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Management and Organizational Influences on the Compliance Behavior of Employees to Reduce Non-malicious IT Misuse Intention

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MANAGEMENT AND ORGANIZATIONAL INFLUENCES ON THE COMPLIANCE BEHAVIOR OF EMPLOYEES TO REDUCE NON-MALICIOUS IT MISUSE INTENTION

by

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ABSTRACT

MANAGEMENT AND ORGANIZATIONAL INFLUENCES ON THE COMPLIANCE BEHAVIOR OF EMPLOYEES TO REDUCE NON-MALICIOUS IT MISUSE INTENTION

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The widespread use of information technology and information systems (IT) throughout corporations, too often includes employees who choose not to follow the stated policies and procedures in performing their job tasks. In many cases, this encompasses employees who mean no harm, but choose not to comply with IT policies and procedures. The present study frames such compliance behavior as non-malicious IT misuse. Non-malicious IT misuse by an employee occurs when the employee improvises, takes short cuts, or works around IT procedures and guidelines in order to perform their assigned tasks. As expressed, they do not intend to cause internal control or compliance problems but may simply want to meet their assigned task objectives with the use of IT applications. Studies usually address this phenomenon with deterrence and punishment/reward theories, but literature suggests additional theoretical approaches to further understand non-malicious IT misuse. This study proposes management driven policy approaches, along with organizational factors to reduce intention of non-malicious IT misuse.

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CHAPTER 1

INTRODUCTION

Over the past three decades, information technology and information systems (IT) have experienced wide adoption across corporations at various employee levels (Ayyagari, Grover, & Purvis, 2011; Wang, 2010). However, with this increased use, IT compliance issues have become common (Bulgurcu, Cavusoglu, & Benbasat, 2010; CERT, 2014; Greitzer et al., 2014; Klamm & Watson, 2009; Siponen, Adam Mahmood, & Pahnila, 2014). Concerns often involve employees who do not adhere fully or consistently with established policies and procedures when performing job functions that include IT (D’Arcy & Devaraj, 2012; Siponen et al., 2014). In many cases, this phenomenon encompasses employees who mean no harm, but choose not to comply with IT policies and procedures (D’Arcy, Herath, & Shoss, 2014; Willison & Warkentin, 2013). The present study frames the resulting compliance behavior around non-malicious IT misuse.

Non-malicious IT misuse by an employee can occur when the employee improvises, takes short cuts, or works around IT procedures and guidelines in order to perform their job responsibilities, without malicious intent. Specifically, employees might seek ways to continue use of obsolete or unauthorized software due to familiarity, or to save time, they may ignore alerts and warnings that request an action by the employee (D’Arcy & Devaraj, 2012). However, literature and studies indicate that a number of major breaches/failures or cyber-attacks are due to the above type non-malicious IT misuses by employees (CERT, 2014; Ponemon Institute, 2012; Verizon Business Systems, 2011). Put another way, employee non-malicious IT misuses contribute to the window/opportunity for malicious activity by employees or outsiders to breach the system, or harm the company.

In a recent survey of information security practitioners, respondents reported that 60% of their losses were due to non-malicious intentions (Richard, 2010). Similarly, in 2011 with their seventh annual study of U.S. company data breaches, Ponemon Institute found that 39% of occurrences were due to negligence of an insider (Ponemon Institute, 2012). In addition, a 2011 data breach study by Verizon reported 69% of security incidents were related to insiders, most non-malicious (Verizon Business Systems, 2011). This information drawn from industry highlights the prevalence of non-malicious IT misuse by employees.

Moreover, from a review of U.S. Securities and Exchange Commission (SEC) filings in Audit Analytics, several examples can be found where corporations were negatively impacted by non-malicious IT activities. In 2006, a corporation (Central Index Key 0001005414) with $11.275 billion in revenue reported problems due to IT that supported complex processes (Audit Analytics, n.d.). The complex processes generated significant staff workload and during that period, employees executed improper tax, property, and reporting activities (Audit Analytics, n.d.). Also in 2006, a company (CIK 0000770944) with revenue of $1.059 billion reported material weaknesses in their IT control compliance, which was in part due to not employing enough personnel to execute processes properly (Audit Analytics, n.d.). Lastly, in 2007 a corporation (CIK 0000840256) with $194 million in revenue reported compliance weaknesses around complex IT related transactions that led to a breach of IT by senior officers (Audit Analytics, n.d.).

In the examples presented above, the SEC reports did not cite malicious behaviors such as collusion, fraud, falsification, or misrepresentation by employees at the “initial” transaction level that lead to the breakdowns. Consequently, lack of malicious behaviors indicates non-malicious activities. Hence, both industry journals and oversight regulatory filings indicate the need to address non-malicious IT misuse by employees.

Non-malicious IT misuse by employees is also part of the overall concern with insider threats addressed by leading organizations. CERT Insider Threat Center, located in the Software Engineering Institute of Carnegie Mellon University, is one entity committed to this area. It is recognized as an authoritative national organization, that uses theoretical and empirical insights to support government, private industry, academia, and law enforcement (CERT, 2014). Studies by CERT reveal that an employee’s noncompliance with policies and procedures could involve organizational, departmental, functional, personal, or even IT complexity issues (CERT, 2014). These areas suggest needed research to understand management, policy, and system related factors that impact non-malicious IT misuse by employees.

The previous discussions of employee non-malicious IT misuse highlight the negative impact on organizations. However, studies commonly evaluate employee “malicious” activities to assess damage from IT misuse in companies (D’Arcy & Devaraj, 2012; Roy Sarkar, 2010; Vance, Lowry, & Eggett, 2013; Willison & Warkentin, 2013; Zafar & Clark, 2009). Malicious activities involve employees who do not accept or regard policies and procedures, and commit activities with an intent of harm to the organization or others (Willison & Warkentin, 2013). Researchers also have noted employee malicious activities such as destroying data, stealing cash and investments, stealing customer records, and committing other fraudulent activities (Willison & Warkentin, 2013; Zafar & Clark, 2009). Although the motivation for the actions can differ, with malicious misuses set on causing harm and non-malicious misuses not intent on causing harm, the pervasive use of IT across corporations can result in both misuses causing significant damage.

CERT identified some common characteristics of insiders who commit malicious activities (Silowash et al., 2012). One characteristic is that malicious insiders often collaborate with nefarious or criminal outsiders (Silowash et al., 2012). Another is a heightened drive for selfish gain (Silowash et al., 2012). Lastly, there is usually a sense of revenge (Silowash et al., 2012). The current research recognizes that malicious misuse driven by these aspects should be properly deterred, controlled, and disciplined. In addition, from the common characteristics behind malicious activities, one can view employee malicious IT misuses as being grounded in personal or internal motivations versus broader organizational reasons. Conversely, as discussed earlier, some established reasons employees commit non-malicious IT misuses include organizational issues such as working around complex systems, compensating for heavy workloads, and lacking training awareness of behavioral impact (CERT, 2014). Based on the role of organizational factors and employee engagement in non-malicious IT misuse, the current research views this relationship as key for increasing understanding of employee non-malicious IT misuse intentions. Moreover, since these employees would not be intent on causing harm to the organization, they should be good resources, and receptive to policies and procedures, management leadership, and other organizational initiatives that support proper use of IT while facilitating job performance.

To set the compliance context for employee behavior, drawing on over 20 years of significant IT experience, the researcher recognizes that certain IT policies and procedures within an organization are mandatory, non-elective types (Osborn, Sandhu, & Munawer, 2000; Sandhu & Samarati, 1996; C. N. Zhang & Yang, 2003). These policies and procedures meet safeguard requirements. Examples include system-mandated change of passwords every 90 days, systematic backups, and formal setup and tracking of user-names (Osborn et al., 2000; Sandhu & Samarati, 1996). The current study identifies and defines these mandatory policies and procedures as Level-2 policies and procedures.

