have a negative emotional impact on employees that manifests itself as depersonalization and a lack of commitment to the organization. For example, as Kiesler et al. argued that, "electronic media does not efficiently communicate nuances of meaning and frame of mind, organizational loyalties…and individuating details about people that might be embodied in their dress, location, demeanor, and expressiveness" (p. 249). Kiesler et al. also argued that mediated communication in the workplace may appear dehumanizing because it lacks the

emotional tone and feeling being expressed by the sender and understood by the receiver to the extent that messages become depersonalized and even misunderstood. Although recent studies have shed some light on the influence mandated use environments have on the organization and its members (Adamson & Shine, 2003; Brown, Massey, Montoya-Weiss, & Burkman, 2002), little effort has been made to examine factors beyond technology that may also affect the organization and its members (Adamson & Shine). Therefore, further research in mandated use environments appears warranted in order to better understand the full impact this environment has on the organization and its members

Another area of concern facing scholars and business professionals alike is the difficulty associated with isolating the value-added component of technology. Typically, studies have focused on an aggregate level of analysis by attempting to realize the value of computer technology at a macro corporate level from a profit and loss perspective (Baily & Chakrabarti, 1999). As a result of the multitude of factors found to contribute to the financial success or failure of an organization, a macro level of assessment has proven to be ineffective in accurately accounting for the specific value realized by the use of computer technology in the workplace (Baily & Chakrabarti). However, there is some evidence suggesting that the value-added component of computer technology exists at a lower level in the organization, with the user/employee rather than the macro corporate level (Banker & Johnston, 1994; Banker, Kauffman, & Morey, 1990; Weill & Olson, 1989). Thus, an examination of users' attitudes and perceptions of technology and the work related attitudes that flow from these, merit further investigation. Therefore, it seems reasonable to suggest that in order to accurately account for the value of

technology in the workplace; research must capture the value-added impact of technology at the user/employee level, which could be captured in their work related attitudes of job satisfaction and organizational commitment.

In addition to the aforementioned limitations found in the research, researchers have also been slow to envision the way in which multiple external and internal factors contribute to the attitudes and perceptions users hold toward technology. In doing so, researchers have also failed to realize the subsequent work-related outcomes, such as of job satisfaction and organizational commitment. As a result of this lag in research there is no well accepted multifactor model designed to explain and describe the influence internal and external factors have on the attitudes employees hold toward technology and their subsequent work related attitudes. Therefore, the current study was developed with the goal of filling the gaps in the research highlighted above. In order to do so, the primary author developed a multifactor model designed to explain the impact technology has on the organization and its members. In order to develop this multifactor model, the primary author incorporated Actor Network Theory (ANT; Callon, 1986; Latour, 1987; Law, 1987) and Social Cognitive Theory (SCT; Bandura, 1986) as the theoretical underpinning for the current study. The following section will provide the rational for the inclusion of both theories and how they served to inform the development of the current model.

Actor-network theory (Callon, 1986; Latour, 1987; Law, 1987) emerged from the field of science and technology research, ANT conceptualizes social interactions in terms of networks. According to Latour, networks integrate the material environment (e.g., technology) and the semiotic environment (e.g., concepts and symbolic meanings). This

implies that social interactions have both material and human causes. For example, culture, society, and nature are constructed together simultaneously and are in a perpetual state of realization (Latour). Therefore, it would be incorrect to think that only one factor could explain the perceptions people hold toward society (Latour). In a similar vein, it also would be incorrect to think that only one factor (such as the technology itself) could explain the attitudes and perceptions employees hold toward computer technology in the workplace. Actor-network theory is also conceptually related to symbolic interactionism, insofar as social interactions construct and reify what is perceived as reality (Callon, 1986).

The following illustration will further explain the multifactor conceptualization of reality poised by ANT. When going about your day, driving your car, or using a computer, there are a number of factors that influence those activities. For instance, when driving a car, you are influenced by traffic regulations, prior driving experience, and the car's drivability. Similarly, the use of computer technology is also influenced by a number of factors such as technological factors (e.g., ease of use), personal factors (e.g., self-efficacy), and organizational factors (e.g., social influence). Thus, in reality, there are a multitude of factors that contribute to a person's view of reality and the way he or she acts in given situations. Because the act of carrying out any task is under the influence of a number of factors, it is reasoned here that multiple factors also contribute the attitudes employees hold toward technology in the workplace. The prior illustration is exactly what the term actor network implies. An actor network, then, is the act linked together with all of its influencing factors (which again are linked), producing a network. An actor network consists of and links together both technical and non-technical elements.

Accordingly, it could be articulated that the perceptions employees hold toward computer technology and their subsequent work-related attitudes are the result of a multitude of factors. In following with the multifactor model of reality, Robey and Zmud (1992) observed that "the spread and acceptance of new technology depends on its fit with the work context, knowledge about the technology, technological infrastructure, and community beliefs about the technology" (p. 15).

Bandura's (1986) SCT also highlights the value of a multifactor approach to explain how people function. In doing so, Bandura advanced a view of human functioning that accords a central role to cognitive, self-regulatory, and self-reflective processes in human adaptation and change. In this way, people are viewed as self-organizing, proactive, self-reflecting, and self-regulating beings rather than reactive organisms shaped solely by environmental forces. From this theoretical perspective, human functioning is viewed as the product of a dynamic interplay between personal, behavioral, and environmental influences (Bandura).

Despite the utility of a multifactor approach for developing a model of technology, most prior models are limited by their myopic focus on the technology itself as the primary factor of interest without considering additional factors that may also influence the attitudes employees hold toward technology. To date, there is no well accepted multifactor model of technology that includes technological, personal, and organizational factors to explain and describe how multiple factors influence employees' attitudes about technology and in turn how these attitudes subsequently influence the work-related attitudes of job satisfaction and organizational commitment. Therefore, the current study was considered with the intention of filling some of the aforementioned

gaps in the literature by developing the model just described above. The inclusion of technological factors consisting of perceived usefulness and ease of use in the development of the current multifactor model will be discussed in greater detail below.

*Technological Factors*

To date, Technology Acceptance Model (TAM; Davis, 1989) is one of the most widely used and influential models developed to explain a person's acceptance and use of new technology (King & He, 2006). Davis developed TAM based on Fishbein and Ajzen's (1975) Theory of Reasoned Action, which has been broadly used in prior research to predict and explain human behavior in various domains (Lin & Wu, 2004). The Theory of Reasoned Action suggests that social behavior is motivated by an individual's attitude towards carrying out that behavior, which is a function of his or her beliefs about the outcome of performing that behavior and the evaluation of each of those outcomes (Fishbein & Ajzen). Among the most salient findings associated with TAM was that users' perceived ease of use and perceived usefulness of technology were found to be the main predictors of users' intentions to use and their actual use of technology (Davis; Venkatesh & Davis, 1996).

Ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). Whereas, perceived usefulness is the degree to which a person believes that using technology will enhance his or her job performance (Davis). Davis also pointed out that perceived usefulness and perceived ease of use are distinct but related constructs in that an increase in perceived ease of use may contribute to an increase in perceived usefulness. In other words, perceived usefulness is a state in which internal beliefs tie in with an individual's

assessment of the mental effort involved in using a system.

Since its inception nearly two decades ago researchers have tested and extended TAM to examine the acceptance and use of word processor and spreadsheet software (Chau, 1996; Venkatesh & Davis, 1996), Internet use (Agarwal & Prasad, 1997), computer support (Taylor & Todd, 1995), production management systems (Venkatesh & Davis, 2000), and employees' acceptance of new technology (Martins, 2004). Despite the number of studies that have sought to extend TAM they have offered little insight into additional factors other than those pertaining to the technology itself (Venkatesh & Davis, 2000). Additionally, several researchers (Davis, 1986; Davis, 1989; Davis, Bagozzi, & Warshaw, 1989; Goodhue & Thompson, 1995) acknowledged that TAM is incomplete in one important respect: it does not account for social influences that contribute to the users' attitudes of technology and its usage. Specifically, Davis et al. recognized the need for additional research to "investigate the conditions and mechanisms governing the impact of social influences on usage behavior" (p, 129). To date, there has yet to be a model of technology that includes social influence within the workplace as a contributing factor to the attitudes employees hold toward computer technology.

In addition to the social influence, both types of perceptions (ease of use and perceived usefulness) are subject to the effects of external and internal variables. For example, Lin and Lu (2000) applied TAM to predict the acceptance of websites, which included external variables such as computer quality, information quality, response time, and system accessibility. The results of Lin and Lu's study indicated that the previously mentioned external variables significantly affected the perceived usefulness and

perceived ease of use of websites. More recently, Hsu and Lu (2004) suggested that researchers should investigate how perceived ease of use, perceived usefulness, and experience are influenced by external factors such as system characteristics, individual personalities, and cultural influences. In following with the work of Hsu and Lu, further investigation of external factors beyond that of technology appears to be warranted. Based on prior research it is reasoned that the addition of both personal and organizational factors to ease of use and perceived usefulness would provide a more thorough explanation of the way in which users' develop their attitudes and perceptions of technology.

The Technology Acceptance Model represents an important contribution toward understanding computer usage and acceptance behaviors based on factors related to the technology itself (Davis, 1989; Robey, 1996). Specifically, TAM highlights two key technological factors (perceived usefulness and perceived ease of use) found to influence users' behavioral intentions to use and ultimately their computer usage (Davis). Both factors (perceived usefulness and perceived ease of use) are measured by six items originally developed by Davis and have proven reliabilities and validities; therefore these measures were used in the current study.

In addition to technological determinants, a limited amount of prior research indicated that a number of personal factors tend to contribute towards the attitudes a person develops toward technology (Loyd & Gressard, 1984a; Murphy, Coover, & Owen, 1989; Nash & Moroz, 1997), which include: computer anxiety and frustration (Cohen & Waugh, 1989; Glass & Knight, 1988; Maurer, 1994), computer self-efficacy (Brosnan, 1998b; Compeau & Higgins, 1995), and individual innovativeness (Goodman

& Griffith, 1991; Rogers, 2003). Given that each of these personal factors alone or combined could affect the users' attitudes and perceptions of computer technology the following section will consider the influence of personal factors beginning with computer self-efficacy in greater detail.

*Personal Factors*

C*omputer Self-Efficacy,* defined as one's capability to use computer technology (Compeau & Higgins, 1995), originated from self-efficacy in social cognitive theory and is conceptualized as person's belief in his or her ability to meet certain situational demands (Bandura, 1997). A high level of self-efficacy is indicative of a person's strong beliefs that he or she has the skills and ability to achieve desired goals. People with high self-efficacy are more likely to put forth additional effort in the process of pursuing their goals than those with low self-efficacy (Bandura). Bandura also added that self-efficacy beliefs touch virtually every aspect of a person's life including: whether they think productively, pessimistically, or optimistically; how well they motivate themselves and persevere in the face of adversities; their vulnerability to stress and depression, and the choices they make. In following, Bandura described the role of self-efficacy in human functioning as "a person's level of motivation, affective state, and actions that are based more on what they believe than on what is objectively true" (p. 2).

Since, belief and reality are seldom perfectly matched, and individuals are typically guided by their beliefs, it bears noting that self-efficacy beliefs are themselves critical determinants of how well knowledge and skills are acquired in the first place (Bandura, 1997). For example, imagine a tenured employee whose job suddenly mandates the use of computer technology in all facets of organizational life. Imagine then

that this employee has little to no prior experience with computers coupled with low computer self-efficacy (e.g., negative beliefs about his or her ability to learn the new technology). Even if the organization offers computer training, it is likely that this employee would experience an increase in anxiety and a decrease in motivation toward computer technology as a result of his or her lack of self-efficacy (Brosnan 1998b). Thistly, the anxiety that results from low self-efficacy would influence the employee's perceptions of technology in such a way that he or she would likely develop an aversion to computer technology (Brosnan). Conversely, if the employee had a great deal of prior experience with computer technology coupled with a moderate to high level of computer self-efficacy, the employee would be motivated to learn the technology and develop an affinity towards computer technology (Chua, Chen, & Wong, 1999).

Self-efficacy beliefs influence the outcomes a person expects; such as the ability to successfully utilize technology in order to accomplish tasks (Marcolin, Compeau, Munro, & Huff, 2000). Those who are confident in their computer skills also expect to utilize technology to enhance the quality of their personal and professional lives, whereas the opposite is true of those who lack confidence and self-efficacy in their computer skills (Marcolin et al.). For example, those who lack confidence in their computer skills envision mistakes and failure before they even begin to use the technology (Pedersen, 2002). This function of self-beliefs associated with self-efficacy can result in a self-fulfilling prophecy in which a person accomplishes what he or she believes they will accomplish (Bandura, 1977). That is, the perseverance associated with high computer self-efficacy is likely to lead to increased performance, which, in turn, raises one's sense of efficacy and spirit, whereas the acquiesce associated with low self-efficacy helps

ensure failure, which further lowers confidence and morale.

Although simply defined as a belief in one's capability to use computer technology, computer self-efficacy has received a great deal of attention over the past decades (Compeau & Higgins, 1995). As a result research has indicated that users high in computer self-efficacy develop relatively high levels of computer competence defined as "the user's potential to apply technology to its fullest possible extent so as to maximize performance of specific job tasks" (Marcolin et al., 2000, p. 38) Also, when individuals are high in computer self-efficacy they perform better in applying their technical knowledge and skills to achieve computer related tasks and are more satisfied with the adoption of computers in the workplace (Yoon, Guimaraes, & O'Neal, 1995). Moreover, research indicates that computer self-efficacy is an important determinant of individual performance and computer use (Munro, Huff, Marcolin, & Compeau, 1997), and computer self-efficacy has a positive influence on users' overall job satisfaction (Blili, Raymond, & Rivard, 1998).

In addition to the value of examining computer self-efficacy and computer anxiety (addressed in the next section) there are a number of computer self-efficacy and computer anxiety measures. For example: The Computer Self-efficacy Scale (CSE; Murphy et al., 1989), and the computer confidence subset of the Computer Attitude Scale (CCCAS; Loyd & Gressard, 1984a), The Computer Anxiety Scale (CAS; Marcoulides, 1989), the Computer Anxiety Rating Scale (CARS; Heinssen, Glass, & Knight, 1987), and the computer anxiety subset of the Computer Attitude Scale (CACAS; Loyd & Gressard, 1984a). More recently, Barbeite and Weiss (2004) developed a scale that combined both computer self-efficacy and computer anxiety into one measure with the

goal of reducing redundancies and inconsistencies found in the existing measures. The result was a valid and reliable measure of computer self-efficacy and computer anxiety comprised of 16-items that maintained the factor structures found in the original measures. These factors include: a) computer self-efficacy for general/beginner activities, b) computer self-efficacy for advanced activities, c) anxiety as a result of computer-related activities, and d) anxiety as a result of computer use (Barbeite & Weiss, 2004).

Additionally, self-efficacy (in this case, computer self-efficacy) and Anxiety (such as computer anxiety) are both part of Bandura's (1997) self-efficacy framework, which is based on four sources of information: previous experiences, observation of other's experiences, verbal persuasion, and affective arousal. In the current context, computer anxiety is also of interest because prior research has indicated that low computer anxiety was positively related to high computer self-efficacy beliefs and performance (Chen, Gully, Whiteman, & Kilcullen, 2000). Therefore, the relevance of computer anxiety to the development of a model of technology will be considered in greater detail below.

*Computer Anxiety* is the fear of computers when using one, or the fear associated with the impending use of a computer (Chua et al., 1999), and is accompanied by a negative emotional state and a negative cogitative experience (Bozionelos, 2001). However, computer anxiety is not considered to be a personality trait, but rather a "state anxiety" which occurs at the time of computer use or at the time of imagined future computer use (Cambre & Cook, 1985; Chua et al.). Computer anxiety is likely to contribute to the development of negative attitudes, perceptions, and beliefs users hold towards using computers (Heinssen et al., 1987).

Computer anxiety is also characterized as an affective response described as the fear of potential negative outcomes such as damaging the equipment or looking foolish in front of others (Cambre & Cook, 1985; Heinssen et al., 1987). From an information-processing perspective, the negative feelings associated with high anxiety detract cognitive resources from task performance (Kanfer & Heggestad, 1997). Therefore, the performance of employees with high computer anxiety tends to be poorer than those with little or no computer anxiety (Cambre & Cook). Computer anxious individuals exhibit phobia-like symptoms which lead them to use computers less, and when using computers to complete tasks, they do so more slowly (Mahar, Henderson, & Deane, 1997), as a result of a decrease in their psychological well-being (Bozionelos, 2001). Bozionelos further explained that if society continues to force computer technology onto computer anxious individuals, their phobia-related symptoms will continue to worsen.

According to prior research, a large number of employees experience computer anxiety or negative affective attitudes towards computers (Cohen & Waugh, 1989; Worthington & Zhao, 1999). However, research findings vary as to the actual number of people who suffer from computer anxiety with some reporting that computer anxiety effects 25% of the population (Gos, 1996), others suggest that 33% of all individuals among different populations experience some level of computer anxiety (Brosnan, 1998a), with yet others indicating that almost 50% of individuals display some sort of anxious behavior while using a computer (Rosen & Maguire (1990). In addition to the number of users experiencing computer anxiety, a general finding of interest is that people with high computer anxiety use avoidance as a coping strategy for anxiety-generating situations (Rachman, 1998). Kanfer and Heggestad (1997) concluded that the

negative feeling linked with high computer anxiety likely result in adverse perceptions of computer technology as well as an increased level of frustration for users.

When computer technology is too complex and becomes too difficult to use, often times users experience high levels of anxiety and frustration that can lead to wasted time, mood changes, and negative interaction with colleagues (Ceaparu, Lazar, Bessiere, Robinson, & Shneiderman, 2004). Further, research suggests that high levels of computer anxiety may lead to decreased job satisfaction (Murrell & Sprinkle, 1993), and in some cases, it can even lead to physiological responses such as increased blood pressure and muscle tension (Scheirer, Fernandez, Klein, & Picard, 2002). Computer generated anxiety has also been recognized as a major reason why people develop low levels of computer self-efficacy, can not use computers to reach their goals, hesitate to use computers, and avoid computers altogether (Storms & Spector, 1987).

The search for knowledge and skills required in today's workplace puts new demands on the contemporary adult work force as a result of sophisticated computer systems being more widely used by both white and blue-collar workers (Bozionelos, 2001). As a result, the primary challenge for contemporary, technology-intensive organizations is the ability to find multi-skilled individuals, with knowledge that spans different roles and who are innovative and adaptive to the implementation of new innovations found in the workplace (Goodman & Griffith, 1991). Similarly, Rogers (2003) indicated that in order for employees to cope with the changes that technology brought to the workplace they must be adaptive and innovative. Given that innovativeness speaks directly to a person's ability to adapt their current course of thought or action for more productive alternatives, it is reasonable to consider individual

innovativeness as a personal factor of interest here.

*Individual Innovativeness* is defined as a predisposed tendency toward adopting an innovation (Rogers, 1962, 2003), whereas an innovation is defined as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers, 2003, p. 12). According to the innovation diffusion theory (Rogers, 1962, 2003), people react differently to a new idea, practice, or object due to their differences in individual innovativeness. The innovativeness of an individual is a persistent predisposition that is reflective of an individual's underlying nature when exposed to an innovation (Rogers, 1962, 2003). Other researchers also agree with Rogers that individual innovativeness is a persisting characteristic or disposition by which one individual can be distinguished from another (Goldsmith, 1990; Hurt, Joseph, & Cook, 1977; Midgley & Dowling, 1978).

Because it is new or perceived as such, adopting an innovation inherently involves a risk (Bhatnagar, Misra, & Rao, 2000; Kirton, 1976), with some people being more likely to take risks of adopting an innovation as opposed to others as a result of their differences in individual innovativeness (Hurt et al., 1977; Rogers, 2003). For example, some individuals are by their nature more willing to take the risk of trying out an innovation while others are suspicious of new ideas and hesitant to change their current practice. Given the rapid introduction of new technologies and the soaring costs associated with those technologies, identifying an individual characteristic such as innovativeness is of substantial value for the successful implementation of computer technology in the workplace (Rogers).

The diffusion of innovations paradigm provides explanations for when and how a

new idea, practice, or technique is accepted, rejected, or reevaluated over time in a given society (Rogers, 1995). Although the theory covers all aspects of the diffusion process, its strength lies in its ability to structure and predict the factors leading to adoption decisions. According to Rogers, the decision to adopt an innovation is predicted, in part, by the perceived attributes of an innovation, and the personality of the potential innovator. In recent years, a great deal of research attention has focused on the impact of perceived attributes on the adoption of technology (see Davis et al., 1989); however, the ability to capture the nature of ones' personality is exacerbated by the difficulties in consistently measuring its associated dimensions (Rogers). Often, researchers use different strategies for measuring innovativeness, which appears to be related to the type of research they are conducting. For example, Kang (2002) measured adoptive innovativeness among cable subscribers using the length of time they have been a digital cable subscriber, while Wei (2001) measures the same construct among cellular phone non-adopters by measuring their ownership of an arbitrary cluster of telecommunication devices. Such differences in approach and measurement strategy have resulted in an inability to evaluate the reliability and validity of findings, which hampers the ability to test and extend the theory of innovation (Rogers).

There are several additional approaches beyond those previously mentioned that have been used to measure innovativeness. Specifically, a number of researchers use as a measure of innovativeness my measuring the time difference between the introduction of an innovation and its actual adoption as an indicator of innovativeness (Goldsmith & Hofacker, 1991). For example, Leung and Wei (1999) used this strategy to categorize all these consumers who had not yet adopted cellular phones in Hong Kong by 1998 as

"laggards." Likewise, when identifying adopter profiles within digital cable subscribers, Kang (2002) used market penetration at the time of study and assumed that all the consumers who had subscribed to digital cable by 1999 must be early adopters. Using this strategy to segment adopters has been criticized since time of adoption is a temporal concept that bears no actual relationship with the construct "innovativeness" (Midgley & Dowling, 1978). In addition, this strategy does not effectively predict future rate of adoption and diffusion, since it requires the adoptive decisions to have already taken place. Another strategy proposed by Midgley and Dowling is the use of a cross-sectional method wherein an individual's ownership of a particular list of products is assessed to ascertain his or her degree of innate innovativeness. Difficulties in determining what constitutes an innovation, choosing the appropriate products within a category, and choosing the products that are complementary or supplementary to the innovation, reduces the reliability and generalizability of findings using this approach (Goldsmith & Hofacker).

The final approach is to directly identify innovators using self-report measures. There are two conceptually distinct dimensions of innovativeness that are often measured: a) global innovativeness and b) context-specific innovativeness. The former is a personality dimension that cuts across the span of human behavior, while the latter refers to innovative attitudes and behaviors within a certain category (Flynn & Goldsmith, 1993). Foxall and Szmigin (1999) argued that since the measures for both these constructs are conceptually and empirically distinct they should not be substituted for each other. Of particular interest here was the concept of global innovativeness, which highlights the degree to which an individual makes innovative decisions independently of

the communicated experiences of others (Midgley & Dowling, 1978). That is, global innovativeness is an individual's predisposition to behave in a given way (Foxall & Szmigin). Based on this global conceptualization, innovativeness is viewed as a personality trait possessed to a greater or lesser degree by all individuals, which is similar to Roger's (1962) original conceptualization of innovativeness. Additionally, it is believed that individual innovativeness is a continuous variable normally distributed within a population and generalizable across products (Hirschman, 1980). An example of a specific measure designed to tap into global innovativeness was the Individual Innovativeness Scale developed by Hurt et al. (1977).

The primary reason for the interest in global innovativeness is found in a substantial body of prior research that highlights the importance of a person's disposition toward innovation and the successful adoption of new technology (Hirschman, 1980; Hurt et al., 1977; Midgley & Dowling 1978; Midgley & Dowling 1993; Yi, Fiedler, & Park, 2006). For example, Yi et al.'s research findings indicated that individual innovativeness moderated the relationship between technological factors (e.g., perceived usefulness and ease of use) and a person's future intentions to use the technology. In addition to the associations between individual innovativeness and computer technology, the following examples also included the attitudes users held toward technology. Specifically, Karahanna, Ahuja, Srite, and Galvin (2002) found a positive relationship between individual innovativeness and the attitudes users held toward technology during on line support group interactions, whereas the findings of Limayem and Khalifa (2000) indicated a positive relationship between individual innovativeness and a person's attitudes and intentions to shop online. As a result of the research reviewed here, it is

reasonable to assume that a person's orientation toward innovativeness will likely have an influence on the attitudes and perceptions people hold toward the innovation itself, in this case, computer technology. Therefore, it could be extrapolated that users who are highly predisposed towards adopting innovations are more likely to develop positive attitudes towards the innovation compared to those individuals who are opposed to adopting innovations.

Since the influx of technology, frequent change appears to have become an enduring feature of many workplaces. In response, scholars argued that organizational members must be innovative in order to adapt to the technologically driven changes found in contemporary organizations (Jablin, 2001; Rice, 1983; Svenning & Ruchinskas, 1984). For example, organizational changes, such as those related to technological advances, have created a work environment that demands innovation and adaptability from its members (Feltovich, Spiro, & Coulson, 1997; Hesketh & Neal, 1999; Lawler, 1994; Schmitt & Chan, 1998). This means that employees are required to be innovative enough to consider learning as a lifelong process of constructing and applying knowledge to match the growing technological demands (Wanberg & Kammeyer-Mueller, 2006). In the face of such change, it is not surprising that innovativeness and adaptability are widely acknowledged as key competencies for today's employee. Thus, workers must engage in behaviors that include the acquisition of job specific skills coupled with an innovative and adaptive orientation in preparation for changes to their current job and future jobs (Hesketh & Considine, 1993).

In addition to the personal factors presently discussed, Spector (1978) indicated that the physical environment (both natural and man-made), the organizational structure

and climate, the rules and procedures of the organization, and individuals both in and out of the organization may shape an employee's assessment of computer technology. As a result of Spector's work, it is reasoned here that in addition to technological and personal factors, organizational factors should be included in the development of a model that highlights technology. Thistly, the following will consider the organizational factors of socialization, social influence, and task structure in greater detail.

*Organizational Factors*

*Socialization* has been defined as the process by which newcomers acquire the requisite attitudes, behaviors, and knowledge in order to participate as an organizational member (Van Maanen & Schein, 1979). When individuals join organizations they must learn to understand and make sense of their new surroundings (Louis, 1980). This method of sense-making is known as organizational socialization. Organizational Socialization also involves a shared understanding between the organization and its members regarding acceptable job behaviors (e.g., the use of computer technology as a means of communicating with others). These behaviors are promoted informally by the activities of coworkers and formally through interactions with supervisors and by organizational policies and procedures propagated to employees during their socialization. Louis (1990) suggests that role theory accounts for the impact that informal organizational procedures have on a new employee by the way the newcomer models the behavior of coworkers, senior colleagues, mentors, and credible supervisors (Mortimer & Simmons, 1978). These role models identify the attitudes and behaviors most appropriate for newcomers to imitate in order to fit in to their new work environment.

More specifically, organizational socialization is considered to be a component of

the assimilation process defined as the way of teaching those ongoing behaviors and cognitive processes by which individuals join, become integrated into, and exit an organization (Jablin, 2001). Jablin described assimilation as "the processes by which individuals become integrated into the culture of an organization" (p. 755). Rousseau (1990) suggests that the behavioral norms encouraging employees to follow the values of the organization will be driven by an organization's espoused values (e.g., trust, autonomy, technological innovation, and the use of technology) communicated by supervisors, coworkers, and the organization itself. These values, according to Rousseau (1991), are "the preferred states that are often manifested in observable behaviors" (p. 159).

The success of an organization in terms of its productivity, employee job satisfaction, and minimal turnover rate (organizational commitment) depends primarily on the effective communication practices of the organization (Downs & Hazen, 1977). The behaviors employees' display in the workplace are best understood as a reflection of the organizational communication practices, such as those utilized during employee socialization (Hargie, Dickson, & Tourish, 1999). For example, the procedures, rules, and policies for appropriate use of technology are the result of the communication interactions that take place during the socialization or re-socialization of organizational members. Since communication is thought to be "the central binding force that permits coordination among people and allows for organized behavior" (Myers & Myers, 1982, p. 2) it could be reasoned that the communication interactions that take place during socialization serve to shape its members attitudes and perceptions of the values and practices of the organization.

Jablin (1987, 2001) suggested that an important feature of newcomer socialization is behavioral and attitudinal modification. Such modification involves the newcomer learning the organization's norms for behavior, attitudes, and structure, and then aligning them with their own norms. Given the trend toward increased complexity and ambiguity in today's workplace and the importance of employee socialization to overall job performance and satisfaction (e.g., Tubre & Collins, 2000), it is considered here that employees socialized into a corporate culture that communicates clearly its position and value of computer technology would likely development more positive attitudes toward technology than employees socialized into a corporate culture of secrecy and distrust toward technology.

Drawing from the work of Kopelman, Brief, and Guzzo (1990), when newcomers see their coworkers rewarded (e.g., rapid promotions and increased salary) for behaving in a manner espoused by the organization, the newcomer is likely to adopt similar behaviors to the extent that the pending rewards serve to influence the newcomer's attitudes and perceptions of the behavior. This rationale is supported by reinforcement theory, which suggests that individuals who are rewarded for certain behaviors will be more inclined to draw a relationship between the behaviors and the rewards and, thus, more apt to repeat those behaviors (Skinner, 1969). For example, during socialization newcomers who see their coworkers rewarded for their positive attitudes and efficient use of computer technology are likely to adopt similar attitudes and behaviors as a result of the pending rewards. Whether it be rewards, social pressure, or just trying to fit in, socialization influences the attitudes and behaviors of employees to the point that a shared set of values and attitudes emerge.

With regard to organizational socialization and technology use, organizational newcomers learn the appropriate use and misuse of computer technology in the workplace through formal and informal communication interactions. Specifically, group and organizational norms regarding the use of technology influences employees' frequency of use and their attitudes toward computer technology. In general, workplace norms have a strong influence on beliefs, attitudes, and behavioral responses to situations. Importantly, norms provide cues regarding the appropriateness of behavior in a particular context (Jackson, 1965). Appropriate technology use involves mastering subtle but important dimensions such as the organization's usage norms (Markus, 1994) and the technologies' symbolic nuances (Sitkin, Sutcliffe, & Barrios-Choplin, 1992). Thus, task socialization regarding the appropriate use of computer technology is considered here as an important factor that contributes to the users' attitudes and perceptions of computer technology in the workplace. In fact, Markus suggests that a key dimension of technology use in organizations is to "behave appropriately," implying that using technology consistently with one's colleagues is crucial for achieving socialization-related goals. Given that work group norms may differ from organizational norms, and social influence is heavily dependent on the salience and immediacy of the source, we expect here that task, organizational, and workgroup socialization will have a positive influence on employees' attitudes and perceptions of computer technology in the workplace.

Prior research assessing the influence of organizational socialization or re-socialization on users' attitudes and acceptance of computer systems were measured using factors from a study by Chao, O'Leary-Kelly, Wolf, Klein, and Gardner (1994).

For example, Rice, Collins-Jarvis, and Zydney-Walker (1999) used Chao et al.'s factors of performance efficiency (measured efficiency in job performance, task mastery, and successful use of appropriate skills and abilities), organizational politics (included knowledge of how things "really are" inside the organization, influential people, and motives behind others' actions), and people socialization (including coworkers as friends, being part of the gang, and included in informal networks). However, these factors have proven to be unreliable (Rice et al.), thus deemed inappropriate for the current study. From a different perspective, researchers have assessed the influence of organizational socialization on users' attitudes and acceptance of computer systems through story telling (Swap, Leonard, Shields, & Abrams, 2001). Also deemed inappropriate here based on the qualitative structure of the current study.

As a result of the limited methods for examining the influence of socialization on employees' attitudes and perceptions of computer technology and even fewer measures to assess this relationship, a modified version of Haueter, Hoff-Macan, and Winter's (2003) Newcomer Socialization Questionnaire (NSQ) designed to assess the three factors of (e.g., organizational, workgroup, and task socialization) was used in the current study. According to Haueter et al., task socialization entails acquiring information about the job and understanding the tasks for which one had been hired, organizational socialization involves the newcomer learning the values, goals, rules, politics, customs, leadership style, and language of the organization, and workgroup socialization involves the newcomer learning particulars about the work group and the behaviors associated with the group's rules, goals, and values. According to Markus (1994), a key determinant of appropriate computer use in the workplace is to behave in a manner that is consistent

with one's colleagues. Based on social pressures to conform to the expectations of others (Kaplan & Miller, 1987) as a result of the social influence of a referent group or authority figure, it is reasoned here that social influence may also influence the attitudes and perceptions employees hold toward computer technology. Therefore, social influence was considered here and its relevance will be discussed in greater detail below.

*Social Influence,* in general has its roots in the classic experiments conducted by Solomon Asch (1951, 1956, 1966). These experiments showed how people could be influenced by group members to claim that clearly dissimilar vertical lines were, in fact, identical. Another classic experiment highlighting the impact of social influence (obedience) was that of Stanley Milgram (1963, 1983). Specifically, Milgram's (1963) experiments examined the extent to which people would comply with orders to give (what they thought were) life-threatening electric shocks to another person, in response to the requests of an individual thought to be in a position of authority. Additionally, theories of social influence have established that social factors have a powerful influence on the behaviors of others (Deutsch & Gerard, 1955; Sherif, 1936; Stacy, MacKinnon, & Pentz, 1993).

According to Deutsch and Gerard (1955) social influence is comprised of normative influence which involves the conformity of one person's behavior to conform with the positive expectations of another, and subjective influence, which is defined as the influence to establish a favorable image within a referent group. More specifically, normative influence refers to the way in which implicit or explicit rules emanating from a group or an authority figure are used to infer acceptable behavior (Kaplan & Miller, 1987). This type of influence has been shown to be a powerful determinant of behavioral

compliance in numerous contexts (Moscovici, 1985). Therefore, according to normative influence employees will likely develop attitudes about computer technology that were congruent with both the implicit and explicit rules expressed by supervisors and coworkers.

Subjective influence differs from normative influence in that the former is concerned with establishing or maintaining a favorable image within a reference group, whereas the latter centers on compliance to rules (Kelman, 1958). Drawing from research on diffusion of innovations, Moore and Benbasat (1991) define image as "the degree to which use of an innovation is perceived to enhance one's status in one's social system" (p. 195). I an effort to develop a favorable image, people engage in behaviors that are thought to elevate their status within a referent group. For example, if a person believed that members of his or her referent group thought that he or she should behave is a specific way, then behaving that way should elevate that persons standing within the group (Blau, 1964; Pfeffer, 1982). Specifically, Pfeffer argued by performing behaviors that are consistent with group norms, an individual "achieves membership and the social support that such membership affords as well as possible goal attainment which can occur only through group action or group membership" (p. 85).

In sum, employees' attitudes and perceptions of computer technology are shaped in part by the organization through a series of interrelated components including social influences. For instance, the use of technology by one's work group has been found to be positively related to an individuals' use of technology, especially when group attraction is high (Fulk, 1993). Also, the use of technology by management has been found to be a significant predictor of employee technology use (Markus, 1994). Schmitz and Fulk

(1991) found that workers' perceptions of e-mail usefulness varied with perceptions of their colleagues and supervisors, and that technology usage patterns are the result of the "attitudes, statements, and behaviors of co-workers" (p. 121). Further, Davis (1989) and Davis et al. (1989) noted that it is important to account for subjective norms such as those present in social influence in determining employee acceptance and use of technology.

Social influence has been previously operationalized in terms of Kelman's (1958) processes of compliance, internalization, and identification. According to Davis (1989) an individual may do what he or she thinks a referent would want them to do even if the action is not consistent with his or her own beliefs and attitudes. Thus, Davis et al. (1989) underscored that the role of social influences in computer technology acceptance and usage represents an important area for a better understanding of real world applications of technology. Specifically, Davis et al. observed that Kelman's (1958, 1961) theoretical distinctions between the processes by which social influences affect behavior (compliance, internalization, and identification) may apply to the realm of technology. Thus Kelman's (1958, 1961) processes of social influence (compliance, internalization, and identification) were applied here to computer technology within the organizational context.

Based on what we know, it could be extrapolated that employees develop attitudes and perceptions of computer technology that are consistent with existing group and organizational norms because they think that it will enhance their acceptance in the workplace. Further, to ensure that employees behave in ways espoused by the organization, such as rules and structures (both formal and informal) are developed to make certain that such behaviors occur. Thus an examination of task structures found in

the workplace relevant to the use of computer technology appears relevant here and will be discussed in greater detail below.

*Task Structure* has its roots in Structuration Theory (Giddens, 1976, 1979) to the extent that Structuration Theory highlights how the process of reality construction becomes a part of the social fabric of an organization through the development of structures. Giddens (1979) argued that structures consist of rules and resources upon which individuals rely on to guide actions. These structures play an important role in the preservation of espoused attitudes forwarded by the organization to reinforce the socially constructed nature of reality by producing and reproducing the attitudes and behaviors associated with that reality. For example, with the inception of technology into the workplace, organizations have been forced to modify their behaviors to include the influence of management to maximize the use of computer technology in the workplace. As Foster and Flynn (1984) pointed out, computer technology has not only revolutionized the ways in which organizations operate, it has also created an environment in which the value of technology is based on the influences of those in power through the development of structures designed to embrace this new form of reality.

In essence, structures found in the workplace create and re-create a work environment that is based on the interaction between the agency (behaviors that humans engage in guided by rules and contexts of the situation), and the agents (the persons who are engaging in the behaviors) (Giddens, 1984). The duality-of-structure suggests that human action is guided by structure and that structure is created by action (Giddens). Thus, the integration of structures with socialization and social influence could effectively explain how the application of rules and resources produce and reproduce a

shared reality through the application of recursive communication structures. For example, an organization trains and equips each new employee with a computer and the latest software to facilitate a seamless stream of communication between its members. Concurrently, rules highlighting the value of technology are developed to encourage the use of computer technology when interacting with others. At the same time, management begins to limit communication interactions with employees to email in the place of traditional face-to-face interactions. As a result, each time an employee engages in computer mediated communication or uses computer technology to complete work related tasks their actions reinforce organizational structures that support the reality that computer technology is a valued asset to the organization.

Another important concept relevant to the interplay between socialization, social influence, and structures is found in the notion of reflexivity, which refers to actors (employees) monitoring their own behaviors and actions (Giddens, 1979). So in the previous example, an employee who interacts with others through computer mediated channels would be able to monitor this behavior based on its appropriateness given the rules espoused during socialization, the influence of others in the organization, and the structures in place that reinforce such behaviors. This attitudinal and behavioral awareness occurs at two levels being a person's discursive consciousness and practical consciousness (Giddens). Discursive consciousness refers to a person's ability to articulate into words the reason he or she chose a particular behavior over another. Again, referring to the previous example, the employee who interacts with others by way of computer technology may explain such behavior (discursive consciousness) by referring to the rules, influences, and structures in the workplace that promote such behavior.

However, the practical consciousness that the employee may not have been able to articulate into words may have been the internal realization that computer technology has come to be viewed as a valuable assistant in which he or she depends on to complete work and to communicate with others. Thus it could be extrapolated that the ways in which organizations develop structures that reinforce its position on computer technology, creates a perceptual reality and a set of norms and rules for its members to follow that shapes their attitudes and perceptions of technology.

In order to measure the degree of structure and variety present in a person's job relative to computer technology a modified version of the Task Characteristics Scale developed by Withey, Daft, and Cooper (1983) was developed. The measure was based on the work of Perrow (1967, 1970) who described organizational technology as the actions employed to transform inputs into outputs. Perrow (1970) identified two dimensions along which these transformation processes could be described. The first dimension is referred to as the number of exceptions or variations found in a specific task. This dimension highlights the frequency of unexpected and novel events that occur. When the number of exceptions is high due to a lack of structure, individuals typically cannot predict problems or behaviors in advance due to the constant state of flux. When few exceptions occur (increased structure), tasks have little ambiguity and become repetitious. The second dimension is analyzability (structure). When any organizational process is analyzable, the work often can be reduced to mechanical steps (structures and rules) that employees can follow to reach work related goals. When work is not analyzable, there are no structures or procedures to tell a person how to perform a job related function.

Using Perrow's (1967, 1970) theory as a guide, Withey et al. (1983) developed a measure that showed evidence of reliability and validity for measuring the structure and variety found in a person's job. The items used in the development of the Task Characteristics Scale were drawn from numerous previously developed scales that were deemed to be unreliable measures of job structure (see Daft & Macintosh, 1981; Glisson, 1978; Hage & Aiken, 1969; Lynch, 1974; Van de Ven & Delbecq, 1974; Van de Ven & Ferry, 1980).

To this point, three distinct factors have been introduced (technological, personal, and organizational) thought to influence an employee's attitudes and perceptions of computer technology in the workplace. However, the research to date that examined these attitudes and perceptions have yielded mixed and inconsistent results. For example, some findings indicate that users develop positive, good, and caring attitudes and perceptions of computer technology, while others indicate that users develop negative, bad, and coercive attitudes and perceptions about computer technology (see Sewell & Barker, 2006). More alarming is the lack of research examining the reason for such inconsistencies as well as the work related attitudes that are affected as a result of the attitudes and perceptions employees hold toward computer technology. Since attitudes and perceptions ultimately shape a persons view of reality and their subsequent behaviors (Ajzen & Fishbein, 1980), the following section will examine the way in which technological, personal, and organizational factors influence the attitudes and perceptions employees hold toward computer technology in the workplace.

*Employee Attitudes/Perceptions of Computer Technology*

Some of the seminal research carried out in the field of attitudes' was conducted

by Ajzen and Fishbein (1980) who described a person's attitude as a predisposition to respond either favorably or unfavorably to objects in the world. Implicit in this viewpoint is the notion of evaluation, where individuals rate their feelings toward an object or procedure. In effect, this evaluation process is the foundations for the current study, which is based on individuals rating their feelings toward various aspects of using computer technology in the workplace. In the study of human-computer interaction, computer anxiety and negative attitudes toward computers were found to be positively correlated (Ahl, 1976; Lee, 1970). According to Ahl, these findings indicated that the negative attitudes people hold toward computer technology are rooted in their feelings about the impact of computers on society, quality of life in general, and their understanding of computers.

Current scholarship has also described computers and technology surveillance as either good or bad (Sewell & Barker, 2006). Specifically, Sewell and Barker found that users developed attitudes and perceptions of computer surveillance that were either coercive or caring. Coercive attitudes assume that surveillance is used as a means of control designed to continually press employees to work harder. To the contrary, computer surveillance seen as caring assumes that surveillance protects the many from the disruptive, lazy, or incompetent few (Findlay & McKinlay, 2003; Miller & Weckert, 2000; Sewell & Barker). Surveillance can also protect employees against unfair work distribution or accusations of incompetence by creating a record of how an employee's performance meets or exceeds management's expectations (Mason, Button, Lankshear, Coates, & Sharrock, 2002).

According to Brown and Duguid (1991), employees learn the appropriate uses of

And develop perceptions of computer technology as a result of their interactions with supervisors and coworkers. These interactions provide guidance and influence that is thought to reside in the unique shared set of norms among organizational members (Brown & Duguid, 1998). To emphasize this position, Brown and Duguid (1998) pointed out that one workgroup may develop a set of norms that encourage learning and exploration of new technologies, whereas another group may evolve specific norms to avoid using computer technology, or possibly even to sabotage the technology. Similarly, George, Iacono, Kling, and Leaming (1995) studied two work groups that were each expected to use computer technology. Their findings indicated that each group developed contrasting views and attitudes of the technology. Additionally, George et al.'s findings indicated that the same technology, when introduced into different social settings, will be viewed in very different ways, resulting in distinct patterns of use shaped by job-specific conditions, employee attitudes and perceptions, and group norms.

Another point of interest to consider centers on the two ideologies that have been used in prior research to examine the attitudes and perceptions people hold toward technology, which are the deterministic and non-deterministic approaches. Beginning with technological determinism (Braverman, 1974); this approach assumes that technology produces consistent effects that may be either positive or negative. However, this approach has garnered little empirical support as a result of this either or orientation and the notion of consistence. Alternatively, the non-deterministic approach (Salanova & Cifre, 1998) assumes that technology may have positive or negative effects on a worker's well-being and satisfaction depending on additional factors such as the employee's evaluation of technology (Wall & Kemp, 1987).

For further clarification, the following illustration of the non-deterministic approach was offered by Majchrzak and Borys (1998) who argued that initially, after the introduction of technology, users may have positive attitudes about the new technology because of organizational support, the espoused value of the technology, and the promise of a seamless integration. However, over time, as the user's exposure to the new technology increases, their attitudes toward the technology may become less positive as a result of a decrease in organizational support and an increase in frustration and anxiety. In other words, users may initially have a positive attitude towards technology that may become increasingly negative as the benefits of the technology fail to be realized. Majchrzak and Borys concluded that researchers should focus their attention on a non-deterministic approach to assess users' attitudes and perception of technology. As a result, the non-deterministic approach was used here because it provides the flexibility needed to develop a model that taps into multiple factors thought be responsible for the attitudes and perceptions employees hold toward technology.

In addition to the value of a multifactor approach to assessing the attitudes and perceptions employees hold toward technology, another area of importance centers on measuring these attitudes and perceptions of technology. Over the last 20 years, many computer attitude scales have been developed. For example, Shaft, Sharfman, and Wu (2004) listed 31 such scales in their research, and this is by no means a definitive list. Some examples include: Attitude Toward Computer Scale (Francis, 1993), Attitudes Toward Computer Scale (Reece & Gable, 1982), Computer Attitude Items (Pelgrum & Plomp, 1993), Computer Attitude Questionnaire (CAQ; Knezek & Miyashita, 1993), Computer Attitude Scale (CAS; Loyd & Gressard, 1984b), and Computer Attitudes Scale

for Secondary Students (CASS; Jones & Clarke, 1994). Despite the vast number of prior measures assessing attitudes users hold toward computers the 20-item Computer Attitudes Scale (CAS) developed by Nickell and Pinto (1986) reported evidence of scale reliability and found the measure to be valid based on tests of predictive validity, concurrent validity, and construct validity. Subsequently, the CAS has been used by a number of researchers (see Harrison & Rainer, 1992; Nickell & Seado, 1986; Pinto, Calvillo, & Nickell, 1987) all of which reported evidence of scale reliability.

In addition to the factors (technological, personal, and organizational) and the attitudes and perceptions employees hold toward technology discussed thus far, the way in which the attitudes and perceptions employees hold influence work related attitudes is also of importance here. In order to buttress this relationship between the attitudes employees hold toward computer technology and their work related attitudes of job satisfaction and organizational commitment the following section will considered these work related attitudes greater detail.

*Work Related Attitudes*

The impact of work-related attitudes has been a widely studied phenomenon. Previous research has consistently demonstrated that work-related attitudes are important for individual performance as well as overall organizational productivity (Locke, 1976; Porter & Steers, 1973). The job-related attitudes of interest here; job satisfaction and organizational commitment, have been previously examined for their relationship with the attitudes employees hold toward work and the organization (Miller & Mange, 1986). Specifically, job satisfaction denotes a group of attitudes that includes individuals' feelings (positive or negative) toward their jobs (Miller & Mange). Accordingly, these

attitudes include cognitive, affective, and behavior evaluations and reactions toward one's job. While there has been considerable speculation as to the antecedent factors related to job satisfaction, the major effects of employee satisfaction are quite clear. For example, low job satisfaction has been found to be positively related to high rates of absenteeism and turnover and negatively related to organizational commitment (Porter & Steers). In addition, Miller and Mange also found that positive work attitudes, such as high job satisfaction, facilitate productivity.

While job satisfaction deals with a person's attitudes toward the job, organizational commitment addresses the person's attitudes toward the organization. Employees who are strongly committed to the organization accept the goals and values of the organization and have a strong desire to maintain membership in that organization (Porter & Steers, 1973). Given the importance of both job satisfaction and organizational commitment, coupled with the positive relationship found between employees' attitudes about computers and their job involvement and organizational commitment (Rafaeli, 1986), both job satisfaction and organizational commitment were included in the current study.

*Job Satisfaction* is identified as "a pleasurable or positive emotional state from the appraisal of one's job or experiences" (Locke, 1976, p. 1297). In following with this definition, the majority of prior research examining employee job satisfaction has been at the organizational level (Myers & Myers, 1982) ranging from extrinsic to intrinsic factors. For example, according to Warr, Cook, and Wall (1979) job satisfaction is a result of extrinsic features, such as compensation, training, physical working conditions, and job security; as well as intrinsic features, such as autonomy, shared goals and values,

recognition, and opportunities to use one's abilities. Moreover, various aspects of communication within the organization have also been found to influence employee job satisfaction such as: quantity and quality of information, use of technology, superior/subordinate communication, and the climate and culture of the organization (Bateman & Strasser, 1984). Employee job satisfaction has been found to influence other work-related behaviors such as productivity, turnover, and absenteeism (Hatcher, 1999; Taber, 1991). Also, job satisfaction has been found to be positively related to organizational commitment indicating that as job satisfaction increases so does organizational commitment (Firth, Mellor, Moore, & Loquet, 2004).

Prior studies of computer technology and its association with user satisfaction have been divided into two distinct research streams (Wixom & Todd, 2005). The first utilizes behavioral measures, such as technology acceptance and use, while the second is based on the attitudes and beliefs of the user (Wixom & Todd). Specifically, the first stream is found in the technology acceptance literature, most notably TAM (see Davis, 1989; Davis et al., 1989). According to Davis, the research objective of TAM is to explain and predict user behavior, such as system adoption and use. More important to the current study is the second stream of research because it is concerned with users' attitudes and perceptions of technology as they relate to user satisfaction (Wixom & Todd). For example, these scholars are concerned with explaining and predicting user satisfaction by identifying and analyzing the attitudes and perceptions users hold toward computer technology. Specifically, the attitudes and perceptions users hold toward computer technology have been found to translate directly to the success or failure of major project development (Lucas, 1975), job-related stress (Ivancevich, Napier, &

Wetherbe, 1983), and worker dissatisfaction (Woodruff, 1980). Lazarus and Folkman (1984) make an important point that an event will not produce any affect on well-being (satisfaction) unless it is cognitively appraised as being positive or negative. Similarly, Wall and Kemp (1987) argued that technology may have a positive or negative affect on employee job satisfaction depending on the perceptions employees hold toward technology. For example, specific attitudes related to technology that have been found to be associated with employee satisfaction include: aspects of the technology itself such as ease of use and perceived usefulness (Davis; Martins, 2004), computer anxiety (Bozionelos, 2001; Cohen & Waugh, 1989; Worthington & Zhao, 1999), computing satisfaction (Chen, Soliman, Mao, & Frolick, 2000; Herring, 2001), computer generated frustration (Ceaparu et al., 2004), and computer competence (Blili et al., 1998). Following this reasoning it can be hypothesized that the relationship between technology and satisfaction is not direct but indirect; meaning that it is mediated by the users' attitudes and perceptions of technology.

In that job satisfaction is different from, yet related to organizational commitment; it could be extrapolated that employees' attitudes and perceptions of computer technology are likely to influence both job satisfaction and organizational commitment. Specifically, it is reasonable to expect that employees who express favorable attitudes and perceptions of computer technology will articulate greater levels of job satisfaction and organizational commitment than employees who develop negative attitudes and perceptions of computer technology. As a result of this association between job satisfaction and organizational commitment, coupled with their impact on the organization as a whole, commitment will be considered in greater detail below.

*Organizational Commitment* indicates various aspects of how people feel about their work environment and has been conceptualized in a number of ways. While different conceptualizations of organizational commitment exist, affective commitment has received the majority of the attention in the literature (Allen & Meyer, 1990b). Allen and Meyer described affective commitment as an emotional attachment to the organization in which employees remain with their organization because they want to. Allen and Meyer (1990a) added that organizational commitment is influenced by the employee's attitudes, affective beliefs, and job characteristics, which in turn influences employee turnover. Another affective definition of organizational commitment that is widely cited in the literature is that of Mowday, Porter, and Steers (1982) who describe organizational commitment as the strength of emotional attachment to the organization and the acceptance of the organization's goals and values.

Affective commitment is of particular interest here because it is reasoned that employees' attitudes and perceptions of computer technology will influence their affective commitment to the organization. Hence, the reduction of employee-organization friction as a result of shared attitudes and perceptions of computer technology affects how employees view the organization (Davis, 2001). That is, the agreement between organizational and personal factors, such as those regarding computer technology and its relevance to mutual goal attainment are important to the way in which employees perceive and are committed to the organization (Hacker & Steiner, 2002; Semler, 1997). In order to be committed to an organization, an employee must perceive a level of compatibility with the organization to the extent that a congruency of values, attitudes, and behaviors must exists between the employee and the organization (Fox, 1995;

Vandenberg & Nelson, 1999). For example, employees who sense their organization cares about them and is willing and able to provide them with the tools (e.g., computer training, equipment, and service support) necessary to perform their jobs are expected, in turn, to offer increased levels of commitment to the organization (Hutchison, Sowa, Eisenberger, & Huntington, 1986). However, when incongruencies in the values, attitudes, and behaviors between the employee and the organization exist, employees' job satisfaction and commitment tend to decrease (Warr et al., 1979).