Other type policies and procedures, perhaps due to cost-benefit or efficiency, are configured with a self-compliance format, hence compliance behavior (Guo, Yuan, Archer, & Connelly, 2011). The present research identifies and defines these as Level-1; they are "initial" compliance controls and play a key role. Employees are expected to follow these mandatory or required IT policies and procedures using their initiative. Although the self-compliance type policies are also mandatory, the main difference in Level-1 and Level-2 is that enforcement is usually not controlled by systematic more costly programming at Level-1 (Guo et al., 2011). At Level-1, behavior normally receives periodic review and oversight monitoring. Depending on the organization, this monitoring may be weekly, monthly, quarterly, semi-annually, or annually if at all. In some cases, public corporations may default to their annual external audits for review of compliance behaviors (Colvin, 1984). In either case, the period before effective monitoring and correction is a risk period for corporations in terms of Level-1 self-compliance controls. Thus at Level-1, for this study employee behavior is of utmost importance and is viewed as the first line of defense against IT attacks and data breaches. The goal is to reduce employee intentions of non-malicious IT misuse so they would be better positioned to support efforts to safeguard IT data and systems. This study’s design takes into account Level-1 and Level-2 type policies and procedures in order to make a clearer assessment of management and organizational influences on employee non-malicious IT misuse intentions.

The present research notes that the Level-1 and Level-2 controls, framed and introduced in the previous discussions, are built on three aspects. The first is that policies and procedures on both levels are considered established authorizing procedures, not provided with a choice to comply or not comply (Guo et al., 2011). Hence, although Level-1 controls tend to be self-compliance types, failure to comply is still considered a violation of policy (Guo et al., 2011). The designation as levels does not convey a varying sense of compliance intent. Next, as used in the current research, level implies a grouping of similar concepts and content items (Merriam-Webster’s collegiate dictionary, 2012), which would be self-compliance type policies and procedures at Level-1 and more costly systematic type controls at Level-2. In information technology, the view of similar concept or content levels is akin to the use of difficulty or skill levels used in the technology gaming industry (De Liu, Xun Li, & Santhanam, 2013). Finally, assigning the numerical Level-1 and Level-2 designation connotes a chronological order (American Psychological Association, 2010), as in employees being part of the first line of defense, Level-1. The above aspects provide the basis for framing and understanding Level-1/Level2 controls in subsequent discussions.

In defining the scope for non-malicious IT misuse intentions, extant literature mainly reports on IT compliance involving all-inclusive non-malicious "insiders" (Greitzer et al., 2014; Roy Sarkar, 2010; Steele & Wargo, 2007; Williams, 2008). Insiders include employees, contractors, vendors, and consultants (Steele & Wargo, 2007). This study narrows the scope of non-malicious IT misuse intentions to employees only. By excluding contractors, vendors, and consultants, research data should isolate the influence of organizational policies and procedures on employees. Accordingly, clearer insight of the impact on employees is significant since this study considers employee behavior a first line safeguard for IT systems and data.

At the time of the current research, a review of top journals only referenced two scholarly works that address non-malicious IT use by employees (Guo et al., 2011; Willison & Warkentin, 2013). Willison and Warkentin (2013) discussed non-malicious IT behavior as part of an overall framework, but their focus was factors leading to malicious abuse and deterrence. However, Guo et al. (2011) targeted non-malicious intentions of employees which contributes to the present research. Most importantly, Guo et al. (2011) put forth a non-malicious security violation model (NMSV) that was not based principally on deterrence, but which demonstrated support for influencing NMSV intentions. The NMSV model was grounded in utilitarian, normative, and self-identity outcomes, in addition to attitude (Guo et al., 2011).

Although both Guo et al. (2011) and Willison and Warkentin (2013) contributed to the understanding of non-malicious IT misuse by employees, their work was based primarily on individual level antecedents. The use of organizational level factors in the present study is expected to provide additional understanding of non-malicious employee behavior. These antecedents can be modified and controlled centrally at the organizational level with the resulting effects monitored. In addition, for the current research, organizational level encompasses both organizational and departmental levels since leaders of both are charged with management oversite and control. The results uncovered in this study are intended to provide insights to managers and leaders about important organizational features that could be controlled to influence a reduction in IT threats and breaches.

As previously indicated, a significant number of empirical studies blend non-malicious IT misuse by employees along with other insiders. This phenomenon is then often evaluated with punishment/reward or deterrence type theories; remedies also commonly applied to malicious actions (Bulgurcu et al., 2010; D’Arcy & Devaraj, 2012; Herath & Wijayanayake, 2009; Chen, Ramamurthy, & Wen, 2012; D’Arcy, Hovav, & Galletta, 2009; Straub, 1990; Kankanhalli, Teo, Tan, & Wei, 2003). In particular, deterrence theory holds that as the severity and certainty of punishment and sanctions increase, the level of prohibited behavior should decrease (Akers, Krohn, Lanza-Kaduce, & Radosevich, 1979). The current study does recognize deterrence and punishment/reward theories as being appropriate for malicious actions, but open to additional theories for non-malicious activities. Moreover, while these studies evaluate influences on employees who are embedded within a group of insiders, the present research examines employee behavior uniquely from other insiders such as contractors and vendors. Thus, as previously discussed, by examining employees only, results of this study should provide more robustness for organizational and management decisions.

After reviewing punishment/reward and deterrence based studies against reasons employees perform non-malicious IT activities, assessment of other influences appear suitable. Punishment/reward and deterrence theories have demonstrated results with antecedents such as certainty of sanctions, condemnation, and perceived severity of sanctions (D’Arcy & Devaraj, 2012; D’Arcy et al., 2009; Siponen & Vance, 2010). However, as referenced earlier, some established reasons employees commit non-malicious IT misuses include working around complex systems, compensating for heavy workloads, and lacking training awareness of behavior impact (CERT, 2014). These reasons seem to have a connection with management leadership and quality of organizational resources. For example, some studies have found employees to be driven to complete job responsibilities successfully within the organization, but with the aid of non-malicious IT misuses (Guo et al., 2011; Siponen & Vance, 2010). Furthermore, the current study reasons that these employees were seeking to meet expectations and possibly did not view non-malicious IT misuses as damaging or subject to severe sanctions. Consistent with prior discussions, since motivations for malicious intentions differ from that of non-malicious intentions (Silowash et al., 2012), and employees influenced toward non-malicious intentions tend to be internally performance driven Guo et al. (2011), the current research focuses on employees. Accordingly, the present study expands the research scope and examines management driven organizational level factors, to understand compliance issues involving non-malicious IT misuse intentions by employees. The resulting research question is:

RQ: What management and organizational factors reduce employee intentions of non-malicious IT misuse while performing job duties?

In seeking to understand the phenomenon surrounding this question, this study also recognizes the need to extend and establish a new theoretical framework.

This paper contains four subsequent chapters. Chapter 2, Literature Review, introduces and presents a discussion of related research on employee non-malicious IT misuse. The analysis identifies the opportunity for new insights, approach to construct development, theoretical basis, and the resulting research model with supporting hypotheses. Chapter 3, Methods, discusses the basis and use of metric conjoint analysis as the multivariate data analysis tool in the research design. Chapter 4 presents an analysis of the results. The paper concludes with a discussion of the findings, contributions, and future research opportunities in Chapter 5.

CHAPTER 2

LITERATURE REVIEW

Introduction and Scope

To begin the literature review for this study, the scope and nature of non-malicious IT misuse are first explored. Overall, as the subject of focus, non-malicious IT misuse is categorized as a compliance behavior (Guo et al., 2011). Previous studies have framed IT compliance behavior using slightly different scopes. These scopes are represented by IS misuse intention (D'Arcy et al., 2009), non-malicious security violation (Guo et al., 2011), intention to comply (Bulgurcu et al., 2010), and policy compliance intention (Hu, Dinev, Hart, & Cooke, 2012). Employee non-malicious IT misuse as defined in the current research extends from these factors.

The four studies cited for framing IT misuse are summarized in Table 1. Two main themes are drawn from these studies in reference to IT misuse. They are (a) IT security policies and procedures were in place, and (b) other social factors such as workgroup, training, understanding, and skill had significant influence (Bulgurcu et al., 2010; D'Arcy et al., 2009; Guo et al., 2011; Hu et al., 2012). Most importantly, these studies present support for factors that influence IT misuse. However, the present research extends these findings by defining and assessing employee non-malicious IT misuse using parsimonious organizational level factors with employees being viewed as instrumental in protecting against IT breaches and attacks.

Table 1

Summary of IT Misuse Dependent Variable in Prior Studies

<table>
<tr><td rowspan="2">Author and Theory</td><td>Purpose of Study</td><td>Dependent Variable - Definition of IT Misuse</td></tr>
<tr><td colspan="2">Dependent Variable- Measurement Items</td></tr>
<tr><td rowspan="2">D’Arcy et al.(2009)
General deterrence theory</td><td>Whether employee’s awareness of IT security measures influence perception of certainty and severity of sanctions, and thereby reduces misuse.</td><td>IS misuse intention – Employee’s intention to perform a behavior that the organization states is IT misuse.</td></tr>
<tr><td colspan="2">• Sending an inappropriate e-mail.
• Use of unlicensed software.
• Unauthorized access to data.
• Unauthorized modification of data.</td></tr>
<tr><td rowspan="2">Guo et al. (2011)
Theory of reasoned action; Theory of planned behavior</td><td>Examine factors that influence end users to violate IT policies and procedures.</td><td>Non-malicious security violation – End user activity known to violate organizational IT policies but done without malicious intent to cause damage.</td></tr>
<tr><td colspan="2">• Writing down the password.
• Using unauthorized portable devices for storing and carrying organizational data.
• Installing and using unauthorized software.
• Using an insecure public wireless network for business purposes.</td></tr>
<tr><td rowspan="2">Bulgurcu et al. (2010)
Theory of planned behavior</td><td>Evaluate how factors based on rational decision-making, drive employees to comply with IT policies to protect organizational resources and information.</td><td>Intention to comply – Employee’s intention to safeguard company’s IT systems and information from potential breaches.</td></tr>
<tr><td colspan="2">• I intend to comply with the requirements of the Information Security Policy (ISP) of my organization in the future.
• I intend to protect information and technology resources according to the requirements of the ISP of my organization in the future.
• I intend to carry out my responsibilities prescribed in the ISP of my organization when I use information and technology in the future.</td></tr>
<tr><td rowspan="2">Hu et al. (2012)
Theory of planned behavior</td><td>Understand the influence of organizational culture and top management on employees’ intention to comply with IT policies.</td><td>Policy compliance intention – Employee’s intention to comply with IT policies of organization.</td></tr>
<tr><td colspan="2">• I intend to follow the information security policies and practices at work.
• I intend to use the information security technologies at work.
• I intend to use common sense on good information security practices at work.</td></tr>
</table>

Study of compliance behaviors by CERT also recognizes three main themes that underlie employees taking part in non-malicious IT misuses (CERT, 2014). The first is that they simply have a lack of knowledge. Next, they have a propensity to ignore or underestimate the seriousness of non-malicious IT misuse. Lastly, these employees perceive that using the system in compliance with the policies and procedures interferes with or hinders job tasks (CERT, 2014). These three themes are also common in individual empirical studies (Bulgurcu et al., 2010; Guo et al., 2011; Parasuraman & Alutto, 1984).

Drawing from CERT (2014), examples of employee non-malicious IT misuses are:

- Ignoring system warnings, alerts, or notices while performing job duties.
- Leaving records, transactions, or processes incomplete (i.e., pass deadlines).
- Using software that is not authorized or supported by company.

CERT's definition for employees and insiders who commit these compliance behaviors is:

> An unintentional insider threat is (1) a current or former employee, contractor, or business partner (2) who has or had authorized access to an organization's network, system, or data and who, (3) through action or inaction without malicious intent, (4) unwittingly causes harm or substantially increases the probability of future serious harm to the confidentiality, integrity, or availability of the organization's resources or assets, including information, information systems, or financial systems. (CERT, 2014)

The definition of employee non-malicious IT misuse intentions in the present research is developed from CERT guidelines and definitions from the four studies presented in Table 1. However, the definition from Guo et al. (2011) is a principal source. The scope of application for the definition in the current study is directed at subjects of publicly traded corporations, registrants of the U.S. Securities and Exchange Commission (SEC). In prior studies, the dependent variable for studying IT misuse (see Table 1) has been named and defined in several overlapping ways. Based on criteria drawn from the above sources, in a similar manner, the present research defines employee non-malicious IT misuse intention as, employee's intention not to follow policies and procedures while using IT to perform job duties, but done without intention of harm to the organization.

Drivers of Non-malicious IT Misuse

In the previous literature review of employee IT misuse as a dependent variable, key relationships and predictor variables were also noted (Bulgurcu et al., 2010; CERT, 2014; D'Arcy et al., 2009; Guo et al., 2011; Hu et al., 2012). Significant independent variables from the review are summarized in Table 2 and Table 3. To support analysis for the current study, the tables are categorized by research level of the variables (i.e., individual, organizational). In addition, variables were selected which had standardized coefficients that produced at least a small-moderate influence, or greater (Hair, Celsi, Money, Samouel, & Page, 2011), relative to its research model. Overall, this review provides empirical support for the independent variables developed subsequently in the research model for the current study.

A detailed assessment and summarization of variables from Table 2 and Table 3 advances seven concepts. Under organizational levels the concepts are: (1) authoritative application of IT policies and procedures, (2) advancement of IT policies and procedures that are not burdensome, (3) provision of knowledge and skill to perform IT policies and procedures, (4) encouragement and support by managers/supervisors, and (5) recognition and reward for compliance. Main themes for individual levels are: (1) recognizing and understanding employee role, and (2) gaining and maintaining knowledge and skill, to perform IT policies and procedures. Consistent with these concepts, extant research by CERT (2014) notes management behavior, policy and procedures, work environment stress, training, and IT applications as key organizational factors impacting non-malicious IT misuse or compliance behavior of employees (CERT, 2014).

Table 2

Individual Level Independent Variables Summary

Variable Name	Variable Definition	Author and Theory
Information Security Awareness	Employee's general knowledge about IT security and IT policy within organization.	Bulgurcu et al. (2010) Theory of planned behavior
Intrinsic Benefit	Employee's positive feelings about compliance with IT policy.	
Safety of Resources	Employee's perception that IT resources are safeguarded as a result of their compliance with IT policy.	
Vulnerability of Resources	Employee's perception that information and technology resources are exposed to risks and threats as a consequence of their noncompliance with IT policies.	
Self-Efficacy to Comply	Employee's judgement of personal skills, knowledge, or competency to meet requirements of IP policy.	
Perceived Behavior Control	Employee's perceived ease or difficulty of performing a behavior, and personal feeling of whether they have the skill and control over doing it.	Hu et al. (2012) Theory of planned behavior

Lastly, two studies presented and controlled for ethical considerations (D'Arcy et al., 2009; Hu et al., 2012). D'Arcy et al. (2009) included moral commitment and found that it influenced perception of IT sanctions. Likewise, Hu et al. (2012) controlled for dutifulness, framed as conscientiousness to comply with rules. Hu et al. (2012) found that dutifulness had a significant impact on intention to comply with IT policies and procedures. Both studies expressed that although the ethical type factors enhanced

Table 3

Organizational Level Independent Variables Summary

Variable Name	Variable Definition	Author and Theory
Sanctions	Tangible or intangible penalties incurred by employees for noncompliance with IT policy.	Bulgurcu et al. (2010) Theory of planned behavior
Work Impediment	Detriment to employees' job-related tasks and activities as a result of compliance with IT policies.	
Rewards	Tangible or intangible compensation given by organization to employees for compliance with IT policies.	
Security Policies	Rules and guidelines for the proper use of organizational IT resources.	D'Arcy et al. (2009) General deterrence theory
SecurityEduca-tion, Training, and Awareness Program	Providing users with general knowledge of IT security environment and the skills necessary to perform required IT procedures.	
Computer Monitoring	Active monitoring employees computing activities that increases the organization's ability to detect IT misuse.	
Workgroup/ department Norm	Approval or disapproval of behaviors in workgroup or department, by those in the workgroup or department.	Guo et al. (2011) Theory of reasoned action; Theory of planned behavior
Perceived Top Management Participation	Perception of the top manager's behavior and actions in facilitating organizational actions.	Hu et al. (2012); Theory of planned behavior
Subjective Norm/ Normative Beliefs	Perception of whether behavior is accepted and encouraged by others in the organization held as important.	Hu et al. (2012); Bulgurcu et al. (2010) Theory of planned behavior

analysis, due to variability and difficulty in manipulation, they are best framed as control variables versus independent variables.

The above discussion on drivers of non-malicious IT misuse provides significant insight for development of this current study. In particular, key organizational level variables align with this study’s focus on management and organizational level factors to influence employee intentions. Additionally, CERT (2014) clearly categorizes these factors from an organizational perspective. Although positioned differently, the individual level concepts also emphasize the value of developing employees with organizational resources, and utilizing employees to counter IT threats and attacks. The next section advances the theoretical framework in light of the above discussion.