Organizational commitment has been and will continue to be a popular research subject. This popularity appears to stem from its important relationships with several workplace behaviors. For example, various studies have shown organizational commitment to be related to job satisfaction (Elangovan, 2001; Mowday et al., 1982; Saks, Mudrack, & Ashforth, 1996). Also, organizational commitment has been found to be strongly related to several important organizational consequences such as intention to quit (Allen & Meyer, 1996; Cotton & Tuttle, 1986; Sager, 1990), absenteeism (Blau, 1986; Naumann, 1993), turnover (Ben-Baker, Al-Shammari, Jefri, & Prasad, 1994; Cohen, 1993; Elangovan, 2001; Porter, Crampom, & Smith, 1976), and to a lesser degree, performance (Meyer & Allen, 1997; Randall, Fedor, & Longenecker, 1990). Despite the increasing recognition of the powerful influence that organizational commitment may exert on a wide range of organizational outcomes and processes, as described above, knowledge of the antecedents of commitment is fragmented at best (Ellemers, Kortekaas, & Ouwerkerk, 1999). Especially relevant to the discussion here is that one particular set of determinants of organizational commitment that has yet to be fully understood is located in the realm of attitude development toward computer technology. Insight into

such determinants could be of considerable practical value in that it could aid our understanding of how attitudes and perceptions (in this case those of computer technology in the workplace) are influenced by a number of factors (e.g., technological, personal, and organizational) that in turn create a reality that influences the work related attitudes of job satisfaction and organizational commitment.

### *Purpose of the Study*

Because computer technology has become such a vital part of organizational life today, it is important to examine the role of technology; the attitudes and perceptions employees hold toward computer technology, the factors associated with the development of these attitudes and perceptions, and the work related attitudes that result. Prior research has indicated mixed results ranging from the perceptions of technology as a teammate (Nass et al., 1996) to the surveillance of computer technology as a form of panoptic control (Berdays, 2002) and as either caring or coercive (Sewell & Barker, 2006). As a result of these mixed results, the current study conceptualized and operationalized employees' attitudes and perceptions of computer technology ranging on a continuum from positive to negative. The examination of attitudes and perceptions are relevant here because they contribute to the construction of "a personal theory of reality" (Yotsumoto & Sekuler, 2006). More specifically, Wertheimer (1938) saw objects as perceived within an environment according to all of their elements taken together as a global construct. This view of attitudes and perceptions highlights the many factors that contribute to a person's view of reality. Similarly, Holender and Duscherer (2004) argued that all direct measures of attitudes and perception are by definition conscious discriminations between various factors. Thistly, it could be extrapolated that a variety of

factors account for the attitudes and perception people hold toward computer technology.

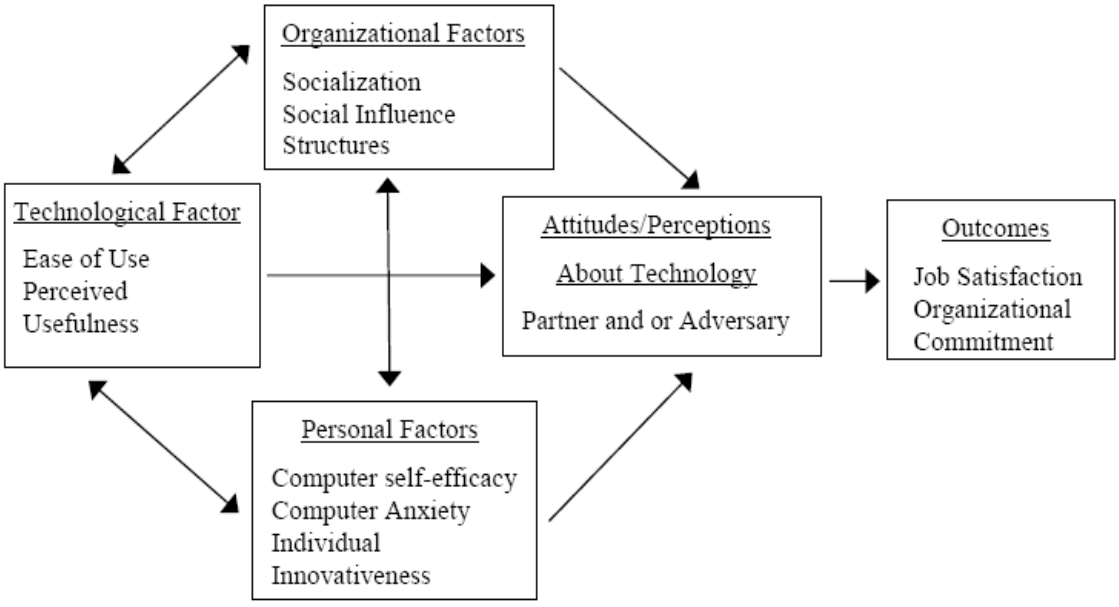
The current study was also informed by Hsu and Lu's (2004) suggestions that researchers need to examine how attitudes and beliefs about technology are influenced by multiple factors such as system characteristics, individual personalities, and cultural influences, in order to better understand how people use technology. The theoretical framework for this dissertation included Actor Network Theory (Latour, 1987), which provided insight into the use of a multifactor approach for examining the influence of technology on employees in the workplace. According to Latour, people are continually being influenced by a wide range of surrounding factors that subsequently influence the way in which people perceive and interact within their construction of reality. Because the act of carrying out any task is under the influence of a number of factors, it is reasonable then to consider a multifactor approach to examine employees' attitudes and perceptions of technology. Additional theoretical underpinning for this dissertation was provided by SCT (Bandura, 1986). Utilizing Bandura's notion of human functioning as the product of a dynamic interplay of personal, behavioral, and environmental influences, coupled with the technological factors (e.g., perceived ease of use and perceived usefulness) found in TAM, the current study considered the combination of technological, personal, and organizational factors in determining the ways in which employees' attitudes and perceptions of technology are developed.

Based on the focus of TAM (use and acceptance of computer technology) it is reasoned here that TAM may not be the best model for explaining the use of computer technology in mandated work environments. In addition to mandated use, this dissertation further extends prior research through the development of the Technology

Technology Management Model was developed to explain how business professionals (e.g., Human Resource Managers) and employees manage technology in the workplace. Additionally, TMM was designed to explain how employees develop their attitudes toward computer technology and their subsequent work related attitudes. As a result of the development of TMM, it could be extrapolated that the attitudes employees develop toward technology are the result of a combination of both internal and external factors. Further, it could be reasoned that the attitudes employees' hold toward technology mediate the relationship between those internal and external factors and the work related attitudes of job satisfaction and organizational commitment. Thus, TMM was developed with the intention of providing a means to explain the previously mentioned associations (see Figure 1).

Figure 1

*Hypothesized Technology Management Model (TMM)*



In sum, the purpose of this dissertation was to develop a model to explain the influence of technology in the workplace by extending prior research in six unique ways: a) TMM was designed for mandated use environments, whereas the predominance of prior models viewed the use of technology as optional. b) The development of TMM includes a multifactor design including technological, personal, and organizational factors, whereas prior models have primarily focused on technological factors. c) TMM explains the way in which the attitudes employees hold toward computer technology mediates the relationship between internal and external factors (technological, personal, and organizational) and their work related attitudes of job satisfaction and organizational commitment. However, prior models have focused on behavioral intentions as a mediator between technological factors and the use or non-use of technology. d) TMM is also the first model to include the influence of the combination of technological, personal, and organizational factor in determining how a person's attitudes and perceptions of computer technology are developed. e) TMM also describes the way in which employees' attitudes and perceptions about technology influence their work related attitudes of job satisfaction and organizational commitment. f) TMM is also heuristic in the sense that it provides researchers with a guide to further expand and test the model.

*Statement of Hypotheses*

Based on the important role computer technology plays in today's workplace, this research study should be of great interest to scholars, businesses, and employees. Based on TMM it is reasoned that technological, personal, and organizational factors shape the attitudes and perceptions employees hold toward computer technology, which in turn influence the work-related attitudes of job satisfaction and organizational commitment.

Given the impact these work-related attitudes have on the success of an organization, coupled with the role communication plays in the development of employees' attitudes and perceptions of technology; the following hypotheses were advanced.

H1: The perceived ease of use of computer technology will be positively related to the attitudes and perceptions employees' hold toward computer technology.

H2: The perceived usefulness of computer technology will be positively related to the attitudes and perceptions employees' hold toward computer technology.

H3: Employees' organizational socialization will be positively related to the attitudes and perceptions employees' hold toward computer technology.

H4: Employees' workgroup socialization will be positively related to the attitudes and perceptions employees' hold toward computer technology.

H5: Employees' task socialization will be positively related to the attitudes and perceptions employees' hold toward computer technology.

H6: Social influence will be positively related to the attitudes and perceptions employees' hold toward computer technology.

H7: Task structure pertaining to the use of computer technology will be positively related to the attitudes and perceptions employees' hold toward computer technology.

H8: Employees' computer self-efficacy will be positively related to the attitudes and perceptions employees' hold toward computer technology.

H9: Employees' lack of computer anxiety will be positively related to the

attitudes and perceptions they hold toward computer technology.

H10: Employees' innovativeness will be positively related to the attitudes and perceptions employees' hold toward computer technology.

H11: There will be a positive relationship between employee job satisfaction and the attitudes and perceptions they hold toward computer technology.

H12: There will be a positive relationship between employee organizational commitment and the attitudes and perceptions they hold toward computer technology.

H13: The data from the combination of socialization, social influence, and task structure will provide a good fit for the model representing the latent variable of organizational factors.

H13a: The data from the combination of ease of use and perceived usefulness will provide a good fit for the model representing the latent variable of technological factors.

H13b: The data from the combination of computer self-efficacy, computer anxiety, and individual innovativeness will provide a good fit for the model representing the latent variable of personal factors.

H14: The data will provide a good fit for TMM in which the attitudes and perceptions employees hold toward computer technology (observed variable) will mediate the relationship between technological, personal, and organizational factors (latent variables) and the employees job satisfaction and organizational commitment (observed variable).

## Summary

Since computer technology has become the newest "member" to join the workplace coupled with the influence technology has on the organization and its members, technology has become an area of interest to scholars, businesses, and employees. Despite this high level of interest in technology, there has yet to be a widely accepted model developed that explains the influence of technology in mandated use work environments. As a result, the goal of this dissertation was to develop a model TMM, comprised of multiple factors (technological, personal, and organizational) hypothesized to influence the attitudes employees hold toward technology and how these attitudes influence employees' work related attitudes of job satisfaction and organizational commitment. Additionally, TMM is among a few models specifically developed for mandated use work environments.

The initial development of TMM may serve as a guide for future researchers by providing them with a new model that has endless possibilities for testing and refinement. For example, researchers may want to include the influence of additional variables thought to influence the latent variables of technological, personal, and organizational factors. Additionally, chapter four here provides a number of additional suggestions for future research that offers support for the heuristic nature of TMM, Further, TMM is unique in the sense that it is the first model to describe the way in which the attitudes and perceptions employees hold toward technology mediate the relationship between technological, personal, and organizational factors and the work related attitudes of job satisfaction and organizational commitment. Technology Management Model is also among one of the first models to describe the relationship between socialization and

employees' attitudes and perceptions of computer technology. Thus, it is reasoned here that the ways in which organizations propagate their values, beliefs, and expectations of technology use to their employees will influence the attitudes employees hold toward computer technology. This influence will in turn serve to shape the attitudes and perceptions employees hold toward computer technology and its subsequent work related attitudes of job satisfaction and commitment. Of additional importance here was found in the work of Lewis and Seibold (1993, 1996) highlighting the critical role of communication in the workplace during times of procedural, structural, and technological changes (e.g., implementation of new technologies) that frequently force its members to adapt, cope, and adjust to a new reality where the workplace is filled with technological advances. Chapter two will describe the methodology utilized during the development of TMM.

# CHAPTER II

## Methodology

### *Participants*

Of the original 1000 questionnaires distributed to full-time working adults, 647 were returned (64.7% return rate), 62 of which could not be used as a result of missing data or unverifiable participants (see procedures section for requirements). This resulted in 586 useable questionnaires for the current study. Participants were working adults in the Mid-Atlantic and Mid-Western regions of the United States (48.6% male, $n = 285$) and (51.4% female, $n = 301$), whose overall tenure at their current job ranged from 1 to 39 years ($M = 9.95$, $SD = 7.67$). Participants ranged in age from 23 to 61 ($M = 40.43$, $SD = 10.44$) and reported working for a variety of organizations including, education (18.8%, $n = 110$), government (8.4%, $n = 49$), service (23.4%, $n = 137$), high tech (3.6%, $n = 21$), manufacturing (7.3%, $n = 43$), civil service (2.9%, $n = 17$), healthcare (15.4%, $n = 90$), customer service (7.2%, $n = 42$), and other (13.1%, $n = 77$). Participants reported their position as top management (12.5%, $n = 73$), mid management (22.4%, $n = 131$), lower management (18.1%, $n = 106$), non-management (33.6%, $n = 197$), or other (13.5%, $n = 79$). The percentage of their day that participants reported using computers as a part of their job functions ranged from 20% to 100% ($M = 71.60$, $SD = 20.29$). Participants also reported their computer experience ranging from 1 to 38 years ($M = 14.48$, $SD = 6.14$).

### *Procedures*

A network sample was utilized for the current study consisting of employees recruited by the primary author and students enrolled in communication courses at a large Mid-Atlantic university and at a large Mid-Western university. The participants were

full-time working adults who are required to use computer technology as a function of their jobs. To ensure that the participants are working adults the following procedure was utilized. The participants (working adults) were given an email address located on the cover letter (see Appendix A) in which they were asked to report the name of their organization in the subject line of the email followed by their name and telephone number in the body of the email. Participants were then instructed to return the completed questionnaire in the self addressed stamped envelope provided by the researcher in which the return name and address were to match the company name indicated in the subject line of their email. Also in the lower right hand corner of the envelope they were asked to write their name as it appeared in the body of the email. Only envelopes containing a completed questionnaire with verifiable information were used in the study. Periodically (i.e., approximately every 30 surveys), the primary author called and verified that the participants who completed a questionnaire were the persons they claimed to be.

The questionnaire included a detailed coversheet with the instructions and requirements for participation. The questionnaire also included demographic information and utilized a number of measures designed to tap into each of the factors presented in TMM including technological, personal, and organizational factors, as well as attitudes/perceptions as a mediating factor, and work related attitudes as outcomes (see Appendix B). The current study was granted exempt status by West Virginia University's Institutional Review Board due to the limited risk involved with the study (see Appendix C for a copy of the Institutional Review Board approval letter). Lastly, all the measures utilized in this study were subjected to Confirmatory Factor Analysis (CFA) to insure the validity of the measures.

## Measures

This section will highlight the criteria used in determining if the data fit the model in the forthcoming CFA and the Structural Equation Models. Prior research has indicated that the interpretation of a model is subjective in that one must know what the measures of fit suggest and why some indicators are inaccurate measures. To elucidate this point the interpretation of a large structural equation model is said to be somewhat subjective especially the Chi-Square results (Bagozzi & Yi, 1988). For example, Bagozzi and Yi, point out that Chi-Square, being one of the long standing indicators of overall goodness-of-fit is sensitive to sample size to the extent that a large sample may indicate a significant Chi-Square when it should not have been significant. Also, according to Joreskog and Sorbom (1984) the Goodness of Fit Indicator (GFI) and the Adjusted Goodness of Fit Indicator (AGFI) will generally range from 0 to 1 and indicates the relative amount of variances and covariances jointly accounted for by the hypothesized model. When GFI and AGFI values are equal to or greater than about .9 this indicates a meaningful model even when the Chi-Square is significant (Joreskog & Sorbom, 1984). Further, according to Bagozzi and Yi (1988), the Root Mean Square Error of Approximation (RMSEA) is based on the non-centrality parameter measure in which a measure greater than .1 indicates a poor fit for the model. Further, the Comparative Fit Index (CFI) and the Bentler Bonett Index or Normed Fit Index (NFI) indicates a good fit to the model at about .9 or greater, with 1 indicating a perfect fit for the model (Bagozzi & Yi, 1988).

### *Technological Factors*

The Technology Acceptance Model (TAM) developed by Davis (1989) contains

two key technological factors (perceived usefulness and perceived ease of use) found to influence users' behavioral intentions to use and ultimately their use of computer technology. Both factors were originally measured by six items each (Davis, 1989). A 5-point Likert-type response format (1 = Strongly Disagree to 5 = Strongly Agree) was used here. Higher scores indicate greater perceived usefulness and ease of use. The following contains a sample item for perceived usefulness, "Using computer technology in the workplace improves my job performance" and for perceived ease of use "My interaction with computer technology is clear and understandable."

The scales for perceived usefulness and perceived ease of use developed by Davis (1989) have amassed evidence of reliability (see Davis, 1989; Davis et al., 1989; Taylor & Todd, 1995; Venkatesh & Davis, 2000). For example, Taylor and Todd (1995) reported reliabilities of .92 for perceived usefulness and .91 for perceived ease of use. Also, Venkatesh and Davis (2000) found that over a series of four studies, reliabilities ranged from .87 to .98 for perceived usefulness and between .86 and .98 for perceived ease of use. Results of the CFA for the perceived usefulness measure used in the current study indicated the exclusion of two items that had standardized regression coefficients below .70. Once the items were removed, the data from the remaining items fit the model: $x^2$ (2) = 4.1, $p$ = .13; CFI = .998, NFI = .997, GFI = .996, AGFI = .982, RMSEA = .042. Results of the CFA for the perceived ease of use measure used in the current study also indicated the exclusion of two items that had standardized regression coefficients below .70. Once the items were removed, the remaining items resulted in meaningful fit for the model: $x^2$ (2) = 3.5, $p$ = .18; CFI = .999, NFI = .997, GFI = .997, AGFI = .985, RMSEA = .036. Cronbach's alpha for the present study was .86 for

perceived usefulness ($M$ = 4.24, $SD$ = 0.76) and .90 for perceived ease of use ($M$ = 3.91, $SD$ = 0.83) (see Appendix D).

Although two items were removed from each of the aforementioned technology measures, the face validity of each measure appeared to remain intact. Given that perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320) the retained items appear to tap into this definition. For example "I find the computer technology in my workplace easy to use" and "Learning to operate computer technology at work is easy for me" are two of the retained items and appear congruent with the definition indicating face validity of the measure. Similarly, with perceived usefulness defined as the degree to which a person believes that using technology will enhance his or her job performance (Davis), items such as "using computer technology in the workplace improves my job performance" and "I find computer technology to be useful in my job" appear to closely tap into the definition set forth by Davis indicating face validity of the current measure.

*Personal Factors*

*Computer Self Efficacy and Computer Anxiety* were measured by the 16-item New Computer Anxiety and Self-Efficacy Scale (NCASES) developed by Barbeite and Weiss (2004) to measure both computer self-efficacy and computer anxiety in one reliable and valid measure. The 16-item scale was reported to contain 4-items each for the following four factors: a) computer self-efficacy for general computer activities (α = .90), b) computer self-efficacy for advanced activities (α = .89), c) anxiety as a result of computer use (α = .88), and d) anxiety as a result of computer-related activities (α = .89) (Barbeite & Weiss, 2004).

A 5-point Likert-type response format (1 = Strongly Disagree to 5 = Strongly Agree) consistent with the original scale was used here. The measure is comprised of short statements regarding an employee's overall perception of his/her computer self-efficacy and computer anxiety. The computer anxiety items were reverse coded to reflect a lack of computer anxiety so that all the measures in this dissertation were positively valenced. Results of the CFA for the 4-item computer self-efficacy measure (general activities) indicated that the data fit the model: $x^2$ (2) = 1.4, $p$ = .499; CFI = .1.00, NFI = .999, GFI = .999, AGFI = .994, RMSEA = .001. Results of the CFA for the 4-item computer self-efficacy measure (advanced activities) resulted in a meaningful fit for the model: $x^2$ (2) = 1.6, $p$ = .471; CFI = 1.00, NFI = .999, GFI = .999, AGFI = .994, RMSEA = .002. Results of the CFA for the 4-item computer anxiety (use) measure resulted in a meaningful fit for the model: $x^2$ (2) = 4.5, $p$ = .106; CFI = .999, NFI = .998, GFI = .996, AGFI = .982, RMSEA = .046. Results of the CFA for the 4-item computer anxiety as (activities) measure resulted in a meaningful fit for the model: $x^2$ (2) = 2.2, $p$ = .329; CFI = .1.00, NFI = .998, GFI = .998, AGFI = .991, RMSEA = .037. Cronbach's coefficient alpha for the current study were .87 for computer self-efficacy (general activities) ($M$ = 4.03, $SD$ = 0.85), .92 for computer self-efficacy (advanced activities) ($M$ = 3.22, $SD$ = 1.19), .93 for computer anxiety (use) ($M$ = 4.57, $SD$ = 0.68), and .87 for computer anxiety (activities) ($M$ = 4.24, $SD$ = 0.77) (see Appendix E).

*Individual Innovativeness* was measured by the Individual Innovativeness Scale developed by Hurt et al. (1977) to measure a person's predisposition to be innovative. A 5-point Likert-type response format (1 = Strongly Disagree to 5 = Strongly Agree) consistent with the original scale was used here. Sample items include: "I enjoy trying

new ideas" and "I seek out new ways to do things" (see Appendix F). Prior studies have found evidence of reliability. For example, Clark and Goldsmith (2006) reported scale reliability of .82, Hurt et al. (1977) reported scale reliability of .86, and Cheney, Block, and Gordon (1986) reported scale reliability of .82. In the present study, results of the CFA indicated the need to exclude eight of the original items because they had standardized regression coefficients below .70. Once the items were removed, the remaining 12-items resulted in a meaningful fit for the model: $x^2$ (54) = 329.74, $p$ = .003; CFI = .919, NFI = .910, GFI = .891, AGFI = .853, RMSEA = .099. Cronbach's alpha for the present study was .96 ($M$ = 4.20, $SD$ = 0.67) (see Appendix D). Note; the removal of additional items did not improve the fit for the model.

Although eight items were removed from the Individual Innovativeness Scale (Hurt et al., 1977), the face validity remained intact. According to Rogers (2003), the innovativeness of an individual is a persistent predisposition that is reflective of an individual's underlying nature when exposed to an innovation. In other words, people high in innovativeness are likely to adopt an innovation. Given that definition, items that were removed from the measure such as "I feel that I am an influential member of my peer group" do not appear to tap into the definition of innovativeness. However, the retained items have face validity because they reflect the definition of innovativeness forwarded by Rogers. For example, "I enjoy trying new ideas" and "I consider myself to be creative and original in my thinking and behavior" are reflective of Roger's definition of innovativeness.

*Organizational Factors*

*Socialization* was measured using a modified and abbreviated version of the

Newcomer Socialization Questionnaire (Haueter et al., 2003), which utilized 18 of the 35 items from the original three measures. Each of the three measures of socialization (12-item organizational, 12-item workgroup, and 11-item task socialization) were subject to CFA and subsequently reduced to 6-items each based on the factor loadings of data from a published research study that utilized this scale (Madlock & Horan, 2009) (see Table 1). The primary reason for the reduction of items was based on redundancies found in the 35-item measure and to produce a measure that would reduce participant fatigue when completing the scale. The 6-item organizational socialization measure consists of items developed to measure newcomers' organizational knowledge and organizational role-behavior knowledge. For the current study, the items were modified to reflect a focus on computer technology. For example, "I understand this organization's objectives and goals" was modified to read, "I understand this organization's objectives and goals regarding the use of computer technology." The modified organizational socialization scale was measured on a 5-point Likert type scale ranging from (1 = Strongly Disagree to 5 = Strongly Agree) consistent with the original measure. For the current study the results of an additional CFA on the abbreviated 6-item organizational socialization measure indicated the exclusion of one additional item as a result of a standardized regression coefficient below .60. Once the item was removed, the data from the remaining items fit the model: $x^2$ (5) = 10.4, $p$ = .07; CFI = .996, NFI = .993, GFI = .993, AGFI = .979, RMSEA = .043.

Although one item was removed from the organizational socialization measure, the face validity of the measure remained intact. According to Haueter et al. (2003), organizational socialization involves the newcomer learning the values, goals, rules,

politics, customs, leadership style, and language of the organization. Based on this definition, the current measure containing such items as "I understand how to use computer technology to fit in with what the organization values and beliefs" and "I know the structure of the organization (e.g., how computer technology links departments together, and who communicates with who via computer technology)," indicates face validity of the measure.

The modified 6-item workgroup socialization measure was designed to measure newcomers' workgroup knowledge and workgroup role-behavior knowledge. For example, "I know my workgroup's objectives" was modified to read, "I know how computer technology contributes to my workgroup's objectives." The modified workgroup socialization scale was measured on a 5-point Likert type scale ranging from (1 = Strongly Disagree to 5 = Strongly Agree) consistent with the original measure. For the current study the results of an additional CFA on the abbreviated 6-item organizational socialization measure indicated the exclusion of one additional item as a result of a standardized regression coefficient below .60. Once the item was removed, the data from the remaining items fit the model: $x^2$ (5) = 10.6, $p$ = .07; CFI = .997, NFI = .995, GFI = .993, AGFI = .978, RMSEA = .044.

Although one item was removed from the workgroup socialization measure, the face validity of the measure remained intact. According to Haueter et al. (2003), workgroup socialization involves the newcomer learning particulars about the work group and the behaviors associated with the group's rules, goals, and values. Based on this definition, the current measure containing such items as "I understand how my computer use in my particular work group contributes to the organization's goals" and "I

know the policies, rules, and procedures of my work group (e.g., when to use, restricted sites, surveillance etc…) regarding the appropriate use of computer technology," indicates face validity of the measure.

Lastly, the modified 6-item task socialization measure was designed to measure newcomers' job related knowledge and job role-behavior knowledge. For example, "I understand how to perform the tasks that make up my job" was modified to read "I understand how to perform the computer related tasks that make up my job" The modified task socialization scale was measured on a 5-point Likert type scale ranging from (1 = Strongly Disagree to 5 = Strongly Agree) consistent with the original measure. For the current study the results of an additional CFA on the abbreviated 6-item task socialization measure indicated the exclusion of one additional item as a result of a standardized regression coefficient below .60. Once the item was removed, the data from the remaining items fit the model: $x^2$ (5) = 10.6, $p$ = .07; CFI = .997, NFI = .995, GFI = .993, AGFI = .978, RMSEA = .044.

Although one item was removed from the task socialization measure, the face validity of the measure remained intact. For example, according to Haueter et al. (2003), task socialization entails acquiring information about the job and understanding the tasks for which one had been hired. Based on this definition, the current measure containing such items as "I know the computer related responsibilities, tasks, and projects for which I was hired" and "I know when to inform my supervisor about my work (e.g., daily, weekly, close to deadlines, when a request is made) through computer mediated messages (e.g., email)," substantiates the face validity of the measure.

According to Haueter et al. (2003), from the original 35-item version of the

measure, organizational, workgroup, and task socialization measures were found to have reliabilities ranging from .88 to .92. Additionally, Madlock and Horan (2009) reported similar reliabilities as did Hauter et al. (2003) with .91 for organizational socialization, .94 for workgroup socialization, and .90 for task socialization. Cronbach's alpha for the present study was .88 for organizational socialization ($M$ = 4.30, $SD$ = 0.72), .86 for workgroup socialization ($M$ = 4.57, $SD$ = 0.59), and .89 ($M$ = 4.60, $SD$ = 4.61) for task socialization (see Appendix G for the current measures of socialization).