Theoretical Framework

The review of literature identified key organizational concepts and variables. These areas included management, knowledge and skill, IT applications, policies and procedures, ethical considerations, and burdensome/cumbersome activities (Bulgurcu et al., 2010; CERT, 2014; D’Arcy et al., 2009; Guo et al., 2011; Hu et al., 2012). Recognition/reward for complying with IT policies was also studied (Bulgurcu et al., 2010). However, in the current research, employee consideration is reflected in efforts by the organization to address job stress. To support the framing of the theoretical relationships for the organizational factors identified in this current study, the theoretical approach is drawn primarily from social learning theory (Bandura, 1971). To provide comprehensive understanding from social learning theory as used in the present research, coping theory (Lazarus & Folkman, 1984) is applied to effects of organizational stress and utilitarian theory (Beauchamp & Bowie, 1997) is applied to the influence of ethics.

Social Learning Theory

Social learning theory is based on the relationships of three overall aspects, environmental, cognitive, and behavioral (see Table 4), and their influence on respondent behavior (Bandura, 1971). There is an interactive nature between these factors but for this study, the focus is the flow through constructs to the targeted employee behavior.

Table 4

Social Learning Theory Aspects

Environmental	Cognitive	Behavior
Influence	Insight	Skill
Modeling	Interpretation	Guidance
Observation	Anticipation	Practice
		Self-efficacy

Note: Adapted from “Social Learning Theory”, by A. Bandura, 1971,
Morristown, N. J., General Learning Press, 1971.

Bandura (1971) found that environmental elements such as words, actions, and experiences of others, provide a basis for those exposed to these elements to learn the behavior, and have that behavior conditioned as a response. Bandura (1971) went on to explain that these environmental elements have a stronger effect when the observer or recipient has a dependent or relevant relationship with the individual being observed. This is akin to management-employee relationships in the current study, where the employee is accountable to management. Accordingly, in formulating a view of the IT compliance environment, employees would look to management, which frames management compliance modeling as an environmental factor. By observing and being exposed to management, employees would learn management’s expressed position and be conditioned to that expected behavior (Bandura, 1971).

To expound, learning by observation allows individuals to comprehend and gain from wider perspectives (Bandura, 1971), thereby increasing their ability to perform the compliance activities. Consequently, experiences acquired by observation play a crucial role for individuals in comprehending and meeting compliance objectives. Experiences achieved by observation or by individuals performing tasks themselves, provide a basis for the individual to reason through challenges to complying with policies and procedures, in order to reach a resolution and avoid noncompliant behavior (Bandura, 1971). However, during this process of reasoning, if employees had previously observed or recognized management responses that were not in agreement with compliance objectives, unfortunately, employees would symbolically incorporate that behavior as an acceptable resolution (Bandura, 1971). In the present research, noncompliant behavior framed as non-malicious IT misuse intention, is expected to be significantly influenced by an employee's observation of management.

Cognitive elements are thoughts and perceptions about what behaviors are expected (Bandura, 1971). Perceptions are formed when impacted by direct stimuli or influences, like goals, objectives, and job responsibilities (Bandura, 1971). Respondents draw on perceptions when they attempt to relate their individual actions to expected behavior outcomes (Bandura, 1971). However, a significant point is that individuals adjust their insight of expected behavior, to what they actually experience (Bandura, 1971). In reference to the current study, although policies may direct one form of compliance behavior, employees could experience seemingly high organizational job demands or stress, that could lead them to adjust perceptions of what is required in order to meet expectations. Accordingly, the present research considers the influence of perceptions or insight when assessing compliance behavior of employees in reference to non-malicious IT misuses.

Behavioral elements for performing compliance activities encompass training awareness, skill, use of actual items (IT), and most importantly self-efficacy (Bandura, 1971). Self-efficacy is an individual's confidence that they can successfully perform the expected behavior (Bandura, 1977). Bandura (1977) established that self-efficacy plays a significant role in performance behavior of individuals. Self-efficacy indicates (1) whether an activity would be undertaken, (2) the level of effort that would be applied, and (3) the consistency of performing the activity in light of difficulties and challenges. In the scope of this study, usability of IT applications, understandability and doability of policies and procedures, and training awareness represent behavior factors that interact with the self-efficacy of employees. Although self-efficacy is not captured as a unique construct in the present study, the collective influence of IT applications, policies and procedures, and training awareness also serves as a proxy for the element of self-efficacy. In summary, these behavior factors stand to influence employee compliance ability in order to decrease non-malicious IT misuse intentions.

As presented, in order for respondents to model or perform the desired behavior, they must have the skill to execute the expected tasks (Bandura, 1971). In reference to IT policies and procedures, respondents should be trained to comprehend and execute the policies and procedures. Likewise, IT applications must have a configuration that is learnable, and which can be operationalized efficiently and effectively. If not, employees will have difficulty performing compliance activities, which Bandura (1971) found, leads to individuals increasing consideration for noncompliant activities. This explains that employees would increase consideration for non-malicious IT misuses in order to accomplish job outcomes, when they lack skill and comprehension to execute policies and procedures, and use IT applications properly.

Bandura’s social learning theory provides a very suitable basis for understanding employee behavior regarding non-malicious IT misuses. Highly cited scholars in IT have also utilized social learning theory to generate good explanatory and predictive analysis of IT behavior (Agarwal & Karahanna, 2000; Chiu, Hsu, & Wang, 2006; Compeau & Higgins, 1995; Marakas, Yi, & Johnson, 1998). Development of the research model in the next section will capture empirically supported variables that align with environmental, cognitive, and behavioral relationships (see Table 4) from social learning theory (Bandura, 1971), to predict employee non-malicious IT misuse intentions.

Social learning theory combined with the previous discussions expresses how employees are affected by five key organizational areas --- management modeling behavior, policies and procedures, IT applications, job demand stress, and training awareness. Bandura's (1971) social learning theory, through environmental aspects (influence, modeling, observation), cognitive (insight, interpretation), and behavior aspects (skill, self-efficacy) explains the relationships for framing these five factors in the present study. Thus, it is expected that employees would be provided with a reduced need for pondering non-malicious IT misuse intentions if these areas are addressed. Following are further theoretical discussions of job demand stress as an antecedent, and employee ethics, which is not an organizational level construct for this study, but will be accounted for.as a control variable.

Organizational Job Demand Stress and Coping Theory

In corporate environments targeted in the current study, IT is inescapable for job performance. However, along with this pervasive use, employees can still experience organizational and management driven job demand stresses (Parasuraman & Alutto, 1984; Ragu-Nathan, Tarafdar, Ragu-Nathan, & Qiang Tu, 2008). It is not uncommon for employees to experience increased workloads, complexities, and heightened time pressures for related IT business processes (Ayyagari et al., 2011; Parasuraman & Alutto, 1981, 1984). In the face of job demand stresses, employees could seek means they view as necessary to successfully complete job duties, although they may not be in accordance with policies and procedures.

In the present study, coping theory is used to understand employee behavior when challenged with organizational job demand stress. Lazarus and Folkman (1984) are credited with principally establishing and advancing coping theory (Beaudry & Pinsonneault, 2005). Coping theory explains how an individual recognizes his or her limitations when faced with demanding or challenging circumstances, but continues to think, analyze, and act to manage the situation (Folkman & Moskowitz, 2004; Lazarus & Folkman, 1984).

Moreover, research shows that although varying by subject and situation, individuals focus on two main elements in these stressful situations, the problem and their emotion (Folkman & Lazarus, 1980). In the current study, employees may operate under stressful situations but still be challenged to consistently use IT properly --- in the face of management actions, policies/procedures, and system applications. Problem-focused coping efforts can include grasping the impact of the problem, developing skills and alternatives/workarounds, plus influencing the working environment (Lazarus & Folkman, 1984). Emotion-focused coping efforts strive to develop a frame of mind to function, given the stress (Lazarus, 1999). Most importantly, it does not mean that the individual mentally alters the facts surrounding the event, but instead they may choose not to dwell on it, or they may reassess it for any positive outcomes (Lazarus, 1999). In the end, employees must cope with the problems and emotions of stress, yet utilize systems properly with reduced intentions of non-malicious IT misuse.