*Social influence* was assessed using the three factor 10-item Social Influence Scale developed by Kelman (1958, 1961). The three factors (compliance, internalization, and identification) are measured by four items for compliance and three items each for identification, and internalization as the original developed by Kelman (1958, 1961) and subsequently used by Malhotra and Galletta (1999). Participants responded to the items on a 5-point Likert scale with responses ranging from (1 = Strongly Disagree to 5 = Strongly Agree). Items were modified to reflect the technological focus of the current study; of which higher scores indicated greater perceived social influence with respect to computer technology. Sample items included: "My private views about the use of computer technology in the workplace are different than those I express publicly" and "In order for me to get rewarded in my job, it is necessary to use computer technology." Prior research examining computer usage as a result of social influence using Kelman's measure reported reliabilities of .71 for compliance, .80 for identification, and .72 for internalization (Malhotra & Galletta, 1999). For the current study the results of the CFA for the 4-item factor of compliance indicated a meaningful fit for the model: $x^2$ (2) = 5.2, $p$ = .061; CFI = .996, NFI = .994, GFI = .994, AGFI = .970, RMSEA = .050. Due to the

limited number of items for the factors of identification and internalization, goodness of fit indices were not applicable. Cronbach's alpha for the present study were .78 ($M$ = 4.37, $SD$ = 0.76) for compliance, .81 ($M$ = 4.18, $SD$ = 0.83) for identification, and .80 ($M$ = 3.57, $SD$ = 0.91) for internalization (see Appendix H for the current measure).

*Task Structure* was measured using a modified version of the original version of the 4-item Task Characteristics Scale developed by Withey et al. (1983). The scale was designed to assess the degree of structure in a person's job. Prior reliabilities for the Task Characteristics Scale were .89 by Withey et al. (1983) and more recently Anandarajan et al. (2000) reported a scale reliability of .91. The modified version of the task characteristics scale used here will be adapted to assess the degree of structure in a person's use of computer technology at work. For example the following item was modified from "To what extent is there a clearly known way to do the major types of work you normally encounter?" to read, "To what extent is there a clearly known way in which you are to utilize computer technology to complete daily activities at work?" A five-point Likert scale ranging from (1 = Very Little Extent to 5 = Very Large Extent) will be used here, which is consistent with the original measure. Higher scores indicate more structure in computer related task characteristics. The results of CFA conducted here for the 4-item Task Characteristics Scale indicated that the data provided a meaningful fit for the model: $x^2$ (2) = 4.1, $p$ = .128; CFI = .999, NFI = .997, GFI = .996, AGFI = .982, RMSEA = .042. Cronbach's alpha for the present study was .90 ($M$ = 4.23, $SD$ = 0.82) (see Appendix I for the modified version of the measure).

*The Attitudes and Perceptions of Computer technology* were measured here by the Computer Attitudes Scale (Nickell & Pinto, 1986). The CAS was designed to measure

general positive and negative attitudes toward computers. Nickell and Pinto developed the measure to include 8 items indicating positive attitudes toward computers (e.g., Computer technology is bringing us into a bright new era) and 12 items indicating negative attitudes toward computers. Sample items include: "People are becoming slaves to computer technology" and "Computer technology intimidates me because it seems so complex." The negatively worded items were reverse coded to indicate that overall higher scores reflected greater positive attitudes towards computer technology. Participants responded to the items on a 5-point Likert scale with responses ranging from (1 = Strongly Disagree to 5 = Strongly Agree).

Nickell and Pinto (1986) reported a reliability of .81 for the positive dimension and .86 for the negative dimension of the scale and through tests of predictive validity, concurrent validity, and construct validity found the instrument to show evidence of validity. Since then a number of researchers have used the measure and found the CAS to be a reliable measure of users' attitudes about computer technology (see Harrison & Rainer, 1992; Nickell & Seado, 1986; Pinto et al., 1987). Results of the CFA conducted for the scale indicated the need to exclude eight of the original items because they had standardized regression coefficients below .70. Once the items were removed, the data from the remaining 12 items indicated a good fit for the model: $x^2$ (54) = 103.62, $p$ = .002; CFI = .971, NFI = .964, GFI = .950, AGFI = .921, RMSEA = .069. Cronbach's alpha for the present study was .96 ($M$ = 3.89, $SD$ = 0.85) (see Appendix J for the measure). Note; the removal of any additional items did not improve the fit for the model.

Although eight items were removed from the Computer Attitudes Scale (Nickell & Pinto, 1986), the face validity of the measure remained intact. For example, according

to Ajzen and Fishbein (1980) a person's attitudes are based on his or her predisposition to respond either favorably or unfavorably to objects in the world. Implicit in this viewpoint is the notion of evaluation, where individuals rate their feelings toward an object or procedure. In effect, this evaluation process is the foundations for the current study, which is based on individuals rating their feelings toward various aspects of using computer technology in the workplace. Based on this definition, the current measure containing such items as "Computers will replace the need for working human beings" and "Computers are responsible for many of the good things we enjoy" substantiates the face validity of the measure.

*Work Related Attitudes*

*Job satisfaction* was measured by the eight-item Abridged Job In General Scale (Russell, Spitzműller, Lin, Stanton, Smith, & Ironson, 2004). A 7-point semantic differential response format was used in the current study instead of the original scale formatting (0 for "no," 1 for "?" and 3 for "yes) for clarity. The scale is comprised of short statement or single word dyads regarding an employee's overall perception of his/her job (e.g., good-bad; undesirable-desirable).The AJIG Scale was found to have evidence of scale reliability. For example, Russell et al. (2004) reported a scale reliability of .87, where Madlock (2008a) reported a scale reliability of .92 and .88 (Madlock, 2008b). Results of the current CFA for the 8-item job satisfaction measure indicated the need to exclude two items that had standardized regression coefficients below .60. Once the items were removed, the data from the remaining items fit the model: $x^2$ (9) = 11.4., $p$ = .09; CFI = .995, NFI = .991, GFI = .987, AGFI = .969, RMSEA = .050. Cronbach's coefficient alpha for the current study was .81 ($M$ = 5.55, $SD$ = 1.16) (see Appendix K).

Although two items were removed from the Abridged Job In General Scale (Russell et al., 2004), the face validity of the measure remained intact. For example, job satisfaction denotes a group of attitudes that includes individuals' feelings (positive or negative) toward their jobs (Miller & Mange). Accordingly, these attitudes include cognitive, affective, and behavior evaluations and reactions toward one's job. Based on this definition, the current measure containing items such as those ranging from "Very good to bad" and from "Better than most to worse than most," substantiates the face validity of the measure.

*Organizational commitment* was measured by the 15-item Organizational Commitment Questionnaire (Mowday, Steers, & Porter, 1979). The items were measured on a 5-point Likert scale response format ranging from (1 = Strongly Disagree to 5 = Strongly Agree) consistent with its original formatting. A sample item reads: "I am proud to tell others that I am part of the organization." According to Barge and Schlueter (1988), internal reliability coefficients for the OCQ ranged from .82 to .92, and the scale measures employee attachment to the organization. More recently, Madlock and Horan (2009) reported a reliability of .92 and Madlock and Kennedy-Lightsey (*in press*) reported a reliability of .76. Results of the CFA conducted here for the 15-item organizational commitment measure indicated the need to exclude seven items that had standardized regression coefficients below .60. Once the items were removed, the data from the remaining items fit the model: $x^2$ (20) = 44.7., $p$ = .049; CFI = .961, NFI = .950, GFI = .973, AGFI = .951, RMSEA = .056. Cronbach's coefficient alpha for the current study was .81 ($M$ = 4.10, $SD$ = 0.67) (see Appendix L).

Although seven items were removed from the Organizational Commitment

Questionnaire (Mowday et al., 1979), the face validity of the measure remained intact. For example, Allen and Meyer (1990b) described organizational commitment as an emotional attachment to the organization in which employees remain with their organization because they want to. Allen and Meyer (1990a) added that organizational commitment is influenced by the employee's attitudes, affective beliefs, and job characteristics, which in turn influences employee turnover. Another definition of organizational commitment that is widely cited in the literature is that of Mowday, Porter, and Steers (1982) who describe organizational commitment as the strength of emotional attachment to the organization and the acceptance of the organization's goals and values. Based on these definitions, the current measure containing items such as "For me this is the best of all possible organizations for which to work" and "I am willing to put in a great deal of effort beyond the normally expected in order to help the organization be successful," substantiates the face validity of the measure.

# CHAPTER III

## Results

Hypotheses 1 through 12 predicted significant positive relationships between the variables. Specifically, Hypothesis 1 predicted that the perceived ease of use of computer technology would be positively related to the attitudes and perceptions employees' hold toward computer technology. Results of Pearson's Product-Moment correlational analysis showed that the data were consistent with the hypothesis by indicating a significant positive relationship ($r = .34$, $p < .001$) between the variables. Therefore, hypothesis 1 was supported.

Hypothesis 2 predicted that the perceived usefulness of computer technology would be positively related to the attitudes and perceptions employees' hold toward computer technology. Results of Pearson's Product-Moment correlational analysis showed that the data were consistent with the hypothesis by indicating a significant positive relationship ($r = .26$, $p < .001$) between the variables. Therefore, hypothesis 2 was supported.

Hypothesis 3 predicted that employees' organizational socialization would be positively related to the attitudes and perceptions they hold toward computer technology. Results of Pearson's Product-Moment correlational analysis showed that the data were consistent with the hypothesis by indicating a significant positive relationship ($r = .36$, $p < .001$) between the variables. Therefore, hypothesis 3 was supported. Hypothesis 4 predicted that employees' workgroup socialization would be positively related to the attitudes and perceptions employees' hold toward computer technology. Results of Pearson's Product-Moment correlational analysis showed that the data were consistent

with the hypothesis by indicating a significant positive relationship ($r = .35$, $p < .001$) between the variables. Therefore, hypothesis 4 was supported.

Hypothesis 5 predicted that employees' task socialization would be positively related to the attitudes and perceptions they hold toward computer technology. Results of Pearson's Product-Moment correlational analysis showed that the data were consistent with the hypothesis by indicating a significant positive relationship ($r = .35$, $p < .001$) between the variables. Therefore, hypothesis 5 was supported.

Hypothesis 6 predicted that social influence (compliance, internalization, and identification) regarding the use of computer technology would be positively related to the attitudes and perceptions employees hold toward that technology. Results of Pearson's Product-Moment correlational analysis showed that the data were consistent with the hypothesis by indicating significant positive relationships between the variables. Specifically, social influence (compliance) ($r = .29$, $p < .001$), social influence (internalization) ($r = .20$, $p < .001$), and social influence (identification) ($r = .50$, $p < .001$) were all positively related to the attitudes and perceptions employees hold toward technology. Therefore, hypothesis 6 was supported.

Hypothesis 7 predicted that the task structure governing the use of computer technology in the workplace would be positively related to the attitudes and perceptions employees hold toward computer technology. Results of Pearson's Product-Moment correlational analysis showed that the data were consistent with the hypothesis by indicating a significant positive relationship ($r = .47$, $p < .001$) between the variables. Therefore, hypothesis 7 was supported.

Hypothesis 8 predicted that employees' computer self-efficacy would be

positively related to the attitudes and perceptions employees' hold toward computer technology. Results of Pearson's Product-Moment correlational analysis showed that the data were consistent with the hypotheses by indicating a significant positive relationship ($r = .22$, $p < .001$) between computer self-efficacy (advanced activities) and the attitudes employees hold toward technology and a significant positive relationship ($r = .41$, $p < .001$) between computer self-efficacy (general activities) and the attitudes employees hold toward technology. Therefore, hypothesis 8 was supported.

Hypothesis 9 predicted that employees' lack of computer anxiety would be positively related to the attitudes and perceptions they hold toward computer technology. Results of Pearson's Product-Moment correlational analysis showed that the data were consistent with the hypothesis by indicating a significant positive relationship ($r = .35$, $p < .001$) between a lack of computer anxiety (activities) and employees attitudes toward technology and a positive relationship ($r = .35$, $p < .001$) between a lack of computer anxiety (use) and employees' attitudes toward technology. Therefore, hypothesis 9 was supported.

Hypothesis 10 predicted that employees' innovativeness would be positively related to the attitudes and perceptions they hold toward computer technology. Results of Pearson's Product-Moment correlational analysis showed that the data were consistent with the hypothesis by indicating a significant positive relationship ($r = .27$, $p < .001$) between the variables. Therefore, hypothesis 10 was supported.

Hypothesis 11 predicted that employee job satisfaction would be positively related to the attitudes and perceptions employees hold toward computer technology. Results of Pearson's Product-Moment correlational analysis showed that the data

were consistent with the hypothesis by indicating a significant positive relationship ($r$ = .72, $p$ < .001) between the variables. Therefore, hypothesis 11 was supported.

Hypothesis 12 predicted that employee organizational commitment would be positively related to the attitudes and perceptions employees hold toward computer technology. Results of Pearson's Product-Moment correlational analysis showed that the data were consistent with the hypothesis by indicating a significant positive relationship ($r$ = .45, $p$ < .001) between the variables. Therefore, hypothesis 12 was supported (see Table 2 for all of the correlational results).

Table 2

*Intercorrelations between Variables*

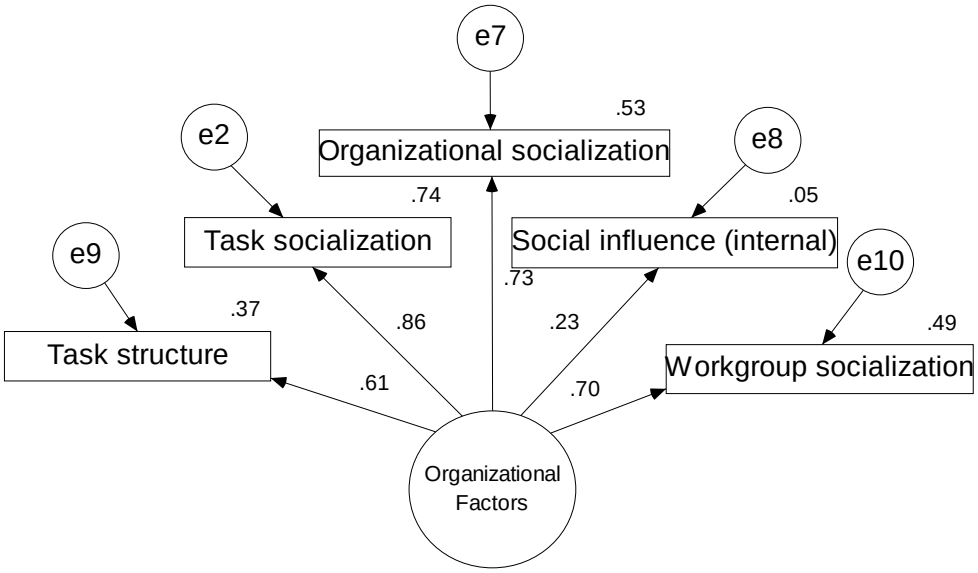
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ease of use | 1.0 | | | | | | | | | | | | | | | | |
| Usefulness | .65** | 1.0 | | | | | | | | | | | | | | | |
| Social influence (compliance) | .68** | .57** | 1.0 | | | | | | | | | | | | | | |
| Self-efficacy (advanced) | .62** | .49** | .61** | 1.0 | | | | | | | | | | | | | |
| Organizational socialization | .54** | .44** | .65** | .43** | 1.0 | | | | | | | | | | | | |
| Workgroup socialization | .43** | .44** | .56** | .37** | .43** | 1.0 | | | | | | | | | | | |
| Task socialization | .42** | .38** | .51** | .27** | .66** | .61** | 1.0 | | | | | | | | | | |
| Organizational commitment | .27** | .22** | .18** | .17** | .24** | .28** | .25** | 1.0 | | | | | | | | | |
| Job satisfaction | .24** | .21** | .22** | .20** | .25** | .26** | .20** | .62** | 1.0 | | | | | | | | |
| Task structure | .52** | .36** | .57** | .46** | .46** | .52** | .49** | .23** | .34** | 1.0 | | | | | | | |
| Innovativeness | .38** | .29** | .49** | .32** | .46** | .29** | .38** | .16** | .15** | .37** | 1.0 | | | | | | |
| Self-efficacy (general) | .39** | .23** | .40** | .37** | .41** | .31** | .37** | .22** | .28** | .63** | .34** | 1.0 | | | | | |
| Social influence (identification) | .43** | .28** | .40** | .37** | .41** | .41** | .37** | .25** | .32** | .71** | .44** | .57** | 1.0 | | | | |
| Social influence (internalization) | .19** | .27** | .22** | .19** | .16** | .25** | .16** | .22** | .14** | .13** | .17** | .11** | .17** | 1.0 | | | |
| Anxiety (activities) | .54** | .39** | .50** | .50** | .46** | .52** | .53** | .22** | .25** | .57** | .48** | .39** | .53** | .19** | 1.0 | | |
| Anxiety (use) | .39** | .33** | .54** | .34** | .43** | .71** | .72** | .16** | .21** | .55** | .45** | .35** | .47** | .20** | .71** | 1.0 | |
| Attitudes | .34** | .26** | .29** | .22** | .36** | .35** | .35** | .45** | .72** | .47** | .27** | .41** | .50** | .20** | .35** | .35** | 1.0 |

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

Hypothesis 13 predicted that the combination of socialization (organizational, workgroup, and task), social influence (compliance, internalization, and identification), and task structure would result in a significant model representing the latent variable of organizational factors. Results of CFA showed that the data were consistent with the hypothesis except social influence (compliance and identification) both of which were subsequently removed from the model due to standardized regression coefficients below .70. The data from the remaining variables fit the model: $x^2$ (5) = 15.1, $p$ = .06; CFI = .958, NFI = .957, GFI = .984, AGFI = .951, RMSEA = .051 (see Figure 2). Therefore, hypothesis 13 was partially supported.

Figure 2

*Model for the Latent Variable of Organizational Factors*

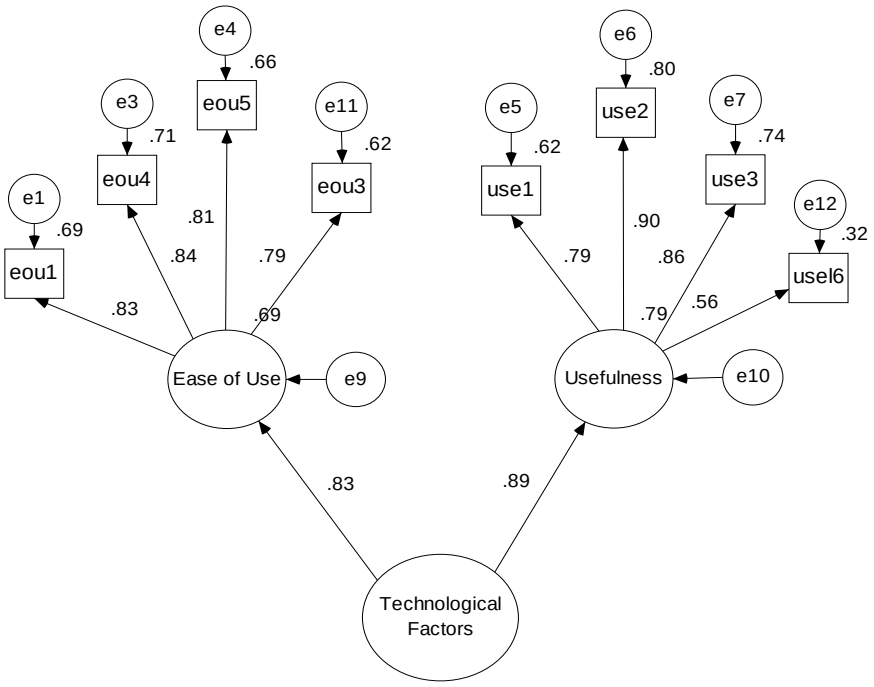



Hypothesis 13a predicted that the combination of ease of use and the perceived usefulness of computer technology would result in a meaningful model representing the latent variable of technological factors. Results of CFA showed that the data were consistent with the hypothesis indicating a meaningful fit for the model: $x^2$ (19) = 43.6, $p$

= .05; CFI = .968, NFI = .959, GFI = .963, AGFI = .949, RMSEA = .068 (see Figure 3). Therefore, hypothesis 13a was supported.

Figure 3

*Model for the Latent Variable of Technological Factors*

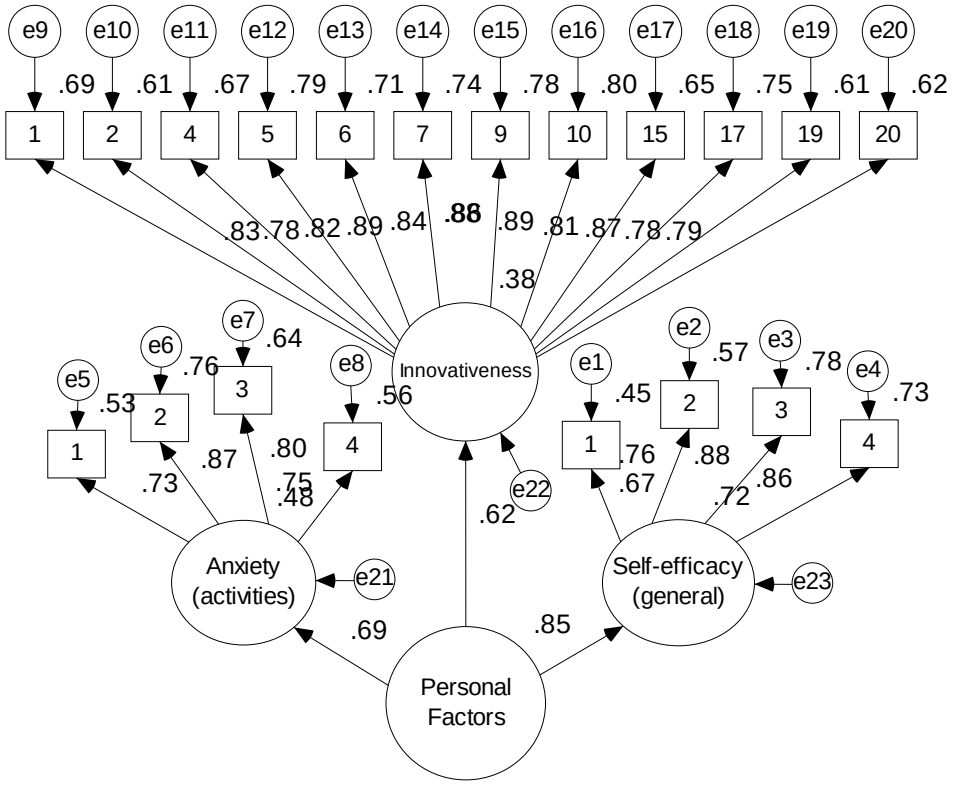



Hypothesis 13b predicted that the combination of computer self-efficacy (general and advanced activities), lack of computer anxiety (activities and use), and individual innovativeness would result in a meaningful model representing the latent variable of personal factors. Results of CFA showed that the data were consistent with the hypothesis except for computer self-efficacy (general activities) and the lack of computer anxiety (use), both of which were subsequently removed from the model due to standardized regression coefficients below .70. Once the variables were removed, the data from the remaining variables fit the model: $x^2$ (169) = 279.8, $p$ = .09; CFI = .968, NFI = .961, GFI = .962, AGFI = .949, RMSEA = .061 (see Figure 4). Therefore, hypothesis 13b was

partially supported.

Figure 4

*Model for the Latent Variable of Personal Factors*

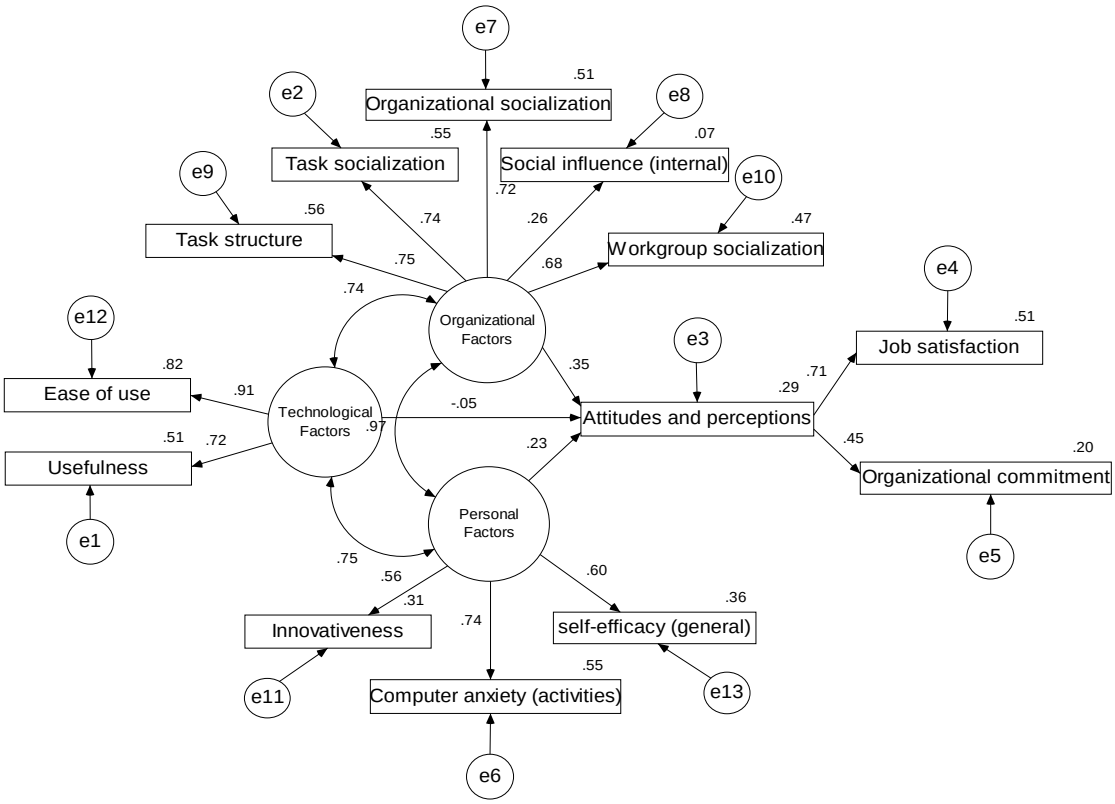



Hypothesis 14 predicted a meaningful path model for TMM in which the attitudes and perceptions employees hold toward computer technology (observed variable) would serve to mediate the relationship between technological, personal, and organizational factors (latent variables) and the employees' job satisfaction and organizational commitment (observed variable). Based on the results of hypotheses 13-13b, the models for each latent variable were used in the development of TMM in order to increase the validity of the model and to reduce the accumulation of error associated with each latent variable. The path model of TMM showed that the data were generally consistent with the hypothesis. Results of the Structural Equation Model indicated that the data fit the

model: $x^2$ (60) = 385, $p$ = .000; CFI = .929, NFI = .926, GFI = .920, AGFI = .897, RMSEA = .099 (see Figure 5). Therefore, hypothesis 14 was supported.

Figure 5

*Actual Technology Management Model (TMM)*




*Post-hoc Analyses*

The first post-hoc analysis measured the influence of the demographic data on the predictor and/or criterion variables such as the attitudes employees hold toward computer technology, their job satisfaction, and their organizational commitment. The findings indicated that employee's sex, age, position, organization type, and the percentage of the workday that the employees are required to use technology were related to one or more of the predictor and/or criterion variables. However, the variables of race, years of computer experience, years of computer experience at current job, and tenure in the current job

were not found to be related to one or more of the predictor and/or criterion variables thus excluded from further analysis. Specifically, preliminary analyses indicated that organizational commitment, differed by participant sex $t$ (584) = -2.09, $p > .05$, position, $F$ (4, 530) = 3.58, $p < .05$, and organization type, $F$ (8, 530) = 2.63, $p < .05$ and was positively related to employee age ($r = .15$, $p < .05$). Preliminary analyses also indicated that the attitudes employees hold toward computer technology differed by organization type, $F$ (8, 530) = 2.16, $p < .05$ and was positively related to the percentage of the workday that employees are required to use technology ($r = .10$, $p = .05$). Additionally, preliminary analyses indicated that job satisfaction differed by position, $F$ (8, 530) = 2.55, $p < .05$ and was positively related to employee age ($r = .16$, $p < .05$).

As a result of these preliminary findings three regression models were developed for the criterion variables of the attitudes employees hold toward computer technology, their job satisfaction, and their organizational commitment. In doing so, the first block of variables containing employee's sex, age, position, organization type, and the percentage of the workday that the employees are required to use technology were entered into a regression model, followed by a second block comprised of the variables found in TMM. This was done to examine whether the variance accounted for in the attitudes employees hold toward computer technology, their job satisfaction, and their organizational commitment were a result of the variables found in TMM or were a result of demographic differences.

The results of the regression model containing the criterion variable of the attitudes employees hold toward technology after the addition of the first block of variables indicated a significant model $F$ (5, 580) = 4.59, $p < .001$, ($R^2 = .038$). The

standardized regression coefficients indicated that position $\beta$ = -.146, $p$ < .05 and the percentage of the workday that the employees are required to use technology $\beta$ = .110, $p$ < .05 were the only significant predictors of the attitudes employees hold toward technology. The addition of the TMM block of variables improved the models ability to predict the attitudes employees hold toward technology, $\Delta R^2$ = .26, $F\Delta$ (14, 571) = 23.10, $p$ < .001. Specifically, the standardized regression coefficients of the model containing the two blocks of variables indicated that task structure $\beta$ = .323, $p$ < .001 was the greatest predictor of the attitudes employees hold toward technology followed by age $\beta$ = .132, $p$ < .001, ease of use $\beta$ = .126, $p$ < .05, position $\beta$ = -.094, $p$ < .05, and social influence (internalization) $\beta$ = .085, $p$ < .05.

The results of the regression model containing the criterion variable of job satisfaction after the addition of the first block of variables indicated a significant model $F$ (5, 580) = 7.56, $p$ < .001, ($R^2$ = .061). The standardized regression coefficients indicated that position $\beta$ = -.181, $p$ < .001 and age $\beta$ = .126, $p$ < .01 were the only significant predictors of job satisfaction. The addition of the TMM block of variables improved the models ability to predict job satisfaction, $\Delta R^2$ = .16, $F\Delta$ (14, 571) = 11.61, $p$ < .001. Specifically, the standardized regression coefficients of the model containing the two blocks of variables indicated that age $\beta$ = .250, $p$ < .001 was the greatest predictor of job satisfaction followed by task structure $\beta$ = .247, $p$ < .001, position $\beta$ = -.137, $p$ < .01, and ease of use $\beta$ = .129, $p$ < .05.

The results of the regression model containing the criterion variable of organizational commitment after the addition of the first block of variables indicated a significant model $F$ (5, 580) = 11.83, $p$ < .001, ($R^2$ = .093). The standardized regression

coefficients indicated that position $\beta$ = -.264, $p$ < .001, sex $\beta$ = .142, $p$ < .01, and age $\beta$ = .092, $p$ < .05 were the only significant predictors of organizational commitment. The addition of the TMM block of variables improved the models ability to predict organizational commitment, $\Delta R^2$ = .15, $F\Delta$ (14, 571) = 13.13, $p$ < .001. Specifically, the standardized regression coefficients of the model containing the two blocks of variables indicated that ease of use $\beta$ = .250, $p$ < .001 was the greatest predictor of organizational commitment followed by position $\beta$ = -.223, $p$ < .001, age $\beta$ = .214, $p$ < .001, sex $\beta$ = .129, $p$ < .01, workgroup socialization $\beta$ = .120, $p$ < .01, and social influence (internalization) $\beta$ = .117, $p$ < .01.

A second post-hoc analysis was conducted after careful review of the results. Tests of multicolinearity were conducted to insure that the latent variables were not measuring the same construct. The reason for this test is a result of the very strong associations between the latent variables. Therefore, the three models were developed to assess for multicolinearity between the latent variables. Beginning with organizational factors and personal factors, a model was developed to assess the goodness of fit. Results of the model containing the latent variables of organizational factors and personal factors indicated that they were measuring different latent constructs. Specifically, the results of the path analysis indicated a poor fit for the model: $x^2$ (19) = 266.6, $p$ = .000; CFI = .857, NFI = .848, GFI = .881, AGFI = .817, RMSEA = .149.

The next model included the latent variables of organizational factors and technological factors. Results of the model containing the latent variables of organizational factors and technological factors indicated that they were measuring different latent constructs. Specifically, the results of the path analysis indicated a poor fit

for the model: $x^2$ (13) = 160, $p$ = .000; CFI = .897, NFI = .905, GFI = .892, AGFI = .826, RMSEA = .139.

The final model included the latent variables of organizational factors and technological factors. Results of the model containing the latent variables of personal factors and technological factors indicated that they were measuring different latent constructs. The results of the path analysis indicated a poor fit for the model: $x^2$ (13) = 160, $p$ = .000; CFI = .897, NFI = .905, GFI = .892, AGFI = .826, RMSEA = .139. Although the latent variables share a strong association they all appear to be measuring different constructs. However, the strong relationships appear reasonable considering the influence they have on one another. According to TMM, a person who displays an affinity for technology by way of personal factors (e.g., high computer self-efficacy, low computer anxiety, and high individual innovativeness) will tend to view technology as easy to use and useful. Similarly, a person who experiences positive organizational factors such as high levels of social influence, high levels of socialization (organizational, workgroup, and task), and high levels of task structure relative to computer use, will also tend to view technology as easy to use and useful.

## Summary

This chapter provided the quantitative results for each hypothesis regarding the development of TMM. The results provided statistically significant correlations between the variables. Additionally, after attempting to control for accumulated error through a series of CFAs, a meaningful fit for the model was established. Also the findings indicated that the attitudes employees hold toward technology mediated the relationship between technological, organizational, and personal factors and the work related attitudes

of job satisfaction and organizational commitment. The model also shows that technological factors have a minimal influence on the attitudes employees develop about computer technology. However, the model does show that the latent variable of organizational factors has the greatest influence on employees' attitudes about technology followed by the latent variable of personal factors. Chapter IV explains the significance as well as the implications of these results.

# CHAPTER IV

## Discussion

### *Brief Summary of Purpose*

This study sought to examine the role of technology; the attitudes and perceptions employees hold toward computer technology, the factors associated with the development of these attitudes and perceptions, and their subsequent work related attitudes. To date, prior research has indicated mixed results ranging from the perceptions of technology as a teammate (Nass et al., 1996) to a form of panoptic control (Berdays, 2002) and as either caring or coercive (Sewell & Barker, 2006). The examination of attitudes and perceptions need to be accounted for because they contribute to the construction of "a person's view of reality" (Yotsumoto & Sekuler, 2006). Further, it was reasoned here that the attitudes employees' develop toward technology in the workplace would mediate the relationship between technological, organizational, and personal factors and the work related attitudes of job satisfaction and organizational commitment.

The goals of this study included the extension of prior research on technology in the workplace through the development of a multifactor model tailored to mandated use environments. Also, TMM was developed to explain how these attitudes then serve to mediate the relationship between technological, personal, and organizational factors and the work related attitudes of job satisfaction and organizational commitment.

### *Discussion of Results*

One of the major assumptions that TMM centers on is the notion that technological, personal, and organizational factors influence the attitudes employees hold toward technology. In order to test these assumptions hypotheses 1-10 were developed.

Specifically, each hypothesis predicted a positive relationship between the observed variables associate with the technological, personal, and organizational factors such as socialization (organizational, workgroup, and task), task structure, social influence (compliance, internalization, and identification), ease of use, perceived usefulness, computer self-efficacy (general and advanced activities), computer anxiety (use and activities), and individual innovativeness and the attitudes employees hold toward computer technology. The results provide us with a number of variables that appear to directly influence employees' attitudes of technology. The value associated with these correlational results can be found in the support it offers for the inclusion of the observed variables used here, as well as the justification for a multifactor design in the development of TMM.

Based on these correlational findings alone, researchers and business managers may find it difficult to accurately explain which variables actually contribute to the attitudes employees hold toward technology. Since behaviors are not enacted in a vacuum, it would be remiss to simply consider these correlational findings without considering their relationship with the other variables found in TMM. In other words, in order to fully understand the impact these correlational results have on the attitudes employees hold toward technology, the results must be considered further as they apply to TMM. The importance of this point will be addressed further in the subsequent sections of this chapter.

Hypotheses 11 and 12 examined the relationships between job satisfaction and organizational commitment and the attitudes employees hold toward technology. These findings indicated that the attitudes employees hold toward technology were positively

related to job satisfaction and organizational commitment. In other words, as employees' positive attitudes toward technology increased so did their job satisfaction and organizational commitment. The opposite condition is also possible, resulting in low levels of job satisfaction and organizational commitment. These findings are of value because they provide support for the position that the value-added component of technology can be realized at the employee level. In this instance, the value of technology is explained by the association between the attitudes employees hold toward technology and their subsequent work related attitudes of job satisfaction and organizational commitment. Additionally, since the value-added component of technology resides in the employee's job satisfaction and organizational commitment, TMM provides a means to explain how to maximize the value-added component of technology by way of technological, personal, and organizational factors found to contribute to the attitudes employees hold toward computer technology. As a result of the costs associated with recruiting, training, and socializing newcomers into the organization coupled with the numbers reflecting the frequency in which people switch jobs (Bureau of Labor Statistics, 2002) organizational communication scholars as well as business professionals should take note of the findings contained in this study.

Hypotheses 13 through 13b predicted that the observed variables considered to create the latent variables of technological, personal, and organizational factors would result in a meaningful fit for each latent variable model. The focus of concern was again with the accumulation of error and the validity of the latent variables included in the construction of TMM. During the process of testing the models, the 4-item ease of use and the 4-item perceived usefulness scales combined to create a meaningful model

representing technological factors. During the process of testing the personal factors model comprised of the 4-item computer anxiety (use), the 4-item computer anxiety (activities), 4-item computer self-efficacy (general), 4-item computer self-efficacy (advanced), and the 12-item individual innovativeness scale, both the computer anxiety (use) and the computer self-efficacy (advanced) scales were removed in order to achieve a meaningful fit for the model. It is reasoned here that the exclusion of the computer self-efficacy (advanced) scale was centered on the complexity of the skills assessed by the measure, such as those pertaining to the ability to write computer programs. Thus, it appears that the assessment of advanced skills may have reached beyond the computer self-efficacy of those who participated in this study. Similarly, it is reasoned that computer anxiety (use) may not applicable here because the population of participants for this study only included employees who were required to use computer technology as part of their job function and therefore should have been trained to use the technology. However, this is a speculation because the amount of training employees received from the organization was not assessed here.

The model for the final latent variable in this study; organizational factors was then tested. This model was originally comprised of socialization (organizational, workgroup, and task), task structure, and social influence (compliance, internalization, and identification). In order to achieve a meaningful fit for the model, the measures of social influence (compliance and identification) were removed. This finding may be associated with the mandated use requirement to participate in this study. Specifically, mandated use environments require compliance and to some extent identification with the referent group because the employee's use of technology is associated with membership

in the organization. In sum, the results of these analyses are of interest because the combination of variables thought to comprise the latent variables of technological, personal, and organizational indicated a meaningful fit for the models, which also supported their inclusion in TMM.

Hypothesis 14 predicted that a Structural Equation Model of TMM would provide a meaningful fit for the model (see Figure 2 for reference). Following the criteria previously set forth in this research study, the data indicated a meaningful fit for TMM. Another important point highlighted by the development of the TMM is found in its simplicity and practicality. For example, TMM is simple and practical in its ability to explain the influence of computer technology on employees and the organization in mandated use work environments. Another example of the simplicity and practicality of TMM is found in its ability to serve as a guide for employees, managers, and the organization to manage the influence of computer technology in the workplace. Since TMM indicates that employees' attitudes toward technology are influenced by organizational factors, managers may want to focus their attention on these factors in order to maximize the value-added component of computer technology in the workplace. Specifically, TMM explains two ways in which technology in the workplace contributes to an organization's bottom line. The first is associated with the money saved in recruiting, training, and socializing employees as a result of increased levels of organizational commitment. The second contribution realized by the organization from technology resides in the positive association between job satisfaction and increased production of employees (see Gruneberg, 1979).

Additionally, TMM offers an explanation of how the personal factors of computer

self-efficacy, computer anxiety, and individual innovativeness influence the attitudes employees hold toward technology. With this realization, employees may begin to work on improving their personal factors beginning with being proactive in building their computer self-efficacy (e.g., taking classes to build computer skills), which in itself will reduce their computer anxiety. Employees may engage in taking risks with technology in an attempt to increase their innovativeness. That said, it is realized here that any increase in innovativeness may take the employee some time to achieve as traits are difficult to change but can be managed. At the same time, employees also need to enhance their organizational factors by engaging in information seeking tactics during the socialization process in order to fully understand the policies regarding appropriate use of computer technology including the content and the appropriateness of messages sent via technology. As a result of utilizing TMM as a guide to manage technology in the workplace, organizations can maximize the value-added component of technology and employees can become active members of the technology driven information society.

Another unique finding associated with TMM was the order in which the latent variables were found to influence the attitudes employees held toward computer technology. Specifically, of interest is the latent variable of technological factors including ease of use and perceived usefulness. Earlier in this chapter I mentioned how I would return to address the importance of considering the correlational results further with their inclusion in TMM. The importance of further consideration is found in the influence the latent variables have on one another and the attitudes employees hold toward technology. To review, the correlational results indicated that both ease of use and perceived usefulness were positively related with employees' attitudes toward

technology. However, when ease of use and perceived usefulness were combined to represent the latent variable of technological factors combined with the influence of the latent variables of personal and organizational factors found in TMM, the standardized regression coefficient between technological factors and the attitudes employees hold toward technology indicate no such association. Thus, it would appear that the ability of technological factors to predict the attitudes employees' hold toward technology was attenuated by the personal and organizational factors found in TMM. To elucidate this point, it appears that employees high in computer self-efficacy, high in individual innovativeness, and low in computer anxiety (personal factors) may as a result; find computer technology easy to use and useful. Thus attenuating the affect technological factors alone have on employees' attitudes toward technology. Similarly, employees who experience high levels of organizational socialization (task, organizational, and workgroup), high levels of task structure, and high levels of social influence (organizational factors) may also find technology easy to use and useful.

One additional point of interest associated with TMM is that the latent variable of organizational factors was the greatest predictor of the attitudes employees held toward technology. The value of this finding is based on the associations between the organizational and personal factors of TMM to the extent that organizational factors appear to attenuate the influence of the personal factors. To elucidate this point, employee socialization that provides them with training and the understanding of how computer technology benefits the organization and the employee, will likely serve to increase employees' computer self-efficacy, decrease their computer anxiety, and increase their innovativeness. Specifically, the increase in computer self-efficacy can be

attributed to the acquisition of computer skills during training. The decrease in computer anxiety could be explained by the increase in confidence associated with the increased knowledge of computers. Further, this increase in computer confidence and knowledge associated with socialization may also increase employees likelihood to take risks when it comes to technology and in doing so will increase their innovativeness.

The association between organizational factors and the attenuation of personal factors may also be found in the task structure associated with technology. Thistly, task structures serve to routinize the technological processes that take place in organizations to the extent that they serve to increase employees' personal factors of computer self-efficacy, computer anxiety, and individual innovativeness. It would appear that social influence may play a lesser role in attenuating the influence of personal factors on the attitudes employees hold toward technology. To explain this point, the social influence of others that is present during socialization may serve to motivate employees to increase their knowledge and understanding of technology in order to conform to ones' referent group. Since the socialization of employees, the propagation of task structure, and social influence are enacted through communication, it appears that the communication exchanges that take place within the organization are important factors to consider when examining the influence of technology in the workplace.

*Application of TMM to Contemporary Organizations*

The development of TMM was designed to assist those working in contemporary organizations to better understand the influence of computer technology in today's workplace. Because TMM appears too broad to clearly explain the dynamics that take place within organizations regarding computer technology, caution should be taken when

interpreting these results. However, the post-hoc analyses did offer an insight as to the potential value of TMM as it is further refined and tested. For example, one of the unique findings associated with the post-hoc analyses was based on the demographics found to serve as predictors for the attitudes employees hold toward technology as well as employees' job satisfaction and organizational commitment. Specifically, employees' age, position with the organization, and their biological sex served as predictors of their attitudes toward technology, their job satisfaction, and their organizational commitment, with age consistently being a greater predictor that the others. Although, this study did not specifically focus on employee demographics, the three that emerged as predictors warrant further investigation.

Of additional interest to contemporary organizations are the demographic variables that did not appear to predict the attitudes employees hold toward technology, their job satisfaction, or their organizational commitment. These variables included race, years of computer experience, years of computer experience at current job, and tenure at their current job. The finding here indicating that computer experience was not a good predictor of work related outcomes of satisfaction and commitment offers support for prior research indicating the same results (Venkatesh, V., & Davis, 1996). Thistly, it would appear that asking applicants to quantify the amount of computer experience they have may not accurately serve to predict their future work related attitudes. The finding that length of tenure had no apparent barring on the employee's attitudes toward technology is a new finding and one that may interest contemporary organizations in that tenured employees' satisfaction and commitment may reside in other factors such as pay, retirement, and effort invested, not those related to computer technology. This is another

area that warrants further investigation before drawing conclusions.

In addition to the demographic data previously discussed, TMM indicates that the latent variable of organizational factors appears to have a greater influence on employees' attitudes toward technology and their subsequent work related attitudes than does the latent variables of technological and personal factors. Due to the broad scope of TMM, the influence of each variable found in the latent variable of organizational factors were not specifically addressed in its development; however; the post-hoc analyses indicated that task structure was the greatest organizational factor to predict employees attitudes toward technology and their subsequent work related variables of job satisfaction and organizational commitment. This finding supports the notion forwarded by Giddens (1979) that structures consist of rules and resources upon which individuals rely on to guide actions. As a result of this finding, today's contemporary organizations may want to provide employees with structure regarding their use of computer technology, which in turn may result in positive outcomes. Again, further investigation is warranted in order to make any further assertions.

Other variables found in the latent variable organizational factors that served as predictors of employees' attitudes toward computer technology and their work related attitudes were social influence and workgroup socialization. The value of these findings to contemporary organizations buttresses those of task structure in that both provide direction to the employee as to the appropriate and expected use of computer technology in the workplace. Specifically, workgroup socialization involves learning the rules, norms, procedures, and values of the person's immediate workgroup. Similarly, social influence involves employees behaving in a manor similar to those individuals in their

referent group. Therefore, if the referent group (e.g., managers) embrace computer technology and utilize it according to the structures set forth by the organization, employees may develop similar attitudes and behaviors. In sum, this study and the development of TMM serves as a starting point to further examine factors that influence the attitudes and perceptions employees hold toward computer technology in the workplace. Further, although TMM appears too broad to clearly explain the dynamics that take place within organizations regarding computer technology, the post-hoc analyses do provide additional insight into the value of task structure, social influence, workgroup socialization, age of the employee, and their position within the organization. What this also tells us is that tenure and of experience with technology may not serve as accurate predictors of the computer and work related attitudes employees hold.

*Limitations*

In total, four limitations should be addressed when interpreting the results of this study. The first limitation involves the methodology used in this study. The addition of a qualitative component could tap into the specific messages that were perceived as social influence along with the messages that were perceived as influential enough to shape the receivers attitudes about technology. Also, a qualitative approach could identify the formal and informal messages exchanged during socialization that employees perceived to adequately address the appropriate use of technology in the workplace.

The second limitation involves the performance of the measures used in the study. Although, the measures used here had been used in a number of prior studies, several of the measures did not perform as prior research indicated. The results of the CFAs conducted here indicated that the Perceived Ease of Use Scale, Perceived Usefulness

Scale, Individual Innovativeness Scale, Newcomer Socialization Questionnaire (organizational, workgroup, and task), the Computer Attitudes Scale, the Abridged Job in General Scale, and the Organizational Commitment Questionnaire were among those measures that did not initially indicate a good fit for the model. This finding suggests that the measures listed above may need additional validity testing.

A third limitation involves the length of the questionnaire used in this dissertation. Although all the variables were accounted for in TMM participants may have experienced fatigued while completing the 132-item questionnaire. During the data verification, cleaning, and input portion of this study, there was no apparent evidence of response set in the completed questionnaires included in the study. Another concern pertaining to the questionnaire involves the list of procedures requested of the participants by the primary author in order to verify that the participants met the requirements for participation. These procedures involved each participant sending an email to the primary author that included their name, workplace, and a telephone number that they could be reached for verification purposes as well as identifiers on the return envelope so the information in the email could be crosschecked with the information on the returned envelope containing the completed questionnaire. As a result of this process, some potential participants may have felt uncomfortable with identifying themselves or may have just been irritated with the list of requests that they chose not to participate in the study. Thus, individuals who are limited on time or easily irritated may have been inadvertently excluded from the study.

Fourth, participants were required to provide self-report data on an array of technological, personal, and organizational factors, their attitudes and perceptions of

technology, and their work related attitudes of job satisfaction and organizational commitment. Although the results generally supported the hypotheses, self-reports may not necessarily be indicative of the actual behaviors that occur in the workplace. Given the number of factors that contribute to employees' job satisfaction and organizational commitment, along with the limited amount of research examining the degree to which the attitudes employees hold toward technology influence their work related attitudes, care should be taken during the interpretation of these results.

*Future Directions*

Throughout the development of TMM a number of possibilities began to surface that would serve to further refine TMM and provide direction for future research. The first that will be discussed here involves a mixed methodological approach. To explain, the value of utilizing a qualitative component to further extend TMM was realized while the primary author was analyzing the data from the current study. Based on the inability of TMM to explain what messages employees perceived as a form of social influence and why these particular messages influenced their attitudes about technology, the addition of a qualitative component would provide future researchers with rich communication specific data to further refine TMM. Building on the inclusion of employees' voices found in a qualitative study, future researchers may also want to include a dialogic component in which to examine the specific communication interactions that take place in each of the latent variable factors (technological, personal, and organizational). This dialogic focus would allow researchers the ability to tap into the role that communication plays in shaping the attitudes and perceptions employees hold toward computer technology. This approach to TMM would provide a level of understanding that a

quantitative study can not provide. For example, the ability to identify specific verbal and nonverbal messages exchanged during employee socialization may increase our understanding of what messages are effective in relaying the expectations associated with technology including the appropriate context and subject matter that is to be conveyed via computer technology.

In addition to differing methodological approaches, there were a number of variables that surfaced during the development of TMM that could serve to further refine TMM. The first variable future researchers may want to consider is symbolic interaction. As a result of the interplay between socialization, social influence, and task structure a shared reality among organizational members develop. More specifically, Symbolic Interaction Theory (SIT; Blumer, 1969; Cooley, 1909; Mead, 1922, 1934) explains how this shared reality is formed through communication interactions (e.g., such as those that take place during socialization, social influence, and as a result of task structures). The inclusion of SIT in future research designed to refine TMM dovetails with the qualitative and dialogic approaches discussed earlier, by highlighting the symbolic reality that is based on the way in which people ascribe meanings and values to the world in which they live. More specifically, Berger and Luckman (1966) point out that as a result of meanings ascribed during communication interactions our view of the world is socially constructed. The importance here to the refinement of TMM is the way in which communication interactions among organizational members serve to shape a shared reality of technology in the workplace. Future researchers may want to tap into the way in which the interpretations of messages and their ascribed meanings serve to influence the attitudes employees hold toward technology that align with the organization and its members.

According to Blumer (1969), it is these ascribed meanings, values, and interpretations developed through communication interactions that have a dominant influence on a person's way of thinking and being in the world.

Drawing from Mead's (1934) work that "reality" is based on a set of social constructs consisting of symbols that are assigned meaning through communication interactions that create structures to govern how people are expected to act in various contexts, it appears reasonable to suggest the inclusion of symbolic interaction in future research. In sum, as organizations become more entrenched within the information age, the way in which the self and its technologically filled environments are redefined determines a new reality. Thus it appears logical to assume that this shared "reality" includes the attitudes and perceptions organizational members hold toward computer technology. Computer frustration is another variable that future researchers may want to consider as a component of the organizational factors found in TMM that could serve to enhance the model.

The suggested inclusion of computer frustration to refine TMM is based on its association with the organization and its subsequent association with the attitudes of those who experience computer frustration such as mood changes, burnout, and negative interaction with colleagues (Ceaparu et al., 2004), lower levels of job satisfaction (Murrell & Sprinkle, 1993), and in some cases, it can even lead to physiological responses such as increased blood pressure and muscle tension (Scheirer et al., 2002). Of interest to the extension of TMM is found in the association between computer frustration and the organizational factors found in TMM. To elucidate this point, Spector (1978) indicated that computer frustration in the workplace is the result of the physical

environment, the organizational structure and climate, the rules and procedures of the organization, and individuals within the organization. Therefore, computer frustration appears to be inversely related with socialization, task structure, and social influence.

Computer generated frustration has been listed as a major reason why people cannot use computers to reach their goal, hesitate to use computers, or avoid computers altogether (Storms & Spector, 1987). These findings offer support for the inclusion of computer frustration in future TMM research because of its apparent influence on the attitudes employees hold toward technology in the workplace. Additional support for the addition of computer frustration to TMM was found in prior research that indicated a negative relationship between computer frustration and the attitudes employees held toward technology (Ceaparu et al., 2004).

Another variable that presented itself as a possible personal factor for future researchers to use in refining TMM was cognitive flexibility. Simply put, flexibility and adaptability as was individual innovativeness are personal factors considered to influence the attitudes employees hold toward technology. Support for the inclusion of cognitive flexibility as a personal factor for future researchers to consider is found in the argument made by Martin and Rubin (1995) that a person must be cognitively flexible before the individual can display flexibility. Thus, cognitive flexibility is the ability to change or shift response in relation to changing tasks or situational demands (Clark, 1996; Rende, 2000). Therefore, workers who are cognitively flexible would be more likely to develop positive attitudes about technology than those employees who are not cognitively flexible because the former have the ability to adapt to changes in technology while the latter do not (Hesketh & Considine, 1993).