Employee Ethical Decision-Making, a Utilitarian Theory Focus

The current research recognizes that in a corporate environment with stressful job demands, employees are also challenged with ethical considerations as they make coping decisions related to non-malicious IT misuse intentions. These considerations could involve how the employee views the outcome of the tasks they perform, the nature of policies and procedures, and the propriety of how IT applications are configured. Studies have shown that ethical positions that form the bases for these considerations are inherent parts of the employee (Alder, Schminke, & Noel, 2007; Schminke, Ambrose, & Noel, 1997). Within the scope of the present research, with inherent aspects, these ethical positions would be akin to traits like educational level, job title, and years on job. Consequently, in the current research the influence of ethical positions is evaluated as a control variable. This approach is consistent with other studies (D’Arcy et al., 2009; Hu et al., 2012), and the present study’s focus on organizational and management level independent constructs. However, given the strength of the personal nature of ethical positions, the theoretical basis for their formation is further evaluated.

The approach to evaluating ethical theories in business falls into three categories: (1) descriptive, which is based on historical business behaviors, (2) conceptual, which looks at importance of meanings, and (3) normative, which frames what behaviors should be followed (Beauchamp & Bowie, 1997). The process that individuals or employees use to decide on a behavior includes: (a) perception of an ethical dilemma, (b) analysis of rules and objectives, (c) alignment of situation with ethical basis, (d) decision, (e) behavior action, and (f) learning from outcome (Donaldson, Werhane, & Cording, 2002). The evaluation of employee non-malicious IT misuse intention in the current study aligns with normative ethical theories.

Within business organizations, a primary normative ethical theory applicable to employee behavior is categorized as consequentialism (Donaldson et al., 2002). Consequentialism focuses on the overall greatest good or best consequence resulting from a decision (Beauchamp & Bowie, 1997). Following is a discussion of consequentialism as a normative framework for ethical behavior in reference to employee non-malicious IT misuse intentions.

Development of the consequentialism view is mainly ascribed to John Stuart Mills (1806 – 1873) where he grounded ethical theory in utility or the greatest good (Beauchamp & Bowie, 1997; Mill, 1879/2010). Mills' view went forward and became known as utilitarianism (Beauchamp & Bowie, 1997). Utilitarianism is commonly used in evaluating ethics of business conduct (Shapeero, Chye Koh, & Killough, 2003).

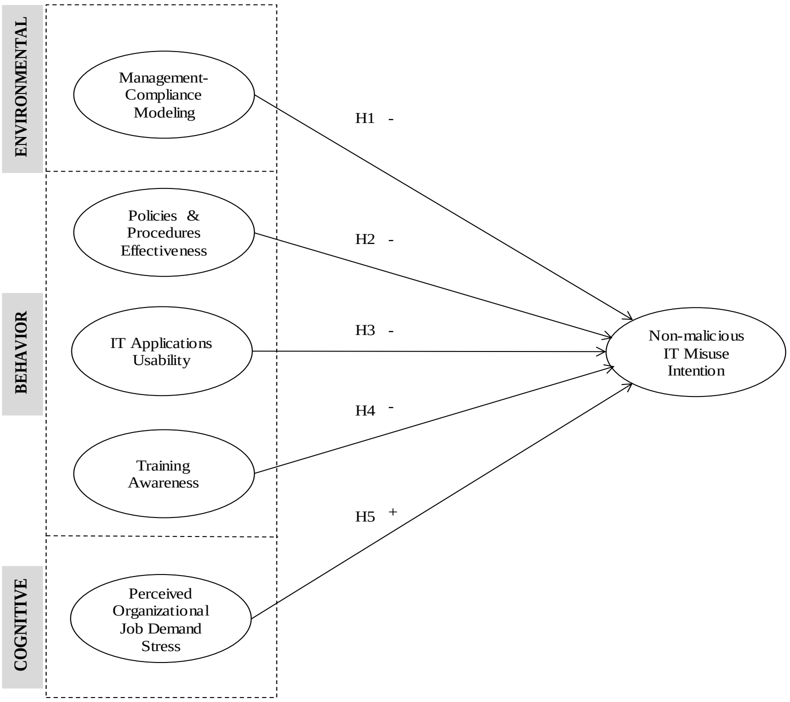
Utilitarianism is primarily applied in two forms, act utilitarianism and rule utilitarianism (Beauchamp & Bowie, 1997). Act utilitarianism applies the act or ethical decision that leads to the maximum benefit or greatest good without significant concern over limiting or restricting rules (Beauchamp & Bowie, 1997). Within the framework of the current study, act utilitarianism could apply to employees who make the decision to take short cuts, work around policies and procedures, and improvise to meet IT related outcomes. Under rule utilitarianism, the act or ethical decision that leads to the maximum benefit or greatest good must be in accordance with policies and procedures, since they are held to be firm and overarching (Beauchamp & Bowie, 1997; Hooker, 2000/2013;

Schminke, Ambrose, & Noel, 1997). In the present research, employees could recognize the difficulty of utilizing IT applications in the face of cumbersome policies and procedures, but accept stressful challenges to their job performance as long as they are compliant with guidelines. The nature of these two ethical behaviors, act utilitarianism and rule utilitarianism, shows the need to control for these variables when evaluating non-malicious IT misuse intentions by employees. The following section utilizes the discussed theories to frame the variable relationships and develop the theoretical model.

Theoretical Model and Hypotheses

The research model for the current study is presented at Figure 1. It is based primarily on Bandura's (1971) social learning theory, along with coping theory (Lazarus & Folkman, 1984) and utilitarianism theory (Beauchamp & Bowie, 1997). This study addresses organizational level constructs that are theorized to impact non-malicious IT misuse intentions within a corporation. The constructs are drawn from literature and are developed in the following sections. The three concepts of social learning theory --- environmental, cognitive, and behavioral --- provide a foundation for framing the relationships of organizational factors that influence non-malicious IT misuse intention (see Figure 1).

Figure 1. Theoretical Model


ENVIRONMENTAL
BEHAVIOR
COGNITIVE
Management-Compliance Modeling
Policies & Procedures Effectiveness
IT Applications Usability
Training Awareness
Perceived Organizational Job Demand Stress
H1 -
H2 -
H3 -
H4 -
H5 +
Non-malicious IT Misuse Intention

Management Compliance Modeling

In reviewing management behavior studies in reference to compliance, Hu et al. (2012) present a view commonly found. Hu et al. (2012) based a study of perceived management participation on Huigang Liang, Saraf, Qing Hu, and Yajiong Xue's (2007) and Jarvenpaa and Ives' (1991) use of top management participation. Top management participation is concerned with the actions carried out by top management executives and officers to facilitate the policy process by championing the initiatives, demonstrating and enforcing commitment, and being fair in applying policies (Hu et al., 2012). Facilitating actions are at the core of Hu et al.'s (2012) perceived management participation and are held to influence accepted behaviors of employees. The assumption is that top management who support IT policies and procedures would hold lower level managers and employees accountable for the same policies and procedures, thereby causing the views of top management to cascade throughout the organization (Hu et al., 2012). In the current research, management's role extends beyond facilitation efforts of top management, as in Hu et al. (2012). The current study extends management's role to include the actual compliance behavior exhibited at middle and lower management levels that are closer to transaction levels.

Zaccaro and Klimoski (2001) identified and recognized the operating environments and roles of (a) top management, (b) middle management that report to top officers, and (c) lower level management in organizations. Organizational strategies and policies are supported when management at each level displays consistent understanding of strategies and policies, and communicate the relative impact within their span of influence (Zaccaro & Klimoski, 2001). For top management the span is across departments and the organization; for middle and lower level management the influence could be a department, unit, or employee (Zaccaro & Klimoski, 2001). Most importantly, the influence of management behavior tends to be more direct at the lower and middle level, whereas top management behavior tends to be more indirect (Zaccaro & Klimoski, 2001). The communication of middle and lower level management combined with the more direct behavior influence of middle and lower management, support extending the focus beyond the top management level (Zaccaro & Klimoski, 2001) as done in the present study.