The addition of cognitive flexibility to TMM enhances the model's ability to explain the challenges present in today's technologically latent workplace. To explicate this point, research indicates that changes, such as those associated with technological advances, create a work environment that demands its employees to be flexible enough to adapt to these technologically driven changes in the workplace (Feltovich, Spiro, & Coulson, 1997; Hesketh & Neal, 1999; Jablin, 2001; Lawler, 1994; Rice, 1983; Schmitt & Chan, 1998; Svenning & Ruchinskas, 1984). Thus, adaptability and flexibility are now considered to be widely acknowledged competencies required of today's employee (Wanberg & Kammeyer-Mueller, 2006). Surprisingly, there is a lack of prior research examining the association between an employee's cognitive flexibility and their attitudes and perceptions of computer technology. Thistly, future researchers can fill this gap with the inclusion of cognitive flexibility in the continued development of TMM.

The final variable that emerged during the development of TMM was associated with the work related attitude of work alienation. Specifically, work alienation represents a state of separation that involves a disconnection of the individual from his or her labor and is not considered to be a desirable state (Hegel, 1910; Kanungo, 1979; Marx, 1964). The value-added component associated with work alienation is found in its negative relationship with job satisfaction and organizational commitment. For example, prior research indicates that as work alienation increases employee satisfaction and commitment to the organization decreases (Wilkes, Frolick, & Urwiler, 1994). However, it has yet to be determined if there is a direct relationship between work alienation and the technological, personal, and organizational factors found in TMM or are these relationships mediated by the attitudes employees hold toward technology.

Prior research indicates that for some, technological advances have allowed greater flexibility in the workplace, while for others this increased level of flexibility has served to isolate and alienate them from the organization and its members (Wilkes et al., 1994). For example, the flexibility offered by technology (involving work away from the office through the use of technology) is being embraced by more and more companies who are capitalizing on the benefits of technology while minimizing the costs of office space (Wilkes, et al.). At the same time, the flexibility found in technology has also created a work environment that isolates employees by limiting their contact with the organization and co-workers to only those that are mediated by technology (Martino & Wirth, 1990). Further, Yaverbaum (1998) found that employees who are required to utilize computer technology on a regular basis to communicate with others experience dissatisfaction, boredom, alienation, and isolation from a lack of interpersonal contact with others in the workplace.

Of additional concern are the projections that indicate there will be well over 90 million of these isolated technologically mediated jobs in the US by 2030 (Wilkes, et al., 1994). Concurrently, it is reasoned that the number of employees who experience work alienation will increase as a result of work environments that force employees to use technology and are bound by structures within the organization that isolate them from their work and from others (Shome, 2006). Given the negative impact work alienation appears to have on the organization and its members it appears to be a variable that future researchers may want to consider to further extend and refine TMM.

*Conclusion*

Based on the important role technology plays in today's workplace, this

dissertation should be of interest to scholars, businesses professionals, and employees. The goal here was to develop a model that could provide a broad range of organizational members with a means to better understand the impact computer technology has on their work-life. Specifically, TMM was developed for mandated use work environments to explain the influence technology has on the organization and its members. Of particular interest here was the influence organizational and personal factors had on the attitudes employees held toward technology. A closer examination of TMM suggests that the source of this influence was derived from the communication interactions that took place in the personal and organizational factors. In other words, it appears that the communication interactions that took place within each of the factors shapes the degree of influence that factor had on the attitudes and perceptions employees held toward technology. Similarly, Lewis and Seibold (1993, 1996) underscored the critical role of communication in the workplace during times of procedural, structural, and technological changes that frequently force its members to adapt, cope, and adjust to a new reality (e.g., introduction of new technologies and its mandated use).

The simplicity and practicality of TMM allows it to serve as a guide for future research and as a means for business professionals to manage the degree of influence technology will have on their employees. Given that the findings indicated a good fit for TMM this dissertation and the introduction of TMM to the academic and business realms should generate further interest. Additionally, numerous suggestions were offered here to entice future researchers to further extend and refine TMM. Ultimately, what this dissertation revealed is that it is possible to develop a multi-factor model of technology in mandated use environments that serves as a guide and explains the way in which

technological, personal, and organizational factors influence employees attitudes toward technology and in turn how these attitudes influence the work related attitudes of job satisfaction and organizational commitment.

References

Adamson, I., & Shine, J. (2003). Extending TAM to measure end user computer satisfaction in a mandatory environment: A bank's treasury. *Technology Analysis and Strategic Management Journal, 15*, 441-454.

Achterberg, M. (2001). How culture affects information sharing in an organization. Retrieved July 30, 2008 from http://www.kwork.org/White Papers/cultural.html.

Agarwal, R., & Prasad, J. (1997). The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies. *Decision Sciences, 28*, 557-582.

Ahl, D. H. (1976). Survey of public attitudes toward computers in society. In D. H. Ahl (Ed.), *The best creative computing* (pp. 77–79). Morristown, NJ: Creative Computing Press.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Allen, N. J., & Meyer, J. P. (1990a). Organizational socialization tactics: A longitudinal analysis of links to newcomers' commitment and role orientation. *Academy of Management Journal, 33*, 847-858.

Allen, N. J., & Meyer, J. P. (1990b). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology, 63*, 1-18.

Allen, N. J., & Meyer, J. P. (1996). Affective, continuance, and normative commitment to the organization: An examination of construct validity. *Journal of Vocational Behavior, 49*, 252-276.

American Management Association (2001). AMA survey: Workplace monitoring & surveillance. Retrieved May 21, 2006 from http://www.american-management-association.org/online_library_welcome/.

Anandarajan, M., Simmers, C., & Igbaria, M. (2000). An exploratory investigation of the antecedents and impact of internet usage: An individual perspective. *Behavior and Information Technology, 19*, 69-85

Appelbaum, S. H. (1990). Computerphobia: Training managers to reduce the fears and love the machines. *Industrial and Commercial Training, 22***,** 9-16.

Asch, S. E. (1951). Effects of group pressure upon the modification and distortion of judgment. In H. Guetzkow (Ed.) *Groups, leadership, and men* (pp. 57-89). Pittsburgh, PA: Carnegie Press.

Asch, S. E. (1956). Studies of independence and conformity: A minority of one against a unanimous majority. *Psychological Monographs*, *70* (Whole no. 416).

Asch, S. E. (1966). Opinions and social pressure. In A. P. Hare, E. F. Borgatta, & R. F. Bales (Eds.), *Small groups: Studies in social interaction,* (pp. 318-324). New York: Alfred A. Knopf.

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of Structural Equation Models. *Journal of the Academy of Marketing Science, 16*, 74-95.

Baily, M. N., & Chakrabarti, A. (1999). *Innovation and the Productivity Crisis.* Washington, D.C: Brookings Institution.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191-215.

Bandura, A. (1986). *Social foundation of thought and action: A Social-Cognitive Theory.*

Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Banker, R. D., & Johnston, H. H. (1994). Cost driver analysis in the service sector: An empirical study of the U.S. Airlines. *Accounting Review, 9*, 576-601.

Banker, R. D., Kauffman, R. J., & Morey, R. C. (1990). Measuring gains in operational efficiency from information technology: A study of the positran deployment at Hardee's Inc. *Journal of Management Information Systems, 7*, 29-54.

Barbeite, F. G., & Weiss, E. M. (2004). Computer self-efficacy and anxiety scales for an Internet sample: Testing measurement equivalence of existing measures and development of new scales. *Computers in Human Behavior, 20*, 1-15.

Barge, K. J., & Schlueter, D. W. (1988). A critical evaluation of organizational commitment and identification. *Management Communication Quarterly, 2*, 116-133.

Barker, J., & Cheney, G. (1994). The concept of and practice of discipline in contemporary organizational life. *Communication Monographs, 61*, 19-43.

Bateman, T. S., & Strasser, A. (1984). A longitudinal analysis of the antecedents of organizational commitment. *Academy of Management Journal, 27*, 95-112.

Ben-Baker, K., Al-Shammari, E. S., Jefri, O. A., & Prasad, J. N. (1994). Organizational commitment, satisfaction, and turnover in Saudi organizations: A predictive study. *The Journal of Socio-Economics, 23*, 449-456.

Berdays, V. (2002). Traditional management theory as panoptic discourse: Language and the constitution of somatic flows. *Culture and Organization, 8*, 35-49.

Berger, P. L., & Luckmann, T. (1966). *The social construction of reality: A treatise in the*

*sociology of knowledge.* New York: Anchor Books.

Bhatnagar, A., Misra, S., & Rao, H. R. (2000). On risk, convenience, and internet shopping behavior. *Communications of the ACM*, *43*, 98-106.

Blau, G. J. (1986). Job involvement and organizational commitment as interactive predictors of tardiness and absenteeism. *Journal of Management, 12*, 577-584.

Blau, P. M. (1964). *Exchange and power in social life*. New York: Wiley.

Blili, S., Raymond, L., & Rivard, S. (1998). Impact of task uncertainty, end-user involvement, and competence on the success of end-user computing. *Information and Management, 33*, 137-153.

Blumer, H. (1969). *Symbolic interactionism.* Englewood Cliffs, NJ: Prentice Hall.

Bocionek, S. R. (1995). Agent systems that negotiate and learn. *International Journal of Human-Computer Studies, 42***,** 265-288.

Bozionelos, N. (2001). Computer anxiety: Relationship with computer experience and prevalence. *Computers in Human Behavior, 17*, 213-224.

Brannan, M. (2005). Effects of communication training on medical student performance. *Gender, Work, & Organization, 12*, 420-439.

Braverman, H. (1974). *Labor and monopoly capital: The degradation of work in the Twentieth century.* New York: Monthly Review Press.

Brosnan, M. J. (1998a). The impact of computer anxiety and self-efficacy upon performance. *Journal of Computer Assisted Learning, 14*, 223-234.

Brosnan, M. J. (1998b). The impact of psychological gender, gender-related perceptions, significant others, and the introducer of technology upon computer anxiety in students. *Journal of Educational Computing Research, 18*, 63-78.

Brown, J. S., & Duguid, P. (1991). Organizational learning and communities of practice: Toward a unified view of working, learning, and innovation. *Organization Science, 2*, 40-57.

Brown, S. A., Massey, A. P., Montoya-Weiss, M. M., & Burkman, J. R. (2002). Do I really have to? User acceptance of mandated technology. *European Journal of Information Systems, 11*, 283-295.

Bureau of Labor Statistics (2002). Number of jobs held, labor market activity, and earnings growth among younger baby boomers: Results from more than two decades of a longitudinal survey. Retrieved July 10, 2007 from http://www.bls.gov/nls/nlsy79r19.pdf.

Callon, M. (1986). The sociology of an actor-network: The case of the electric vehicle. In M. Callon, J. Law, & A. Rip (Eds). *Mapping the dynamics of science and technology: Sociology of science in the real world.* London: Macmillan.

Cambre, M. A., & Cook, D. L. (1985). Computer anxiety: Definition, measurement, and correlates. *Journal of Educational Computing Research, 1*, 37-54.

Campbell, N. J. (1990). High school students' computer attitudes and attributions: Gender and ethnic group differences. *Journal of Adolescent Research,* 5, 485-499.

Ceaparu, I., Lazar, J., Bessiere, K., Robinson, J., & Shneiderman, B. (2004). Determining causes and severity of end-user frustration. *International Journal of Human-Computer Interaction, 17*, 333-356.

Chau, P.Y. K. (1996). An empirical assessment of a modified technology acceptance model. *Journal of Management Information Systems, 13*, 185-204.

Chao, G. T., O'Leary-Kelly, A. M., Wolf, S., Klein, H. J., & Gardner, P. (1994).

Organizational socialization: Its content and consequences. *Journal of Applied Psychology, 79*, 730-743.

Chen, G., Gully, S. M., Whiteman, J., & Kilcullen, R. N. (2000). Examination of relationships among trait-like individual differences, state-like individual differences, and learning performance. *Journal of Applied Psychology, 85*, 835-847.

Chen, L. D., Soliman, K. S., Mao, E., & Frolick, M. N. (2000). Measuring user satisfaction with data warehouses: An exploratory study. *Information & Management*, *37*, 103-110.

Cheney, G., Block, B. L., & Gordon, B. S. (1986). Perceptions of innovativeness and communication about innovations: A study of three types of service organizations. *Communication Quarterly, 34*, 213-230.

Cheney, P. H., & Dickson, G. W. (1982). Organizational characteristics and information systems: An exploratory investigation. *Academy of Management Journal, 25*, 170-184.

Chua, S. L., Chen, D., & Wong, A. (1999). Computer anxiety and its correlates: A meta-analysis. *Computers in Human Behavior, 15*, 609-623.

Clark. J. M. (1996). Contributions of inhibitory mechanisms to unified psychological theory in neuroscience and psychology. *Brain and Cognition, 30,* 127-152.

Clark, R. A., & Goldsmith, R. E. (2006). Interpersonal influence and consumer innovativeness. *International Journal of Consumer Studies, 30*, 34-43.

Clarke, A., & Smyth, M. (1993). A co-operative computer based on the principles of human cooperation. *International Journal of Man-Machine Studies, 38***,** 2-22.

Cohen, B. A. (1993). Organizational commitment and turnover: A meta-analysis. *Academy of Management Journal, 36*, 1140-1157.

Cohen, B. A., & Waugh, G. W. (1989). Assessing computer anxiety. *Psychological Reports, 65*, 735-738.

Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *Management Information Systems Quarterly, 19*, 189-211.

Cooley, C. (1909). *Social organization: A study of the large mind.* New York: Scibners.

Cotton, J. L., & Tuttle, J. M. (1986). Employee turnover: A meta-analysis and review with implications for research. *Academy of Management Review, 11*, 55-70.

Daft, R. L., & Macintosh, N. B. (1981). A tentative exploration into amount and equivocality of information processing in organizational work units. *Administrative Science Quarterly, 26*, 207-224.

Davis, F. D. (1986). *A Technology Acceptance Model for empirically testing new end-user information systems: Theory and results*. Cambridge, MA: MIT Sloan School of Management.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Management Information Systems Quarterly, 13*, 319-340.

Davis, F. D. (1993). User acceptance of IT: System characteristics, user perceptions and behavioral impacts. *International Journal of Man–Machine Studies, 38*, 475-487.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: Comparison of two theoretical models. *Management Science, 35*,

982-1003.

Desmarais, M., Girous, L., & Larochelle, S. (1993). An advice-giving interface based on plan-recognition and user-knowledge assessment. *International Journal of Man-Machine Studies, 39***,** 901-924.

Deutsch, M., & Gerard, H. (1955). A study of normative and informational social influence upon individual judgment. *Journal of Abnormal and Social Psychology, 51*, 629-636.

Downs, C. W., & Hazen, D. (1977). A factor analytic study of communication satisfaction. *Journal of Business Communication, 14*, 63-73.

D'Urso, S. C. (2006). Who's watching us at work? Toward a structural-perceptual model of electronic monitoring and surveillance in organizations. *Communication Theory, 16*, 281-303.

Edley, P. (2001). Technology, employed mothers, and corporate colonization of the lifeworld: A gendered paradox of work and family balance. *Women and Language, 24*, 27-35.

Elangovan, A. R. (2001). Causal ordering of stress, satisfaction and commitment, and intension to quit: A structural equations analysis. *Leadership and Organization Development Journal, 22*, 159-165.

Ellemers, N., Kortekaas, P., & Ouwerkerk, J. (1999). Self-categorization, commitment to the group and group self-esteem as related but distinct aspects of social identity. *European Journal of Social Psychology, 29*, 371-389.

Feltovich, P. J., Spiro, R. J., & Coulson, R. L. (1997). Issues of expert flexibility in contexts characterized by complexity and change. In P. J. Feltovich & K. M. Ford

(Eds.), *Expertise in context* (pp. 125-146). Cambridge, MA: MIT Press.

Findlay, P., & McKinlay, A. (2003). Surveillance, electronic communications technologies and regulation. *Industrial Relations Journal, 34*, 305-318.

Firth, L., Mellor, D. J., Moore, K. A., & Loquet, C. (2004). How can managers reduce employee intention to quit? *Journal of Managerial Psychology, 19*, 170-187.

Fishbein, M., & Ajzen, I. (1975). *Attitude, intentions and behavior: An introduction to theory and research.* Boston: Addison-Wesley.

Flynn, L. R., & Goldsmith, R. E. (1993). A validation of the Goldsmith and Hofacker innovativeness scale. *Education and Psychology Measurement, 53*, 1105-1116.

Foster, L. W., & Flynn, D. M. (1984). Management information technology: Its effects on organizational form and function. *Management Information Systems Quarterly, 8*, 229-236.

Fox, R. (1995). Electronic junk. *Communications of the ACM, 38*, 1-8.

Foxall, G. R., & Szmigin, I. (1999). Adoption-innovation and domain specific innovativeness. *Psychological Reports, 84*, 1029-1030.

Francis, L. J. (1993). Measuring attitude toward computers among undergraduate college students: The affective domain. *Computers in Education, 20*, 251-255.

Fulk, J. (1993). Social construction of communication technology. *Academy of Management Journal, 36*, 921-950.

George, J. F., Iacono, S., & Kling, R. (1995). Learning in context: Extensively computerized work groups as communities of practice. *Accounting, Management and IT, 5*, 185-202.

Giddens, A. (1976). *New rules of sociological method.* New York: Basic.

Giddens, A. (1979). *Central problems in social theory.* Berkeley, CA: University of California.

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration.* Berkeley, CA: University of California.

Gilroy, F. D., & Desai, H. B. (1986). Computer anxiety: Sex, race, and age. *International Journal of Man-Machine Studies, 25*, 711-719.

Glass, C. R., & Knight, L. A. (1988). Cognitive factors in computer anxiety. *Cognitive Therapy and Research, 12*, 351-366.

Glisson, C. A. (1978). Dependence of technological routinization on structure variables in human service organizations. *Administrative Science Quarterly, 23*, 383-395.

Goldsmith, R. E. (1990). The validity of a scale to measure global innovativeness. *Journal of Applied Business Research*, *7*, 89-97.

Goldsmith, R. E., & Hofacker, C. F. (1991). Measuring consumer innovativeness. *Journal of the Academy of Marketing Science, 19*, 209-221.

Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance, *Management Information Systems Quarterly, 19*, 213-236.

Goodman, P. S., & Griffith, T. L. (1991). A process approach to the implementation of new technology. *Journal of Engineering and Technology Management, 8*, 261-285.

Gos, M. W. (1996). Computer anxiety and computer experience: A new look at an old relationship. *Clearing House, 69*, 266-271.

Greenwald, C. (2006). Tech companies see U.S. talent shortage as a barrier to innovation. *Information Technology Association of America.* Retrieved November 20, 2008

from http://www.itaa.org/newsroom/release.cfm?ID=2386.

Gruneberg, M. M. (1979). *Understanding job satisfaction.* New York: Wiley.

Hacker, K. L., & Steiner, R. (2002). The digital divide for Hispanic Americans. *Howard Journal of Communications, 13*, 267-283.

Hage, J. T., & Aiken, M. (1969). Routine technology, social structure and organization goals. *Administrative Science Quarterly, 14*, 366-377.

Hargie, O., Dickson, & Tourish, D. (1999). *Communication in management*. San Francisco: Jossey-Bass.

Harrison, A. W., & Rainer, R. K. (1992). The influence of individual differences on skill in end- user computing. *Journal of Management Information Systems, 9***,** 93-110.

Hatcher, T. (1999). How multiple interventions influenced employee turnover: A case study. *Human Resource Development Quarterly, 10*, 365-382.

Haueter, J. A., Hoff-Macan, T., & Winter, J. (2003). Measurement of newcomer socialization: Construct validation of a multidimensional scale. *Journal of Vocational Behavior, 63*, 20-39.

Hegel, G. W. F. (1910). *Phenomenology of the mind*. Translated by J. B. Baillie. New York: Macmillan.

Heinssen, R. K., Glass, C. R., & Knight, L. A. (1987). Assessing computer anxiety: Development and validation of the computer anxiety rating scale. *Computers in Human Behavior, 3*, 49-59.

Herring, S. D. (2001). Using the World Wide Web for research: Are faculty satisfied? *Journal of Academic Librarianship*, *27*, 213-219.

Herrmann, A. F. (2006). Stockholders in cyberspace: Weick's sensemaking online.

*Journal of Business Communication*, *44*, 13-35.

Hesketh, B., & Considine, G. (1998). Integrating individual and organizational perspectives for career development and change. *European Journal of Work and Organizational Psychology, 7*, 405-481.

Hesketh, B., & Neal, A. (1999). Technology and performance. In D. R. Ilgen & E. D. Pulakos (Eds.), *The changing nature of performance* (pp. 21-51). San Francisco: Jossey-Bass.

Hirschman, E. C. (1980). Innovativeness, novelty seeking, and consumer creativity. *The Journal of Consumer Research, 7*, 283-295.

Holender, D., & Duscherer, K. (2004). Unconscious perception: The need for a paradigm shift. *Perception & Psychophysics, 66*, 872-881.

Hsu, C. L., & Lu, H. P. (2004). Why do people play on-line games? An extended TAM with social influences and flow experience. *Information & Management, 41*, 853-868.

Hurt, H. T., Joseph, K., & Cook, C. D. (1977). Scales for the measurement of innovativeness. *Human Communication Research*, *4*, 58-65.

Hutchison, S., Sowa, D., Eisenberger, R., & Huntington, R. (1986). Perceived organizational support. *Journal of Applied Psychology, 71*, 500-508.

Ivancevich, J. M., Napier, H. A., & Wetherbe, J. C. (1983). Occupational stress, attitudes, and health problems of the information systems professional. *Communications of the ACM, 26*, 800-806.

Jablin, F. M. (1987). Organizational entry, assimilation, and exit. In F. M. Jablin, L. L. Putnarn, K. H. Roberts, & L. W. Porter (Eds.), *Handbook of organizational*

*communication* (pp. 679-740). Newbury Park, CA: Sage.

Jablin, F. M. (2001). Organizational entry, assimilation, and disengagement/entry. In F. M. Jablin & L. L. Putnam (Eds.), *The new handbook of organizational communication: Advances in theory, research, and methods* (pp. 732-818). Thousand Oaks, CA: Sage.

Jackson, J. (1965). Social stratification, social norms, and roles. In I. D. Steiner & M. Fishbein (Eds.), *Current studies in social psychology* (pp. 301-308). New York: Holt, Rinehart & Winston.

Jackson, M. H., Poole, M. S., & Kuhn, T. (2002). The social construction of technology and studies of the workplace. In L. Lievrouw & S. Livingstone (Eds.), *The handbook of new media* (pp. 236-253). London: Sage.

Johnstone, A., Berry, U., & Nguyen, T. (1994). There was a long pause: Influencing turn-taking behavior in human-human and human-computer spoken dialogues. *International Journal of Human-Computer Studies, 41***,** 383-411.

Jones, T., & Clarke, V. A. (1994). A computer attitude scale for secondary students. *Computersand Education, 22*, 315-318.

Joreskog, K. G., & Sorbom, D. (1984). *LISREL: Analysis of Linear Structure Relationships by the Method of Maximum Likelihood.* Mooresville, IN: Scientific Software.

Kanfer, R., & Heggestad, E. D. (1997). Motivational traits and skills: A person-centered approach to work motivation. *Research in Organizational Behavior, 19*, 1-56.

Kang, M. H. (2002). Digital cable: Exploring factors associated with early adoption. *Journal of Media Economics, 15*, 193-207.

Kanungo, R. N. (1979). The concept of alienation and involvement revisited. *Psychological Bulletin, 86*, 119-138.

Kaplan, M. F., & Miller, C. E. (1987). Group decision making and normative versus informational influence: Effects of type of issue and assigned decision rule. *Journal of Personality and Social Psychology, 53*, 306-313.

Karahanna, E., Ahuja, M., Srite, M., & Galvin, J. (2002). Individual differences and relative advantage: The case of GSS. *Decision Support Systems, 32*, 327-341.

Keenan, A., & Newton, T. J. (1984). Frustration in organizations: Relationships to role stress, climate, and psychological strain. *Journal of Occupational Psychology, 57*, 57-65.

Kelman, H. C. (1958). Compliance, identification, and internationalization: Three processes of attitude change. *Journal of Conflict Resolution, 2*, 51-60.

Kelman, H. C. (1961). Processes of opinion change. *Public Opinion Quarterly, 2*, 51-60.

Kiesler, S., Siegel, J., & McGuire, T. W. (1987). Social psychological aspects of computer mediated communication. In K. Finnegan, R. Salamon, & R. Thompson (Eds.), *Information technology: Social issues* (pp. 290-306). UK, Seven Oaks: Hodder and Stoughton.

King, W. R., & He, J. (2006). A meta-analysis of the technology acceptance model. *Information & Management, 43*, 740-755.

Kirton, M. (1976). Adaptors and innovators: A description and measure. *Journal of Applied Psychology*, *61*, 622-629.

Knezek, G. A., & Miyashita, K. T. (1993). *Handbook for the young children's computer inventory*. Denton, TX: Texas Center for Educational Technology.

Kopelman, R., Brief, A., & Guzzo, R. (1990). The role of climate and culture in productivity. In B. Schneider (Ed.), *Organizational climate and culture* (pp. 282-318). San Francisco: Jossey-Bass.

Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Milton, Keynes: Open University Press.

Law, J. (1987). Technology and heterogeneous engineering: The case of Portuguese expansion. In W. E., Bijker, T. P., Hughes, & T. J., Pinch (Eds.). *The social construction of technological systems: New directions in the sociology and history of technology* (pp. 159-176). Cambridge, MA: MIT Press.

Lawler, E. E. (1994). From job-based to competency-based organizations. *Journal of Organizational Behavior, 15,* 3-15.

Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal and Coping*. New York: Springer.

Lee, R. S. (1970). Social attitudes and the computer revolution. *Public Opinion Quarterly, 34*, 53-59.

Leung, L., & Wei, R. (1999). Who are the mobile phone have-nots? Influences and consequences. *New Media & Society, 1*, 209-226.

Lewis, L. K., & Seibold, D. R. (1993). Innovation modification during intraorganizational adoption. *Academy of Management Review, 18*, 322-354.

Lewis, L. K., & Seibold, D. R. (1996). Communication during intraorganizational adoption: Predicting users' behavioral coping responses to innovations in organizations. *Communication Monographs, 63*, 131-157.

Limayem, M., & Khalifa, M. (2000). What makes consumers buy from the Internet? A

longitudinal study of online shopping. *IEEE Transactions on Systems, Man & Cybernetics, 30*, 421-433.

Lin, J. C. C., & Lu, H. P. (2000). Towards an understanding of the behavioral intention to use a Web site. *International Journal of Information Management, 20*, 197-208.

Lin, F. H., & Wu, J. H. (2004). An empirical study of end-user computing acceptance factors in small and medium enterprises in Taiwan: Analyzed by structural equation modeling. *Journal of Computer Information Systems, 44*, 98-108.

Locke, E. A. (1976). The nature and causes of job satisfaction. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 1297-1349). Chicago: Rand McNally.

Louis, M. R. (1980). Surprise and sense making: what newcomers experience in entering unfamiliar organizational settings. *Administrative Science Quarterly, 64*, 226-251.