The role and influence of all management levels were further reported in a 25 year (1985 -2009) review of 1,159 empirical studies from top journals (DeChurch, Hiller, Murase, Doty, & Salas, 2010). Consistent with Zaccaro and Klimoski (2001), the outcome of middle and lower level management indicated nearly all of their focus was on the individual, team, or unit. Likewise, employee behavior was the management emphasis. On the other hand, top management's focus went beyond organizational and departmental levels, with nearly all the management emphasis focused strategically and externally (DeChurch et al., 2010). This profile of middle and lower level management again advances the rationale for extending the management focus from the top level down to lower levels of management, which would capture more of the influence at employee, team, unit, and department transaction levels.

To better represent the role and influence of all three levels of management in the current study of non-malicious IT misuse, the management construct is drawn from Staples, Hulland, and Higgins (2006). Staples et al. (2006) applied self-efficacy theory to the study of effective management of employees. "Modeling best practices by manager" was the environmental construct based on self-efficacy theory. Modeling is a key aspect for how users learn from behavior they observe in others under self-efficacy theory, and the related social learning and social cognitive theories (Bandura, 1971, 1977, 1988). Results produced strong support and significance for the influence of "modeling best practices by manager" on the behavior of employees (Staples et al., 2006).

Based on the preceding discussions, the current study will frame the environmental modeling construct as "management compliance modeling". It captures management behavior which is consistent with the policies and procedures that in effect, are the policies and procedures approved by management. In addition, it reflects management behavior that aligns, supports, and promotes organizational awareness of the policies and procedures. It could encompass all three divisions of management, top, middle, and lower levels. However, due to the transactional nature of uses subject to

Level-1 compliance controls, the particular focus of the present research is influence of middle and lower levels of management. The measurement of management compliance modeling will be based on how much respondents value management following and demonstrating compliance, with company IT policies and procedures. Thus,

H1: As management's modeling of compliance behavior increases, employees decrease non-malicious IT misuse intention.

Policies and Procedures Effectiveness

In the current study, policies and procedures that advance IT compliance behavior and control must be understandable and doable by employees to be effective (Hu et al., 2012). Specifically, effectiveness implies that policies and procedures are clearly defined and written, in addition to being relevant and practiced (Hu et al., 2012). With effectiveness, employees should not be influenced to work around or not fully comply when performing job duties. Effective policies and procedures in turn provide increased perception for organizational awareness of policy and procedure goals (Straub & Welke, 1998). Policies and procedures play a central organizational role in supporting employee compliance behavior and should reflect attributes that facilitate their use (Hu et al., 2012).

Effective policies and procedures also express the position of management in terms of IT compliance since the policies and procedures are approved by management (Hu et al., 2012). In addition, the present study recognizes that managers are also positioned to help employees understand policies and procedures, and know how to execute them; this influence should limit employee improvisations and misapplications (X. Zhang & Bartol, 2010).

Prior studies have tested the effectiveness of policies and procedures by measuring how clearly they are defined, how they support business transactions, and how well they fit with IT applications (Hu et al., 2012; Spears & Barki, 2010). Likewise, policies and procedures effectiveness in the current study will be assessed by how much importance respondents place on their clarity, efficiency, and fit with business processes. Lastly, the influence of policies and procedures on employee conduct, supports its recognition as being relevant for this study and its classification as a behavior factor under social learning theory (Bandura, 1971). Thus,

> H2: As the effectiveness of policies and procedures increases, employees decrease non-malicious IT misuse intention.

IT Applications Usability

IT applications in the present research are framed around their usability for employees. Two sub-areas that address usability for employees are the capabilities of the IT applications and easiness to use (CERT, 2014; Galletta & Hufnagel, 1992; Petter & McLean, 2009; Vance et al., 2013). Capabilities encompass systems that (1) contain security functionality which supports good procedures, (2) process procedures efficiently, and (3) provide substantive compliance reporting (Vance et al., 2013). In addition, Galletta and Hufnagel (1992) found that in supporting or working through policies and procedures, IT applications must do so with formal guidelines and with consistency across organizational applications.

When employees are using IT applications to complete job assignments and in doing so are working within policies and procedures, it is reasonable to expect that they do not want IT applications that are difficult to use and understand. Above all, employees would not want IT applications that will take effort away from completing their job assignments. It is possible for these desired characteristics of IT applications to impact employee compliance behavior. Accordingly, CERT (2014) reported that employees are influenced to work around systems and related policies and procedures when they are difficult to use and understand. In addition, research demonstrates a strong direct influence between system quality (including easiness of use) and employee behavior (Petter & McLean, 2009). Moreover, inability to work around difficult IT also leads to employee frustration, performance issues, and weakened work group dynamics (Lazar, 2006; Xiaojun Zhang, Venkatesh, & Brown, 2011). In the current study, employee behavior demonstrates non-malicious IT misuse when working around difficult IT applications.

Easiness of use encompasses efficient system response and reporting times, menu flows that are logical, fields that are clearly defined, and processes that can be completed with proficiency (Petter & McLean, 2009). The current study considers that employees are expected to meet the performance requirements reflected in the policies and procedures for using IT applications; system capabilities and easiness to use provide usability and support employees in this effort. Accordingly, IT applications are positioned for relevant behavior influence under Bandura's (1971) social learning theory. Similar to measures of other studies (Moore & Benbasat, 1991; Petter & McLean, 2009; Wixom & Todd, 2005), IT applications usability will be assessed based on the consideration respondents assign to the usefulness, easiness of use, and efficiency of the applications.

Thus,

H3: As the usability of IT applications increases, employees decrease non-malicious IT misuse intention.

Training Awareness

In the present study, training awareness involves two aspects. One purpose directed to the organization, is training to address the transfer of content to employees to develop skill and functional ability for using IT properly (Cronan & Douglas, 1990; Montoya, Massey, & Khatri, 2010; Puhakainen & Siponen, 2010; Stanton, Stam, Mastrangelo, & Jolton, 2005). Employees who develop IT proficiency will be less tempted to rely on improper short cuts and processes to complete job responsibilities when challenged by heavy workloads and time pressures. The other purpose is to instruct employees about the policies and procedures authorized by management for the proper use of IT applications (Puhakainen & Siponen, 2010). Specifically, training awareness on policies and procedures, and IT applications combine to influence the behaviors employees execute (Bandura, 1977). Examples of actions that reflect the organization's commitment to training awareness include general announcements, postings, expressions of organizational security positions, and statements repeated across management (Knapp, 2005). As a result, having the knowledge of how to best utilize IT applications and what is allowed according to policies and procedures, influences employees to reduce their intentions of non-malicious IT misuses (Bandura, 1977).

SolarWinds, an industry leader in providing IT management and security software to corporations and the federal government, also noted the value of training awareness. In their 2014 survey of the federal government, respondents saw untrained insiders as a significant threat (SolarWinds, 2014). Moreover, Morris (2011) found limitations in training, and policies and procedures to be significant factors contributing to internal control weaknesses. Non-malicious IT misuses would be an element of internal control weaknesses, subject to the influence of training.

Hu et al. (2012) explained that as employees feel a sense of control from their ability to easily use acquired skill, and understand policies and procedures, they are more likely to comply with related compliance guidelines. Hu et al. (2012) went on to express that effective training is the most significant resource for developing skills and understanding of policies and procedures. Hence, training awareness is positioned to influence employee behavior of non-malicious IT misuse intentions under Bandura's (1971) social learning theory. Training awareness based on earlier studies (Cronan & Douglas, 1990; Puhakainen & Siponen, 2010), will be measured by the importance respondents assign to IT training that is available and useful for performing job duties. Thus,

> H4: As training awareness increases, employees decrease non-malicious IT misuse intention.

Perceived Organizational Job Demand Stress

In light of developing IT, Dull and Tegarden (1999) noted increasing volumes and complexities of accounting information, and the compounding impact of information surrounding ERP type applications. This finding describes some drivers of job demand stress as generated from the organizational level. As previously discussed, organizational job demand stress can be derived from heavier workloads, information overload, and time pressures (Ayyagari et al., 2011; D’Arcy et al., 2014; Parasuraman & Alutto, 1981; Ragu-

Nathan et al., 2008). Studies still seek to understand effects of organizational job demand stress in IT environments (Ayyagari et al., 2011; D’Arcy et al., 2014; Liang & Xue, 2009; Ortiz de Guinea & Webster, 2013). In particular, D’Arcy et al. (2014) evaluated and supported the influence of stress from complex information security requirements, and employees coping by intentionally violating security policies. Although their study utilized coping theory, it was more narrowly defined, centering on emotion-focused coping techniques and individual level constructs (D’Arcy et al., 2014). Organizational level constructs as designed in the current research is expected to expand the understanding of job demand stress.

Most importantly, the manner in which employees cope with organizational job demand stress can be strongly influenced by their unique situation (Lazarus, 1999). For the current research, this uniqueness supports the use of “perceived” organizational job demand stress. When stress is perceived, an employee’s skill, understanding, experience, and physiological response to the perceived stress can influence whether the employee relies more on problem-focused or emotion-focused coping strategies (Lazarus & Folkman, 1984). The current study centers on problem-focused coping processes used by employees, since problem-focused techniques reflect modifications in behavior and resulting actions (Lazarus & Folkman, 1984). Employees’ thoughtful evaluation and interpretation of factors for stress falls in line with cognitive aspects of Bandura’s (1971) social learning theory. In the present research, perceived organizational job demand stress is positioned to assess its influence on the employee behavior, non-malicious IT misuse intention. Drawing from previous research (Ayyagari et al., 2011; D’Arcy et al., 2014), perceived organizational job demand stress will be measured by how respondents feel employees modify behavior of non-malicious IT misuse intention, in response to job responsibilities with varying levels of perceived stress. Thus,

> H5: As perception of job demand stress decreases, employees decrease non-malicious IT misuse intention.

CHAPTER 3

METHODS

This study used the multivariate technique, conjoint analysis, to collect and analyze the data (Hair, Black, Babin, & Anderson, 2009). The approach for using conjoint analysis is similar to the methodology followed by Tiwana and Bush (2007) in their study of management IT outsourcing decisions. Moreover, IS research finds conjoint analysis advantageous since it allows experimental manipulation of attributes through scenarios, while using external surveys to collect the data (Lohrke, olloway, & oolley, 2010; Tiwana & Bush, 2007). In addition, by using scenarios, conjoint analysis is very effective for testing sensitive behavior like non-malicious IT misuse intention in the present study (Hanisch & Rau, 2014).

Another advantage for conjoint analysis is found in the nature of the hypotheses being tested. In the hypotheses, behavior intention was evaluated based on influences of certain conditions and factors. To be analyzed, respondents could have been assessed using their retrospective collection of past actions and behaviors in response to certain factors. However, in retrospective assessments, respondents might have difficulty recalling past specifics and their resulting actions (Hanisch & Rau, 2014). Conversely, conjoint analysis allows respondents to formalize decisions in a present and prospective tense based on the profiles before them (Hanisch & Rau, 2014). Conjoint analysis would thus allow theory to be tested at the time respondents are reasoning through attributes and making decisions (Lohrke et al., 2010). Accordingly, in the present study of behavior intention, conjoint analysis was expected to provide robustness over methods that would utilize decisions based on post hoc assessment (Hanisch & Rau, 2014).

Analysis of variance (ANOVA) was selected as the primary statistical technique for evaluating results of the conjoint analysis (Lohrke et al., 2010; Shepherd, 1999; Zacharakis & Shepherd, 2001) using cluster analysis to group respondents (Green & Krieger, 1996; Il-Horn Hann, Kai-Lung Hui, Sang-Yong Tom Lee, & Png, 2007; Priem, 1992). Many studies utilize hierarchical linear modeling (HLM) to assess measurements due principally to their test of multi-level interaction effects of attributes (Choi & Shepherd, 2005; Hanisch & Rau, 2014; Wood & Williams, 2014). The current study utilized a main effects model without attribute interactions, which made cluster analysis and ANOVA more suitable for evaluating the influence of main effects and related respondent group differences (Green & Krieger, 1996; Il-Horn Hann et al., 2007; Priem, 1992).

Following are discussions on how conjoint analysis was applied and designed to measure hypothesized influences of the five independent variables (attributes). In addition, as discussed above, cluster analysis and ANOVA was designed to assess potential group differences in the conjoint analysis measurements. The particular focus, although not hypothesized, was potential group differences based on respondents' act or rule utilitarian ethical positions.

Application of Conjoint Analysis

Conjoint analysis can be metric or nonmetric based (Priem, 1992). Nonmetric conjoint analysis uses a ranking of attributes by respondents to measure main effects only, whereas metric conjoint analysis rates attributes to measure main effects and interactions if necessary (Hanisch & Rau, 2014; Priem, 1992). The current research used a metric conjoint analysis approach similar to other empirical studies that assessed decision-making and intentions of individuals (Hanisch & Rau, 2014; Priem, 1992; Tiwana & Bush, 2007; Wood & Williams, 2014). Most importantly, metric conjoint analysis can use rating scales like Likert (Hair et al., 2011), to measure respondents as they evaluate influence of profiles (Hanisch & Rau, 2014).

In metric conjoint analysis, the relationships between the attributes (independent variables) that respondents evaluate are predefined based on sound theory (Hanisch & Rau, 2014; Priem, 1992). In the current study, along with theory, the development and definition of attributes are supported by their use in validated instruments of prior scholarly research. These studies assessed management behavior (Staples et al., 2006), policies and procedures (Hu et al., 2012) , IT applications (Osei-Bryson, Dong, & Ngwenyama, 2008; Vance et al., 2013), organizational job demand stress (Ayyagari et al., 2011; Ragu-Nathan et al., 2008), and training (Hu et al., 2012; Staples et al., 2006). The dependent is framed for conjoint analysis methods (Schwarz, Jayatilaka, Hirschheim, & Goles, 2009; Tiwana & Bush, 2007; Xin (robert) Luo, Warkentin, & Han Li, 2013).

Utilizing metric conjoint analysis methodology, the current research assessed results across four areas (a) attributes, (b) conjoint profiles (scenarios), (c) part-worth utility, and (d) overall utility (Tiwana & Bush, 2007; Xin (robert) Luo et al., 2013). Attributes reflect the independent variables, valued at two levels, high or low (Hair et al., 2009). Conjoint profiles are grouping of the attributes for evaluation of affects (Hair et al., 2009). The current study used a full-profile method where all attributes were included (Hair et al., 2009). Part-worth utility captures the value of the contribution made by each level of the attribute (Hair et al., 2009). Overall utility, from the summated part-worths, measures the strength of influence, the combination of all attribute levels for a given profile make on the dependent being evaluated (Hair et al., 2009). Part-worth utilities also produce the relative percentage importance out of 100% for each attribute (Hair et al., 2009). In summary, respondents were provided profiles containing high or low values for each of the independent attributes, and asked to rate the influence value of that combination of attributes on the dependent.

Following evaluation of the attributes, respondents used a nine-point Likert scale to measure the impact on the dependent, 1 equal very unlikely, 9 equal very likely (see Appendix A). In metric conjoint analysis, comparing ratings from other respondents provides the ability to determine the strength of influence exhibited by the attributes (Lohrke et al., 2010; Schwarz et al., 2009). The metric conjoint analysis approach in the current study is referred to as a traditional additive model, where the part-worths are added to determine the overall influence (Hair et al., 2009).

Metric Conjoint Analysis Design

The methodology and efficiency for measuring metric conjoint analysis results are based on the number of attributes, number of levels per attribute, and number of dependent factors (Hanisch & Rau, 2014). The theoretical model in the present study utilized five attributes, with two levels each. The initial factorial experimental design produced 32 (2^5) profiles. However, to create a survey aimed at reducing respondent fatigue, an orthogonal fractional factorial design was used, that minimized the number of profiles needed (Hanisch & Rau, 2014; Holland & Shepherd, 2013; Hair et al., 2009). Using XLSTAT conjoint analysis software (Becker, Rai, Ringle, & Völckner, 2013;

Carter, Wright, Thatcher, & Klein, 2014; Ye Chen, Kilgour, & Hipel, 2009; Prat, Comyn-Wattiau, & Akoka, 2015), an orthogonal fractional factorial design produced a subset of profiles to estimate main effects (Hair et al., 2009). It is significant that due to the nature and robustness of metric conjoint analysis, respondents are not required to evaluate all 32 profiles (Hair et al., 2009). However, for statistical productivity and reliability, each respondent must evaluate a minimum number of profiles (Hair et al., 2009).