Louis, M. (1990). Acculturation in the workplace: Newcomers as lay ethnographers. In B. Schneider (Ed.), *Organizational climate and culture* (pp. 85-129). San Francisco: Jossey-Bass.

Loyd, B. H., & Gressard, C. (1984a). The effects of sex, age, and computer experience on computer attitudes. *AEDS Journal, 18*, 67-77.

Loyd, B. H., & Gressard, C. (1984b). Reliability and factorial validity of computer attitude scales. *Educational and Psychological Measurement, 44*, 501-505.

Lucas, H. C., Jr. (1975). *Why information systems fail.*, New York: Columbia University Press.

Lynch, B. P. (1974). An empirical assessment of Perrow's technology construct. *Administrative Science Quarterly, 19*, 338-356.

Mabert, V. A., Soni, A., & Venkataramanan, M. A. (2003). The impact of organization size on enterprise resource planning (ERP) implementations in the US manufacturing sector. *Omega, 31*, 235-247.

Madlock, P. E. (2008a). The link between leadership style, communicator competence, and employee satisfaction. *Journal of Business Communication*, *45*, 61-75.

Madlock, P. E. (2008b). Employee satisfaction: An examination of supervisors' communication competence. *Human Communication, 11*, 81-100.

Madlock, P. E., & Horan, S. M. (2009). Predicted outcome value of organizational, work group, and task socialization. *Communication Research Reports, 26*, 40-49.

Madlock, P. E., & Kennedy-Lightsey, C. M. (*in press*). The effects of supervisors' verbal aggressiveness and mentoring on subordinate outcomes. *Journal of Business Communication*.

Mahar, D., Henderson, R., & Deane, F. (1997). The effects of computer anxiety, state anxiety, and computer experience on users' performance of computer based tasks. *Personality and Individual Differences, 22*, 683-692.

Majchrzak, A., & Borys, B. (1998). Computer-aided technology and work: Moving the field forward. *International Review of Industrial and Organizational Psychology, 13***,** 305-354.

Malhotra, Y., & Galletta, D. (2005). A multidimensional commitment model of volitional systems adoption and usage behavior. *Journal of Management Information Systems, 22*, 117-151.

Mann, S. (1999). Getting the message: Communication at work. *Journal of General Management, 20*, 78-91.

Marcolin, B. L., Compeau, D. R., Munro, M. C., & Huff, S. L. (2000). Assessing user competence: Conceptualization and measurement. *Information Systems Research, 11*, 37-60.

Marcoulides, G. A. (1989). Measuring computer anxiety: The Computer Anxiety Scale. *Educational and Psychological Measurement, 49*, 733-739.

Marcuse, P. (2007). The production of regime culture and instrumentalized art in a globalizing state. *Globalizations, 4*, 15-28.

Markus, M. L. (1994). Electronic mail as the medium of managerial choice. *Organization Science, 5*, 502-527.

Martin, M. M., & Rubin, R. B. (1995). A new measure of cognitive flexibility. *Psychological Reports, 76,* 623-626.

Martin, R. (1985). Attitudes towards advanced manufacturing technology (AMT): The role of AMT experience, skill level and job involvement. *Social Behavior, 3*, 297-305.

Marsan, C. D. (2001). Wired workforce plans stress corporate nets. *Network World, 18*, 1-3.

Martino, V., & Wirth, L. (1990). Telework: A new way of making a living. *International Labor Review, 129*, 529-554.

Martins, L. (2004). A model of business school students' acceptance of a web-based course management system. *Academy of Management Learning & Education, 3*, 7-26.

Marx, K. (1964). *Early writings.* Edited and translated by T. B. Bottomore. New York: McGraw-Hill.

Mason, D., Button, G., Lanshear, G., & Coates, S. (2002). Getting real about surveillance and privacy at work. In S. Woolgar (Ed.), *Virtual society? Technology, cyberbole, reality,* (pp.137-152). Oxford: Oxford University Press.

Maurer, M. M. (1994). Computer anxiety correlates and what they tell us. *Computers in Human Behavior, 10*, 369-376.

Mead, G. H. (1922). A behavioristic account of the significant symbol. *Journal of Philosophy 19*, 157-163.

Mead, G. H. (1934). *Mind, self, and society.* Chicago IL: University of Chicago Press.

Meyer, J. P., & Allen, N. J. (1997). *Commitment in the workplace: Theory, research, and application*. Thousand Oaks, CA: Sage.

Midgley, D. F., & Dowling, G. R. (1978). Innovativeness: The concept and its measurement. *Journal of Consumer Research*, *4*, 229-242.

Midgley, D. F., & Dowling, G. R. (1993). A longitudinal study of product from innovation: The interaction between predispositions and social messages. *The Journal of Consumer Research, 19*, 611-625.

Milgram, S. (1963). Behavioral study of obedience. *Journal of Abnormal and Social Psychology*, *67*, 371-378.

Milgram, S. (1983). *Obedience to authority: An experimental view*. New York: Harper Collins.

Miller, K., & Mange, P. R. (1986). Participation, satisfaction, and productivity: A meta-analytic review. *Academy of Management Journal, 29*, 727-753.

Miller, S., & Weckert, J. (2000). Privacy, the workplace and the internet. *Journal of Business Ethics, 28*, 255-265.

Moon, Y. (2003). Don't blame the computer: When self-disclosure moderates the self-serving bias. *Journal of Consumer Psychology, 13*, 125-137.

Moon, Y., & Nass, C. (1998). Are computers scapegoats? Attributions of responsibility in human-computer interaction. *International Journal of Human-Computer Study, 49*, 79-94.

Moore, G. C., & Benbasat, I. (1991). Development of an instrument to measure the perceptions of adopting an information technology innovation. *Information Systems Research, 2*, 192-222.

Morrow, P. C., Prell, E. R., & McElroy, J. C. (1986). Attitudinal and behavioral correlates of computer anxiety. *Psychological Reports,* 59, 1199-1204.

Mortimer, J., & Simmons, R. (1978). Adult socialization. *Annual Review of Sociology, 4,* 421-454.

Moscovici, S. (1985). Social influence and conformity. In G. Lindzey & E. Aronson (Eds.), *Handbook of social psychology* (Vol. 2, pp. 347-412). New York: McGraw-Hill.

Mowday, R. T., Porter, L. W., & Steers, R. (1982). *Organizational linkages: The psychology of commitment, absenteeism, and turnover*. San Diego, CA: Academic Press.

Mowday, R. T., Steers, R. M., & Porter, L. W. (1979). The measurement of organizational commitment. *Journal of Vocational Behavior, 14*, 234-247.

Munro, M. C., Huff, S. L., Marcolin, B. L., & Compeau, D. R. (1997). Understanding and measuring user competence. *Information and Management, 33*, 45-57.

Murphy, C., Coover, D., & Owen, S. (1989). Development and validation of the

computer self-efficacy scale. *Educational and Psychological Measurement, 49*, 893-899.

Murrell, A. J., & Sprinkle, J. (1993). The impact of negative attitudes toward computers on employees' satisfaction and commitment within a small company. *Computers in Human Behavior, 9*, 57-63.

Myers, T., & Myers, E. (1982). *Managing by communication: An organizational approach*. New York: McGraw-Hill.

National Telecommunications and Information Administration. (2002). A nation online: How Americans are expanding their use of the Internet. Retrieved October 8, 2008.from http://www.ntia.doc.gov/ntiahome/dn/anationonline2.pdf.

Nardi, B. A., & O'Day, V. L. (2000). *Information ecologies: Using technology with heart*. Cambridge, MA: MIT Press.

Nash, J. B., & Moroz, P. A. (1997). An examination of the factor structures of the computer attitude scale. *Journal of Educational Computing Research, 17*, 341-356.

Nass, C., Fogg, B. J., & Moon, Y. (1996). Can computers be teammates? *International Journal of Human-Computer Study, 45*, 669-678.

Nass, C., & Moon, Y. (2000). Machines and mindlessness: Social responses to computers. *Journal of Social Issues, 56*, 81-103.

Nass, C., Steuer, J., Henriksen, L., & Dryer, D. C. (1994). Machines, social attributions, and ethopoeia: Performance assessments of computers subsequent to self-or-other-evaluations. *International Journal of Human-Computer Study*, *40*, 543-559.

Naumann, E. (1993). Antecedents and consequences of satisfaction and commitment

among expatriate managers. *Group & Organization Management, 18*, 153-187.

Nickell, G. S., & Pinto, J. N. (1986). The computer attitude scale. *Computers in Human Behavior, 2*, 301-306.

Nickell, G. S., & Seado, P. C. (1986). The impact of attitudes and experience on small business computer use. *American Journal of Small Business, 10*, 37-48.

Pedersen, P. E. (2002). The adoption of text messaging services among Norwegian teens: Development and test of an extended adoption model. Retrieved October 8, 2008 from http://ikt.hia.no/perep/snf 23_02.pdf.

Pelgrum, W. J., & Plomp, T. J. (1993). *The IEA study of computers in education: Implementation of an innovation in 21 educational systems*. Oxford: Pergamon Press.

Perrow, C. A. (1967). Framework for comparative organizational analysis. *American Sociological Review, 16*, 444-459.

Perrow, C. (1970). *Organizational analysis: A sociological view.* Belmont, CA.: Wadsworth Publishing.

Pfeffer, J. (1982). *Organizations and Organization Theory*. Marshfield, MA: Pitman.

Pinto, J. N., Calvillo, M., & Nickell, G. S. (1987). Concurrent validity study of the computer attitudes scale. *Journal of Occupational Behavior, 8*, 57-75.

Porter, L. W., Crampom, W. J., & Smith, F. J. (1976). Organizational commitment and managerial turnover: A longitudinal study. *Organizational Behavior and Human Performance, 15*, 87-98.

Porter, L. W., & Steers, R. M. (1973). Organizational work and personal factors in employee turnover and absenteeism. *Psychological Bulletin, 80***,** 151-176.

Rachman, S. (1998). *Anxiety*. East Sussex, UK: Psychology Press Ltd.

Rafaeli, A. (1986). Employee attitudes toward working with computers. *Journal of Occupational Behavior, 7*, 89-106.

Randall, D. M., Fedor, D. B., & Longenecker, C. O. (1990). The behavioral expression of organizational commitment. *Journal of Vocational Behavior, 36*, 210-224.

Reece, M. J., & Gable, R. K. (1982). The development and validation of a measure of general attitudes toward computers. *Educational and Psychological Measurement, 42*, 913-916.

Reeves, B., & Nass, C. (1996). *The media equation: How people treat computers, television, and new media like real people and places.* New York: Cambridge University Press.

Rende, B. (2000). Cognitive flexibility: Theory, assessment, and treatment. *Seminars in Speech and Language, 27*, 121-133.

Rice, R. E. (1983). Mediated group communication. In R. E. Rice & Associates (Eds.), *The new media: Communication, research, and technology* (pp. 129-154). Beverly Hills, CA: Sage.

Rice, R. E., Collins-Jarvis, L., & Zydney-Walker, S. (1999). Individual and structural influences on information technology helping relationships. *Journal of Applied Communication Research, 27*, 285-309

Robey, D. (1996). Research commentary: Diversity in information systems research: Threat, promise, and responsibility. *Information Systems Research, 7*, 400-408.

Robey, D., & Zmud, R. W. (1992). Research on the organization of end-user computing: Theoretical perspectives from organization science. *Information Technology &*

*People, 6*, 11-27.

Rogers, E. M. (1962). *Diffusion of innovations* (*1st ed.*). New York: Free Press.

Rogers, E. M. (1995). Diffusion of innovations (4th Ed.). New York: Free Press.

Rogers, E. M. (2003). *Diffusion of innovations* (*5th ed.*). New York: Free Press.

Rosen, L., & Maguire, P. (1990). Myths and realities of computer phobia: A meta-analysis. *Anxiety Research, 3*, 175-191.

Rousseau, D. (1990). Assessing organizational culture: The case for multiple methods. In B. Schneider (Ed.), *Organizational climate and culture* (pp. 153-192). San Francisco: Jossey-Bass.

Russell, S. S., Spitzműller, C., Lin, L. F., Stanton, J. M., Smith, P. C., & Ironson, G. H. (2004). Shorter can also be better: The abridged job in general scale. *Educational and Psychological Measurement, 64*, 878-893.

Saks, A. M., Mudrack, P. E., & Ashforth, B. E. (1996). The relationship between work ethic, job attitude, intentions to quit, and turnover for temporary service employees. *Canadian Journal of Administrative Sciences, 13*, 226-241.

Salanova, M., & Cifre, E. (1998). New technologies and psychosocial factors at work: A non-deterministic approach. *Behavior & Information Technology, 16*, 274-281.

Scheirer, C., Fernandez, R., Klein, J., & Picard, R. (2002). Frustrating the user on purpose: A step toward building an affective computer. *Interacting with Computers, 14*, 93-118.

Schmitt, N., & Chan, D. (1998). *Personnel selection: A theoretical approach.* Thousand Oaks, CA: Sage.

Schmitz, J., & Fulk, J. (1991). Organizational colleagues, media richness, and electronic

mail: A test of the social influence model. *Communication Research, 18*, 487-523.

Schumacker, R. E., & Lomax, R. G. (2004). *A beginner's guide to structural equation modeling* (2nd ed.). Mahwah, NJ: Erlbaum.

Semler, S. W. (1997). Systematic agreement: A theory of organizational alignment. *Human Resource Development Quarterly, 8*, 23-40.

Sewell, G., & Barker, J. R. (2006). Coercion versus care: Using irony to make sense of organizational surveillance. *Academy of Management Review*, *31*, 1-24.

Shaft, T. M., Sharfman, M. P., & Wu, W. W. (2004). Reliability assessment of the attitude towards computers instrument (ATCI). *Computers in Human Behavior, 20*, 661-668.

Sherif, M. (1936). *The psychology of social norms.* New York: Harper.

Shome, R. (2006). Thinking through the diaspora: Call centers, India, and a new politics or hybridity. *International Journal of Cultural Studies*, *9*, 105-124.

Sitkin, S. B., Sutcliffe, K. M., & Barrios-Choplin, J. R. (1992). A dual-capacity model of communication media choice in organizations. *Human Communication Research, 18*, 563-598.

Skinner, B. (1969). *Contingencies of reinforcement*. New York: Appleton-Century-Crofts.

Smith, B., & Caputi, P. (2001). Cognitive interference in computer anxiety. *Behavior & Information Technology, 20*, 265-273.

Spector, P. E. (1975). Relationships of organizational frustration with reported behavioral reactions of employees. *Journal of Applied Psychology, 60*, 635-637.

Spector, P. E. (1978). Organizational frustration: A model and review of the literature.

*Personnel Psychology, 31*, 815-828.

Stacy, A. W., MacKinnon, D. P., & Pentz, M. A. (1993). Generality and specificity in health behavior: Application to warning-label and social influence expectancies. *Journal of Applied Psychology, 78*, 611-627.

Storms, P. L., & Spector, P. E. (1987). Relationships of organizational frustration with reported behavioral reactions: The moderating effect of locus of control. *Journal of Occupational Psychology, 60*, 227-234.

Straub, D. W., & Watson, R. T. (2001). Research commentary: Transformational issues in researching IS and Net-enabled organizations. *Information Systems Research, 12*, 337-345.

Svenning, L., & Ruchinskas, J. (1984). Organizational teleconferencing. In R. Rice (Ed.), *The new media: Communication, research, and technology* (pp. 217-248). Beverly Hills, CA: Sage.

Swap, W., Leonard, D., Shields, M., & Abrams, L. (2001). Using mentoring and storytelling to transfer knowledge in the workplace. *Journal of Management Information Systems, 18*, 95-114.

Taber, T. D. (1991). Triangulating job attitudes with interpretive and positivist measurement methods. *Journal of Personnel Psychology, 44*, 577-600.

Taylor, S., & Todd, P. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research, 6*, 144-176.

Trunk, C. (1999). Building bridges between WMS & ERP. *Journal of Transportation and Distribution, 40*, 6-8.

Tubre, T. C., & Collins, J. M. (2000). Jackson and Schuler (1985) revisited: A meta-

analysis of the relationships between role ambiguity, role conflict, and job performance. *Journal of Management, 26*, 155-169.

Turner, J. W., & Reinsch, N. L., Jr. (2006). The business communicator as presence allocator: Multi-communicating, equivocality, and status at work. *Journal of Business Communication*, *44*, 36-58.

United States Department of Labor (USDL). (2002). Work at home in 2001. Retrieved June 20, 2006 from http://www.bls.gov/rafod/1460.pdf.

Vandenberg, R. J., Nelson, J. B. (1999). Disaggregating the motives underlying turnover intentions: When do intentions predict turnover behavior? *Human Relations, 52*, 1313-1336.

Van de Ven, A. H., & Delbecq, A. (1974). A task contingent model of work unit structure. *Administrative Science Quarterly, 19*, 183-197.

Van de Ven, A. H., & Ferry, D. L. (1980). *Measuring and assessing organizations.* New York: Wiley.

Van Maanen, J., & Schein, E. H. (1979). Toward a theory of organizational socialization. In B. M. Staw (Ed.), *Research in Organizational Behavior* (vol. 1, pp. 209–264). Greenwich, CT: JAI Press.

Venkatesh, V., & Davis, F. D. (1996). A model of the antecedents of perceived ease-of-use: Development and test. *Decision Sciences, 27*, 451-481.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science, 46*, 186-204.

Venkatesh, A., & Vitalari, N. P. (1992). An emerging distributed work arrangement: An

investigation of computer-based supplemental work at home. *Management Science, 38*, 1687-1706.

Wall, R., & Kemp, N. (1987). The nature and implications of advanced manufacturing technology: Introduction. In T. D. Wall, C. W. Clegg, & N. Kemp (Eds.), *The human side of advanced manufacturing technology* (pp. 173-195). New York: Wiley.

Wanberg, C. R., & Kammeyer-Mueller, J. D. (2006). Predictors and outcomes of proactivity in the socialization process. *Journal of Applied Psychology, 85,* 373-385.

Warr, P., Cook, J., & Wall, T. (1979). Scales for the measurement of some work attitudes and aspects of psychological well-being. *Journal of Occupational Psychology, 52*, 129-148.

Watzlawick, P., Beavin, J. H., & Jackson, D. D. (1967). *Pragmatics of human communication*. New York: Norton & Company.

Wei, R. (2001). From luxury to utility: A longitudinal analysis of cell phone laggards. *Journalism & Mass Communication Quarterly, 78*, 702-719.

Weill, P., & Olson, M. H. (1989). Managing investment in information technology: Mini case examples and implications. *Management Information Systems Quarterly, 13*, 3-17.

Wertheimer, M. (1938). Gestalt theory. In E. D. Willis (Ed.), *A source book of Gestalt psychology* (pp. 1-11). London, England: Kegan, Trench, Trubner, & Company.

Wilkes, R. R., Frolick, M. N., & Urwiler, R. (1994). Critical issues in developing successful tele-work programs. *Journal of Systems Management, 45*, 28-34.

Withey, M., Daft, R. L., & Cooper, W. H. (1983). Measures of Perrow's work unit technology: An empirical assessment and a new scale, *Academy of Management Journal, 26***,** 45-63.

Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research, 16*, 85-102.

Wood, A. F., & Smith, M. J. (2001). *Online communication: Linking technology, identity, and culture.* Mahwah, NJ: Erlbaum.

Woodruff, O. K. (1980). Data processing people: Are they satisfied/dissatisfied with their jobs? *Information and Management, 3*, 219-225.

Worthington, V. L., & Zhao, Y. (1999). Existential computer anxiety and changes in computer technology: What past research on computer anxiety has missed. *Journal of Educational Computing Research, 20*, 299-315.

Yaverbaum, G. J. (1998). Critical factors in the user environment: An experimental study of users, organizations and tasks. *Management Information Systems Quarterly, 12*, 75-88.

Yi, M. Y., Fiedler, K. D., & Park, J. S. (2006). Understanding the role of individual innovativeness in the acceptance of IT-Based innovations: Comparative analyses of models and measures. *Decision Sciences, 37*, 393-426.

Yoon, Y., Guimaraes, T., & O'Neal, Q. (1995). Exploring the factors associated with expert systems success. *Management Information Systems Quarterly, 19*, 83-106.

Yotsumoto, Y., & Sekuler, R. (2006). Out of mind, but not out of sight: Intentional control of visual memory. *Memory & Cognition, 34*, 421-433.

# APPENDIX A

WestVirginiaUniversity
Department of Communication Studies

February 16, 2009

Dear Participants:

You are being asked to participate in a research study conducted by Principal Investigator Theodore A. Avtgis PhD and Co-Investigator Paul E. Madlock PhD student in the Department of Communication Studies at West Virginia University. We are conducting research with an interest in your responses to variety of questions regarding your use of computer technology at your current workplace. This research study is being conducted for the purpose of the Co-Investigator's dissertation. Completing the questionnaire and submitting it indicates that you have agreed to participate in the study. The two criteria required to participate in this research study are: **You must be working full-time (40 hrs) at your current job and that you are required to use computer technology in your current job. The term computer technology refers to the use of either a laptop or a desktop computer.**

To insure anonymity please do not mark or write your name on the questionnaire. Once completed, seal your questionnaire in the envelope provided. Please complete the questionnaire independently and be sure to read each section carefully and answer all questions honestly. In addition to completing the survey with NO identifying marks, we request that you provide verification of your identity by emailing your name (first and last) and work phone number to the following address: pem3@comcast.net with the word survey in the subject line. Additionally, on the outside of the envelope containing your completed survey please place your name (first and last) on the lower left hand corner. This will in no way be connected to your survey responses but will serve as a check to make sure we are receiving valid surveys from working adults. Again, this does not compromise your confidentiality—no one will be able to connect your name with your survey responses because an independent party will remove the questionnaires from the envelopes. Only for verification purposes, you may be contacted again using the information you provided.

Participation in this research study is voluntary. You may skip certain questions if you want and you may stop completing the questionnaire at any time without fear of penalty. If you are a student, your actual performance in this study or your refusal to participate or withdrawal from this research study will in no way affect your class standing, grades, or status in any athletic or other activity associated with West Virginia University. There are no known risks associated with participation in this study. It should take approximately 25-35 minutes to complete this survey.

If you would like more information about this research project, feel free to contact the Co-Investigator Paul E. Madlock at 304-293-3905 or by email pmadlock@mix.wvu.edu. This study has been acknowledged by West Virginia University's Institutional Review Board.

**Thank you for your participation.**

Sincerely,

Theodore A Avtgis
Principal Investigator
Theodore.Avtgis@mail.wvu.edu

Paul Madlock, PhD Student
Co-Investigator
pmadlock@mix.wvu.edu

Phone: 304-293-3905
Fax: 304-293-6667
108 Armstrong Hall
PO Box 6293
Morgantown, WV 26506-6293

# APPENDIX B

**Please provide the following information**

Male _____ Female _____

Age _____

Your race White_____ Black_____ Hispanic_____ Asian_____ Other_____

Total number of years_____ months_____ of computer experience.

Total number of years_____ months_____ you used computer technology at your current job.

Total number of years_____ months_____ employed at your current job.

Current position (Circle the most appropriate category):

Top management Middle Management Lower Management Non-management Other

Which best describes your organization (circle one):

High Tech Manufacturing Service Education Civil Service Government

Customer Service Healthcare Other

---

From zero (meaning not at all) to 100% (meaning all day long) what percentage of your workday is spent using computer technology?_____

**Directions:** Please think of your current job when reading the following statements. For each statement please indicate the degree to which <u>you</u> feel the statement applies to your computer use at your current job.

Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5

____Learning to operate computer technology at work is easy for me.

____I find computer technology in the workplace to be flexible to interact with.

____I find it easy to get computer technology to do what I want it to do.

____It is easy for me to become skillful at using computer technology.

____My interaction with computer technology is clear and understandable.

____I find the computer technology in my workplace easy to use.

____Using computer technology in the workplace improves my job performance.

____Using computer technology in my job enables me to accomplish tasks more quickly.

____I find computer technology to be useful in my job.

____Using computer technology in my job increases my productivity.

____Using computer technology enhances my effectiveness on the job.

____Using computer technology makes it easier to do my job.

____I feel confident making selections from an on screen menu.

____I feel confident using the computer to write a letter or essay.

____I feel confident escaping or exiting from a program or software.

____I feel confident calling up a data file to view on the monitor screen.

____I feel confident troubleshooting computer problems.

____I feel confident understanding terms/words relating to computer hardware.

____I feel confident explaining why a program (software) will or will not run on a given computer.

____I feel confident writing simple programs for the computer.

____Working with a computer would make me very nervous.

____I get a sinking feeling when I think of trying to use a computer.

____Computers make me feel uncomfortable.

____Computers make me feel uneasy and confused.

____Learning computer terminology makes me feel very nervous.

____Thinking about computer software programs for a computer makes me uncomfortable.

____I feel confused when visiting a computer store.

____Taking a class to learn about the uses of computers makes me nervous.

**Directions:** Please think of your current job when reading the following statements. For each of these statements please indicate your response by writing the number that best describes how you feel about the statement.

Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5

____I know the history of this organization regarding its view of computer technology (e.g., use of email to communicate with members of the organization, computer surveillance etc...).

____I know the structure of the organization (e.g., how computer technology links departments together, and who communicates with who via computer technology).

____I understand how computer technology contributes to the operations of this organization (e.g., when and when not to use computer technology).

____I understand this organization's objectives and goals regarding the use of computer technology.

____I understand how to use computer technology to fit in with what the organization values and beliefs.

____I know this organization's overall policies and/or rules (e.g., regarding the use and misuse of computer technology).

____I understand how my computer use in my particular work group contributes to the organization's goals.

____I understand the relationship between my group and other groups regarding the use of computer technology.

____I understand how each member's computer use contributes to the group's end product/service.

____I understand what the group's supervisor expects from the work group regarding the use of computer technology.

____I know the policies, rules, and procedures of my work group (e.g., when to use, restricted sites, surveillance) regarding the appropriate use of computer technology.

____I understand how to behave when using computer technology in a manner that consistent with my work group's values and ideals.

____I know the computer related responsibilities, tasks, and projects for which I was hired.

____I understand how to perform the computer related tasks that make up my job.

____I understand how to operate the technology I use in my job (e.g., voicemail, software, programs).

____I know who my customers (internal and external) are and how to communicate with them via computer technology.

____I know when to inform my supervisor about my work (e.g., daily, weekly, close to deadlines, when a request is made) through computer mediated messages (e.g., email).

____I know what constitutes acceptable use of computer technology (i.e., what does my supervisor and or customers expect from me).

**Directions:** Please think of your current job when reading the following statements. For each of these statements please indicate the degree to which the statement about computer technology applies to your use of computers during your workday.

Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5

____What the use of computer technology in the workplace stands for is important for me.

____The reason I prefer to use computer technology in the workplace is because of the underlying organizational values.

____I like using computer technology in the workplace based on the similarity of my values and the organizational values underlying its use.

____I feel a sense of personal ownership about the use of computer technology in the workplace.

____I talk up the use of computer technology to my colleagues as a great use of resources.

____I am proud about using computer technology in the workplace.

____My private views about the use of computer technology in the workplace are different than those I express publicly.

____Unless I'm rewarded in some way for using computer technology in the workplace, I see no reason to spend extra effort in using it.

____In order for me to get rewarded in my job, it is necessary to use computer technology.

____How hard I work on using computer technology in the workplace is directly linked to how much I am rewarded.

**Directions:** For the following questions, please indicate the <u>extent to which you agree</u> with each of them regarding <u>your</u> computer use at your current job.

Very Little Extent = 1; Little Extent = 2; Neutral = 3; Large Extent = 4; Very Large Extent = 5

____To what extent is there a clearly known way in which you are to utilize computer technology to complete daily activities at work?

____To what extent is there a clearly defined body of knowledge regarding the use of computer technology that can guide your use of technology in doing your work?

____To what extent is there an understandable sequence of steps that can be followed for using computer technology at your work?

____To what extent can you actually rely on established procedures and practices regarding computer technology to do your work?

**Directions:** When reading the following statements think about how you feel about computer technology in general. Please indicate the degree to which you feel that way about computer.technology at you job.
Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5

____Soon our lives will be controlled by computers.

____Computers turn people into just another number.

____Computers are lessening the importance of too many jobs now done by humans.

____People are becoming slaves to computers.

____Computers are dehumanizing to society.

____The overuse of computers may be harmful and damaging to humans.

____Soon our world will be completely run by computers.

____Computers will replace the need for working human beings.

____Computers make me uncomfortable because I don't understand them

____Computers will never replace human life.

____I feel intimidated by computers.

____Computers intimidate me because they seem so complex.

____Computers are difficult to understand and frustrating to work with.

____Computers are bringing us into a bright new era.

____The use of computers is enhancing our standard of living.

____Life will be easier and faster with computers.

____Computers are a fast and efficient means of getting information.

____There are unlimited possibilities for the use of computer applications.

____Computers are responsible for many of the good things we enjoy.

____Computers can eliminate a lot of tedious work for people.

**Directions:** Think of your job in general. All in all, what is it like most of the time? Please indicate your response by placing an X in the blank that best describes how you feel about your current job.

Very Good ____ ____ ____ ____ ____ ____ ____ Bad

Undesirable ____ ____ ____ ____ ____ ____ ____ Desirable

Better than most ____ ____ ____ ____ ____ ____ ____ Worst than most

Disagreeable ____ ____ ____ ____ ____ ____ ____ Agreeable

Makes me content ____ ____ ____ ____ ____ ____ ____ Makes me discontent

Excellent ____ ____ ____ ____ ____ ____ ____ Not excellent

Enjoyable ____ ____ ____ ____ ____ ____ ____ Not enjoyable

Poor ____ ____ ____ ____ ____ ____ ____ Not poor

**Directions:** Think of the company you work for. All in all, how do you feel about that company most of the time? Please indicate the degree to which you agree with the following statements.

Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5

____I feel very little loyalty towards the organization.

____I am proud to tell others that I am part of the organization.

____The organization really inspires the best in me in the way of performance.

____ For me this is the best of all possible organizations for which to work.

____I really care about the fate of the organization.

____Deciding to work with this organization was a mistake on my part.

____I talk up this organization to friends as a great organization to work for.

____I am willing to put in a great deal of effort beyond the normally expected in order to help the organization be successful.

____I find that my values and the organization's values are very similar.

____I would do almost any type of job assignment in order to keep working for this organization.

____There is not too much to be gained by sticking with this organization indefinitely.

____I am extremely glad that I chose this organization to work for over others I was considering.

____I could just as well be working with a different organization as long as the task was similar.

____It would take very little change in my present circumstances to cause me to leave this organization.

____Often I find it difficult to agree with this organization's policies on important matters relating to its employees.

**Directions:** People respond to their environment in different ways. The statements below refer to some of the ways people can respond. Please indicate the degree to which each statement applies to you by marking whether you:

Strongly Disagree = 1; Disagree = 2; are Neutral = 3; Agree = 4; Strongly Agree = 5

____My peers often ask me for advice or information.

____I enjoy trying new ideas.

____I seek out new ways to do things.

____I am generally cautious about accepting new ideas.

____I frequently improvise methods for solving a problem when an answer is not apparent.

____I am suspicious of new inventions and new ways of thinking.

____I rarely trust new ideas until I can see whether the vast majority of people around me accept them.

____I feel that I am an influential member of my peer group.

____I consider myself to be creative and original in my thinking and behavior.

____I am aware that I am usually one of the last people in my group to accept something new.

____I am an inventive kind of person.

____I enjoy taking part in the leadership responsibilities of the group I belong to.

____I am reluctant about adopting new ways of doing things until I see them working for people around me.

____I find it stimulating to be original in my thinking and behavior.

____I tend to feel that the old way of living and doing things is the best way.

____I am challenged by ambiguities and unsolved problems.

____I must see other people using new innovations before I will consider them.

____I am receptive to new ideas.

____I am challenged by unanswered questions.

____I often find myself skeptical of new ideas.

APPENDIX C


**Expedited - IRB Protocol - Exemption**

To: Avtgis, Theodore
From: WVU Office of Research Compliance
Date: Tuesday, February 17, 2009
Subject: No action required

Tracking #: H-21520
Title: The Development of Technological Management Model: A Conceptualization of Computer Technology in the Workplace

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The above-referenced study was reviewed by the Institutional Review Board and was granted exemption on 2/17/2009 in accordance with 45 CFR 46.101(2).

While no action is required on your part, the IRB made the following findings:

> This research study was granted an exemption in accordance with Research that involves educational tests, survey procedures, interview procedures or observation of public behavior [45 CFR 46.101(2)]. If you have questions please refer to the IRB website.
>
> This protocol was reviewed using the following:
> Exemption Checklist (210r)

The following documents have been approved and validated for use in this study and are available in the BRAAN system:

> Cover Letter
> Verbal Recruitment Script

Thank you.

Board Designee: White, Barbara
Letter Sent By: White, Barbara, 2/17/2009 11:48 AM

# APPENDIX D

*Perceived Ease of Use Scale*

Learning to operate computer technology at work is easy for me.

† I find computer technology in the workplace to be flexible to interact with.

I find it easy to get computer technology to do what I want to do.

It is easy for me to become skillful at using computer technology.

My interaction with computer technology is clear and understandable.

† I find the computer technology in my workplace easy to use.

*Perceived Usefulness Scale*

Using computer technology in the workplace improves my job performance.

Using computer technology in my job enables me to accomplish tasks more quickly.

I find computer technology to be useful in my job.

† Using computer technology in my job increases my productivity.

† Using computer technology enhances my effectiveness on the job.

Using computer technology makes it easier to do my job.

† *Denotes items removed from scale*.

# APPENDIX E

*Computer Self-Efficacy Scale*

*General Activities*

I feel confident making selections from an on screen menu.

I feel confident using the computer to write a letter or essay.

I feel confident escaping or exiting from a program or software.

I feel confident calling up a data file to view on the monitor screen.

*Advanced Activities*

I feel confident troubleshooting computer problems.

I feel confident understanding terms/words relating to computer hardware.

I feel confident explaining why a program (software) will or will not run on a given computer.

I feel confident writing simple programs for the computer.

*Computer Anxiety Scale*

*Computer Use*

Working with a computer would make me very nervous.

I get a sinking feeling when I think of trying to use a computer.

Computers make me feel uncomfortable.

Computers make me feel uneasy and confused.

*Computer Activities*

Learning computer terminology.

Thinking about prepackaged (software packages) programs for a computer.

Visiting a computer store.

Taking a class about the uses of computers.

# APPENDIX F

*Individual Innovativeness Scale*

My peers often ask me for advice or information.

I enjoy trying new ideas.

† I seek out new ways to do things.

* I am generally cautious about accepting new ideas.

I frequently improvise methods for solving a problem when an answer is not apparent.

* I am suspicious of new inventions and new ways of thinking.

* I rarely trust new ideas until I can see whether the vast majority of people around me accept them.

† I feel that I am an influential member of my peer group.

I consider myself to be creative and original in my thinking and behavior.

* I am aware that I am usually one of the last people in my group to accept something new.

† I am an inventive kind of person.

† I enjoy taking part in the leadership responsibilities of the group I belong to.

†* I am reluctant about adopting new ways of doing things until I see them working for people around me.

† I find it stimulating to be original in my thinking and behavior.

* I tend to feel that the old way of living and doing things is the best way.

† I am challenged by ambiguities and unsolved problems.

* I must see other people using new innovations before I will consider them.

† I am receptive to new ideas.

I am challenged by unanswered questions.

* I often find myself skeptical of new ideas.

** Reverse coded items.*

*† Denotes items removed from scale.*

# APPENDIX G

*Newcomer Socialization Questionnaire*

*Organizational Socialization*

I know the history of this organization regarding its view of computer technology (e.g., use of email to communicate with members of the organization, computer surveillance etc...).

I know the structure of the organization (e.g., how computer technology links departments together, and who communicates with who via computer technology).

I understand how computer technology contributes to the operations of this organization (e.g., when and when not to use computer technology).

I understand this organization's objectives and goals regarding the use of computer technology.

I understand how to use computer technology to fit in with what the organization values and beliefs.

† I know this organization's overall policies and/or rules (e.g., regarding the use and misuse of computer technology).

*Workgroup Socialization*

I understand how my computer use in my particular work group contributes to the organization's goals.

† I understand the relationship between my group and other groups regarding the use of computer technology.

I understand how each member's computer use contributes to the group's end product/service.

I understand what the group's supervisor expects from the work group regarding the use of computer technology.

I know the policies, rules, and procedures of my work group (e.g., when to use, restricted sites, surveillance) regarding the appropriate use of computer technology.

I understand how to behave when using computer technology in a manner that consistent with my work group's values and ideals.

*Task Socialization*

I know the computer related responsibilities, tasks, and projects for which I was hired.

† I understand how to perform the computer related tasks that make up my job.

I understand how to operate the technology I use in my job (e.g., voicemail, software, programs).

I know who my customers (internal and external) are and how to communicate with them via computer technology.

I know when to inform my supervisor about my work (e.g., daily, weekly, close to deadlines, when a request is made) through computer mediated messages (e.g., email).

I know what constitutes acceptable use of computer technology (i.e., what does my supervisor and or customers expect from me).

† *Denotes items removed from scale.*

# APPENDIX H

*Social Influence Scale*

*Internalization*

What the use of computer technology in the workplace stands for is important for me.

The reason I prefer to use computer technology in the workplace is because of the underlying organizational values.

I like using computer technology in the workplace based on the similarity of my values and the organizational values underlying its use.

*Identification*

I feel a sense of personal ownership about the use of computer technology in the workplace.

I talk up the use of computer technology to my colleagues as a great use of resources.

I am proud about using computer technology in the workplace.

*Compliance*

My private views about the use of computer technology in the workplace are different than those I express publicly.

Unless I'm rewarded in some way for using computer technology in the workplace, I see no reason to spend extra effort in using it.

In order for me to get rewarded in my job, it is necessary to use computer technology.

How hard I work on using computer technology in the workplace is directly linked to how much I am rewarded.

# APPENDIX I

*Task Characteristics Scale (Structure)*

To what extent is there a clearly known way in which you are to utilize computer technology to complete daily activities at work?

To what extent is there a clearly defined body of knowledge regarding the use of computer technology that can guide your use of technology in doing your work?

To what extent is there an understandable sequence of steps that can be followed for using computer technology at your work?

To what extent can you actually rely on established procedures and practices regarding computer technology to do your work?

# APPENDIX J

*Computer Attitudes Scale*

*Negative Attitudes/Adversary*

* Soon our lives will be controlled by computers.

†* Computers turn people into just another number.

* Computers are lessening the importance of too many jobs now done by humans.

* People are becoming slaves to computers.

†* Computers are dehumanizing to society.

†* The overuse of computers may be harmful and damaging to humans.

* Soon our world will be completely run by computers.

* Computers will replace the need for working human beings.

* Computers make me uncomfortable because I don't understand them.

†* I feel intimidated by computers.

†* Computers intimidate me because they seem so complex.

* Computers are difficult to understand and frustrating to work with.

*Positive Attitudes/Partner*

† Computers are bringing us into a bright new era.

† The use of computers is enhancing our standard of living.

Life will be easier and faster with computers.

Computers are a fast and efficient means of getting information.

There are unlimited possibilities for the use of computer applications.

Computers are responsible for many of the good things we enjoy.

Computers can eliminate a lot of tedious work for people.

† Computers will never replace human life.

* *Reverse coded items.*

† *Denotes items removed from scale.*

# APPENDIX K

*Abridged Job in General Scale*

Very Good ____ ____ ____ ____ ____ ____ ____ Bad

† Undesirable ____ ____ ____ ____ ____ ____ ____ Desirable

Better than most ____ ____ ____ ____ ____ ____ ____ Worst than most

Disagreeable ____ ____ ____ ____ ____ ____ ____ Agreeable

Makes me content ____ ____ ____ ____ ____ ____ ____ Makes me discontent

Excellent ____ ____ ____ ____ ____ ____ ____ Not excellent

Enjoyable ____ ____ ____ ____ ____ ____ ____ Not enjoyable

† Poor ____ ____ ____ ____ ____ ____ ____ Not poor

† *Denotes items removed from scale.*

# APPENDIX L

*Organizational Commitment Questionnaire*

†* I feel very little loyalty towards the organization.

I am proud to tell others that I am part of the organization.

The organization really inspires the best in me in the way of performance.

For me this is the best of all possible organizations for which to work.

† I really care about the fate of the organization.

* Deciding to work with this organization was a mistake on my part.

I talk up this organization to friends as a great organization to work for.

I am willing to put in a great deal of effort beyond the normally expected in order to help the organization be successful.

I find that my values and the organization's values are very similar.

I would do almost any type of job assignment in order to keep working for this organization.

†* There is not too much to be gained by sticking with this organization indefinitely.

† I am extremely glad that I chose this organization to work for over others I was considering.

†* I could just as well be working with a different organization as long as the task was similar.

†* It would take very little change in my present circumstances to cause me to leave this organization.

†* Often I find it difficult to agree with this organization's policies on important matters relating to its employees.

** Reverse coded items.*
*† Denotes items removed from scale.*

# TABLES

Table 1

*Abbreviated Newcomer Socialization Questionnaire*

| Organizational Socialization | Factor Loading |
|---|---|
| I know the history of this organization regarding its view of computer technology (e.g., use of email to communicate with members of the organization, computer surveillance etc...). | .87 |
| I know the structure of the organization (e.g., how computer technology links departments together, and who communicates with who via computer technology). | .83 |
| I understand how computer technology contributes to the operations of this organization (e.g., when and when not to use computer technology). | .88 |
| I understand this organization's objectives and goals regarding the use of computer technology. | .79 |
| I understand how to use computer technology to fit in with what the organization values and believes. | .81 |
| I know this organization's overall policies and/or rules (e.g., regarding the use and misuse of computer technology). | .75 |
| Workgroup Socialization | |
| I understand how my computer use in my particular work group contributes to the organization's goals. | .89 |
| I understand the relationship between my group and other groups regarding the use of computer technology. | .72 |
| I understand how each member's computer use contributes to the group's end product/service. | .81 |
| I understand what the group's supervisor expects from the work group regarding the use of computer technology. | .88 |
| I know the policies, rules, and procedures of my work group (e.g., when to use, restricted sites, surveillance) regarding the appropriate use of computer technology. | .83 |

| | |
|---|---|
| I understand how to behave when using computer technology in a manner that consistent with my work group's values and ideals. | .79 |
| Task Socialization | |
| I know the computer related responsibilities, tasks, and projects for which I was hired. | .82 |
| I understand how to perform the computer related tasks that make up my job. | .71 |
| I understand how to operate the technology I use in my job (e.g., voicemail, software, programs). | .86 |
| I know who my customers (internal and external) are and how to communicate with them via computer technology. | .88 |
| I know when to inform my supervisor about my work (e.g., daily, weekly, close to deadlines, when a request is made) through computer mediated messages (e.g., email). | .81 |
| I know what constitutes acceptable use of computer technology (i.e., what does my supervisor and or customers expect from me). | .79 |

Table 2

*Intercorrelations between Variables*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ease of use | 1.0 | | | | | | | | | | | | | | | | |
| Usefulness | .65** | 1.0 | | | | | | | | | | | | | | | |
| Social influence (compliance) | .68** | .57** | 1.0 | | | | | | | | | | | | | | |
| Self-efficacy (advanced) | .62** | .49** | .61** | 1.0 | | | | | | | | | | | | | |
| Organizational socialization | .54** | .44** | .65** | .43** | 1.0 | | | | | | | | | | | | |
| Workgroup socialization | .43** | .44** | .56** | .37** | .43** | 1.0 | | | | | | | | | | | |
| Task socialization | .42** | .38** | .51** | .27** | .66** | .61** | 1.0 | | | | | | | | | | |
| Organizational commitment | .27** | .22** | .18** | .17** | .24** | .28** | .25** | 1.0 | | | | | | | | | |
| Job satisfaction | .24** | .21** | .22** | .20** | .25** | .26** | .20** | .62** | 1.0 | | | | | | | | |
| Task structure | .52** | .36** | .57** | .46** | .46** | .52** | .49** | .23** | .34** | 1.0 | | | | | | | |
| Innovativeness | .38** | .29** | .49** | .32** | .46** | .29** | .38** | .16** | .15** | .37** | 1.0 | | | | | | |
| Self-efficacy (general) | .39** | .23** | .40** | .37** | .41** | .31** | .37** | .22** | .28** | .63** | .34** | 1.0 | | | | | |
| Social influence (identification) | .43** | .28** | .40** | .37** | .41** | .41** | .37** | .25** | .32** | .71** | .44** | .57** | 1.0 | | | | |
| Social influence (internalization) | .19** | .27** | .22** | .19** | .16** | .25** | .16** | .22** | .14** | .13** | .17** | .11** | .17** | 1.0 | | | |
| Anxiety (activities) | .54** | .39** | .50** | .50** | .46** | .52** | .53** | .22** | .25** | .57** | .48** | .39** | .53** | .19** | 1.0 | | |
| Anxiety (use) | .39** | .33** | .54** | .34** | .43** | .71** | .72** | .16** | .21** | .55** | .45** | .35** | .47** | .20** | .71** | 1.0 | |
| Attitudes | .34** | .26** | .29** | .22** | .36** | .35** | .35** | .45** | .72** | .47** | .27** | .41** | .50** | .20** | .35** | .35** | 1.0 |

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

# FIGURES

Figure 1

*Hypothesized Technology Management Model (TMM)*

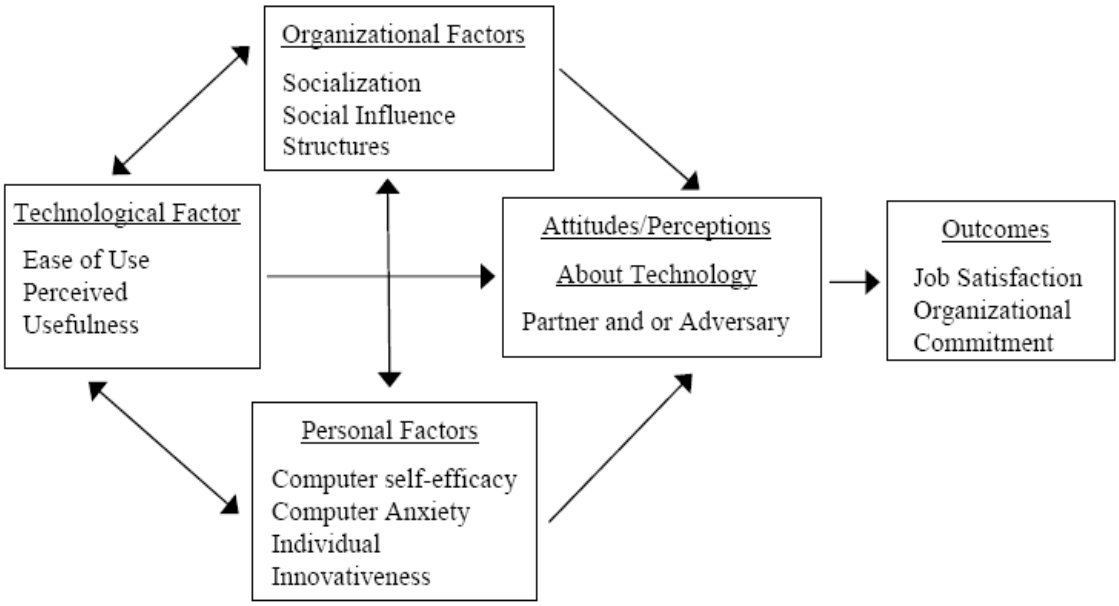

Figure 2

*Model for the Latent Variable of Organizational Factors*

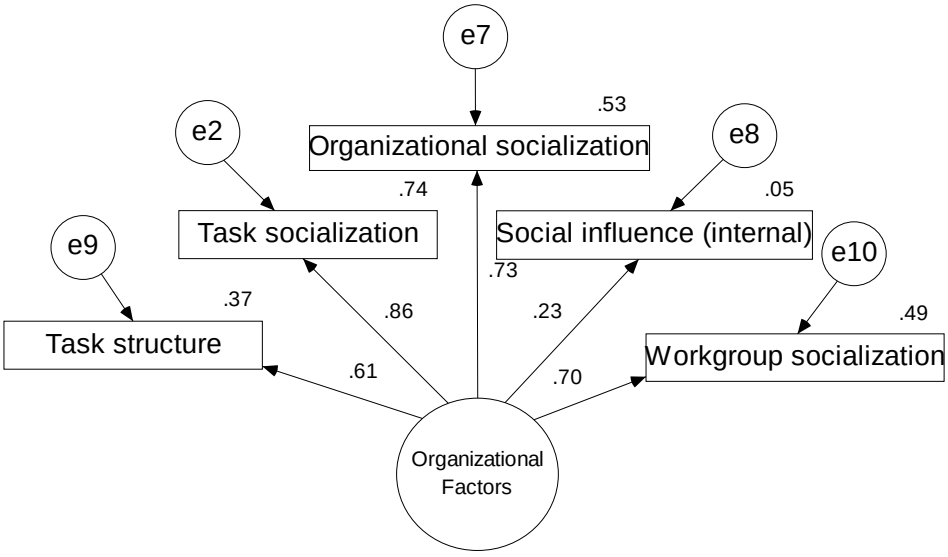

Figure 3

*Model for the Latent Variable of Technological Factors*

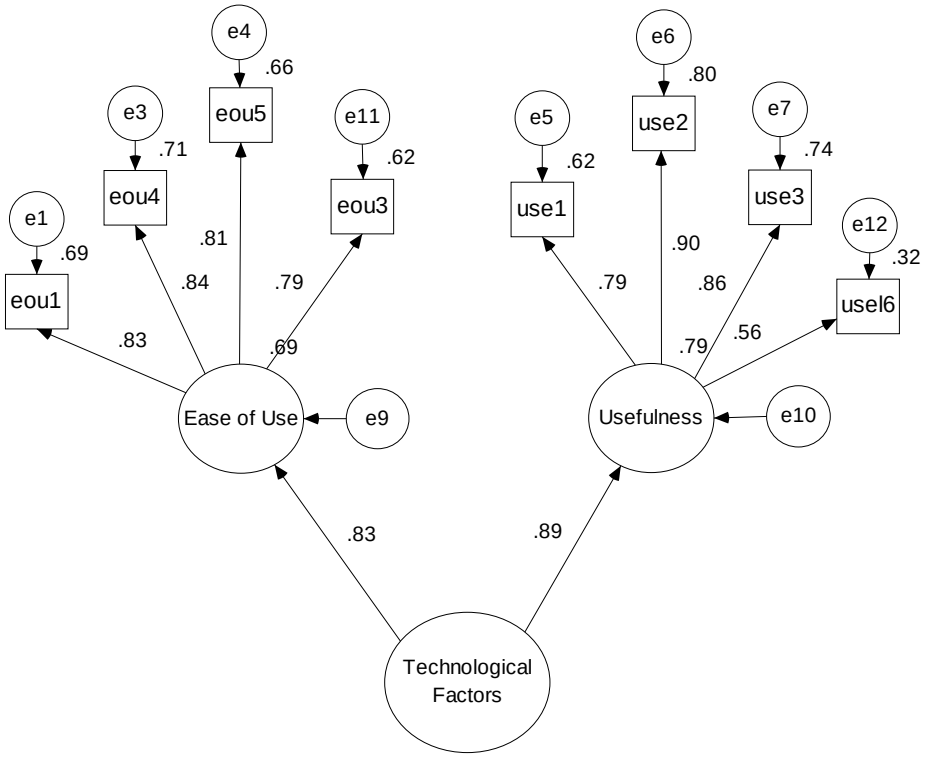

Figure 4

*Model for the Latent Variable of Personal Factors*

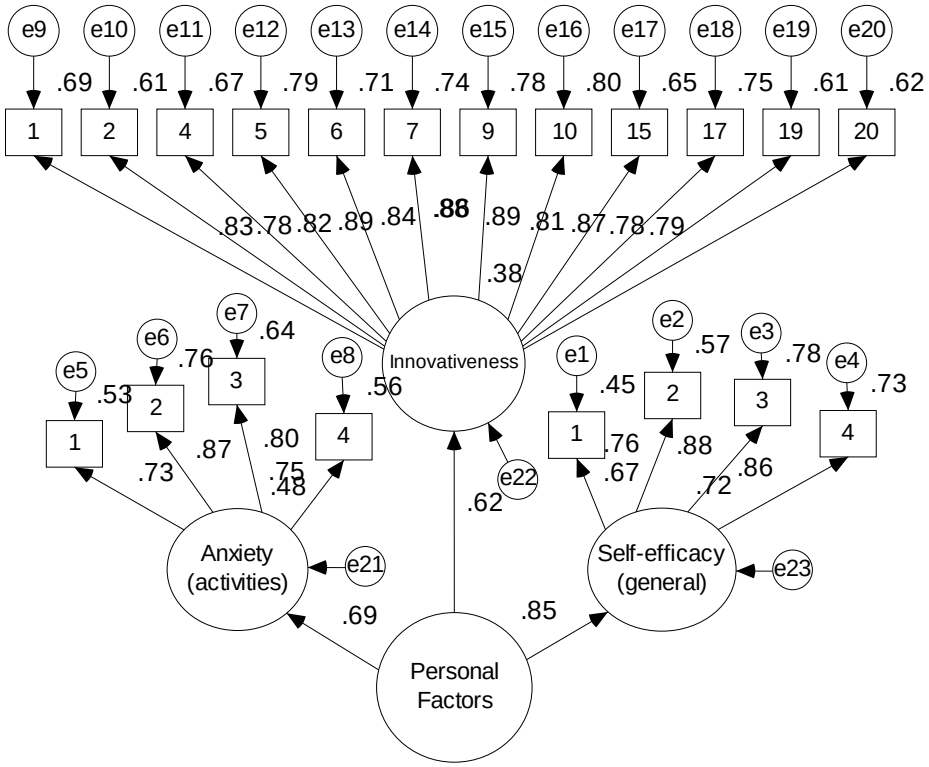

Figure 5

*Actual Technology Management Model (TMM)*