For the current research, 16 was set as the minimum for fractional factorial design (Hanisch & Rau, 2014). Sixteen profiles are normally used for empirical conjoint studies (Hanisch & Rau, 2014). In addition, for five attributes, 16 profiles allows testing of all main effects, without main effects being confounded by other interactions (Tobias & Trutna, 2012). XLSTAT utilizes ordinary least squares to estimate measurement values of effects. Ordinary least squares, which is also foundational for PLS (partial least squares), is commonly viewed as being reliable and not too sensitive to sample sizes (Gefen, Rigdon, & Straub, 2011). Thus, based on the initial factorial calculation of 32, and the selection to produce a smaller number of 16 design profiles for testing using an orthogonal fractional factorial method, the theoretical model supported efficient testing using metric conjoint analysis.

In metric conjoint analysis, validation profiles (sometimes referred to as holdout profiles) are used to assess the quality and validity of survey responses to the design profiles in the study (Hair et al., 2009). The validation profiles are included within the mix of design profiles to be evaluated by respondents at the same time (Hair et al., 2009). For each respondent, the 16 profiles included in the design are the only profiles used for determining overall estimates of the high/low part-worths or coefficients for each of the five attributes' two levels (Hair et al., 2009). The estimates are then applied to the high/low levels of the attributes in each of the validation profiles, to calculate an estimated rating for that validation profile (Hair et al., 2009). The calculated estimated rating is compared to the actual rating assigned by the respondent to assess quality and validity of the survey responses (Hair et al., 2009).

In the current study and pilot, four validation profiles were included to assess the reliability of responses to the 16 design profiles (Hair et al., 2009). Based on other empirical studies, valid surveys are expected to have estimated scores or a hit rate within at least 70 to 85% of the actual scores recorded by respondents (Mulye, 1998; Schlereth, Skiera, & Wolk, 2011). In order for profiles to qualify for inclusion in conjoint calculations, the present study set 80% as the target hit rate (85% for pilot). The target was calculated based on the mean absolute difference in the actual score percent of the design profiles and the estimated score percent for the validation profiles, based on the scale range (see Appendix B).

Control Variables

Control variables were led by two ethical factors which assessed characteristics of act and rule utilitarianism in respondents (Beauchamp & Bowie, 1997; Shapeero et al., 2003). Act and rule utilitarian scales were adapted from previously validated instruments (Casali, 2011; Fan, Ho, & Ng, 2001; Perry & Nixon, 2005) (see Appendix C). Items were measured on a 7-point Likert scale apart from the conjoint profiles.

Descriptive variables also included: (1) age, (2) sex, (3) education, (4) industry, (5) company's number of employees, (6) years with company, (7) department, and (8) years in current position. In addition, data were obtained for level of IT use on job, management experience, number people managed, and management level (Alder et al., 2007; Bulgurcu et al., 2010; D’Arcy & Devaraj, 2012). Select control variables were assessed using Pearson correlation, factor analysis, cluster analysis, and ANOVA (Hair et al., 2009, 2011).

Survey Development and Testing

Target Population

Survey criteria targeted respondents who use IT in their normal job duties, but who are not responsible for authorizing or setting IT policy and procedures. In addition, experienced users were captured. Targeted entities were publicly traded U.S. companies, regulated by the SEC (Securities and Exchange Commission).

Framing and Pretesting Survey

The initial draft of the profile design for the high/low attributes, the act/rule utilitarian scale items, and the demographic questions was reviewed with two industry experts for face validity. The experts agreed with the selected attributes, and also emphasized the impact of efficient policies/procedures and stress to get work done. From the initial review, labels/categories were reworded to improve clarity of demographic questions. In addition, some items were reordered to enhance flow. Wording was also clarified in the act/rule utilitarian scale items for better adaptation in the current study. The initial review provided a basis for further development.

Four academic scholars then reviewed the survey for quality, validity, and theoretical agreement with the research model. As a result, prequalification questions were modified to screen out respondents responsible for setting or establishing IT policies and procedures. Demographic questions were further modified or added to expand descriptives around IT experience, management experience, and job level. To improve alignment with the research model and conjoint analysis design, the high/low attribute levels were reworded for simplicity and clarity. Following this stage, pretests were conducted.

Six subjects participated in the pretest. The pretest demonstrated support for the metric conjoint analysis approach, the survey logic, and completion effort. In addition, participant comments expressed agreement or understanding for the five attributes selected for testing. With indicated support from the pretest, the pilot was conducted.

Survey Pilot

Qualtrics LLC administered the survey and supplied 18 respondents for pilot testing. Instructions in the survey established the setting for evaluating the profiles. Instructions explained that the employee action being evaluated took place in a publicly traded U.S. corporation, regulated by the Securities and Exchange Commission (SEC). The company would also maintain standard Level 2 systematic controls such as adequate backups, system-mandated change of passwords every 90 days, and formal setup and tracking of user-names. The profile attributes were to be evaluated against employees who use IT in their normal job duties. Responses from the 18 pilot surveys were kept separate and not included with the full study. However, the 18 pilot surveys were subject to the face validity and validation testing used in the full study. One respondent did not pass face validity due to straight lining. Five respondents did not pass testing of validation profiles, for a result of 12 pilot samples. Twelve final pilot samples or 67% is reasonable based on other conjoint analysis studies where up to 11% of respondents fail face validity checks (Hanisch & Rau, 2014; Tiwana & Bush, 2007) and up to 30% is an acceptable miss rate for validation profiles (Mulye, 1998; Schlereth et al., 2011).

Although a small pilot sample was used, exploratory factor analysis was performed on the four act utilitarian and three rule utilitarian control variables to detect, potentially poor measurements in the full study. Four of seven items loaded cleanly, scale items 3 and 7 for act utilitarianism and, 4 and 6 for rule utilitarianism (see Appendix C). However, all seven items were kept and reassessed with the full data. The four items were over .70, loading strongly on their utilitarian component (Hair et al., 2009). It was very favorable to have strong loadings since only two items loaded on each component. However, the use of one and two item scales to assess individual ethics in empirical studies is established (Casali, 2011; Fan et al., 2001; Kujala, 2001; Perry & Nixon, 2005).

The overall review of factor results indicated a reasonable basis for utilizing the act and rule utilitarian variables. In the summary measure of intercorrelations, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA) was below the accepted guideline of .50 (Hair et al., 2009). The KMO MSA assesses how well variables intercorrelate and predict each other (Hair et al., 2009). Never the less, as sample size increases, MSA should improve, thus the full sample was expected to move MSA beyond the .50 target and produce more meaningful results (Hair et al., 2009). Also, to assess the overall representation of the derived factors, the percentage of variance criterion was used. For this research, factors are considered to be satisfactorily developed if they capture at least 60% of the variance to be explained (Hair et al., 2009). The factor solution accounted for 82.1% of the variance in this limited sample and is satisfactory.

The descriptive statistics of the items in the factor solution indicated their influence. Act utilitarian items, 3 and 7, had a mean average of 3.500, while rule utilitarian items, 4 and 6, had a mean average of 5.583. The size of the variability in the mean averages for the two utilitarian bases indicated the need for reviewing final conjoint analysis results against these characteristics.

The generated part-worths indicated that the profiles used in the metric conjoint analysis design were able to capture the effects necessary to perform a full study. Most importantly, the direction of influence was captured in accordance with the research model. Stress was positively related to the dependent and showed that low stress, likewise, produced a -0.342, decrease in the dependent, non-malicious IT misuse intention. The other four attributes were negatively related to the dependent, and their high level produced a drop in the dependent. Pilot results supported advancing to the full study.

To address common method bias (Podsakoff, MacKenzie, & Podsakoff, 2012), and support validity and reliability, the following techniques were used:

- The order of the profiles (scenarios) and attributes varied by survey (Hanisch & Rau, 2014).
- Each survey included a practice profile to evaluate and rate before officially beginning (Hanisch & Rau, 2014).
- Four validation profiles were included in the survey (Hair et al., 2009).
- In separate questioning, at two intervals within the evaluation of the 16 profiles, subjects were asked to correctly enter a designated word to continue.

The above four procedures to address common method bias positioned the survey to gather valid and reliable data for metric conjoint analysis. The basis for relying on these four steps is in part derived from the significant difference in the 9-point experiment type responses required for the conjoint analysis profiles, and the more traditional 7-point Likert scale responses to the act and rule utilitarian survey items (Podsakoff et al., 2012). Most scholars hold that method biases can be reduced when data collection uses wording, item structure, and measures that vary and limit development of tendencies by respondents (Podsakoff et al., 2012). Thus, the mix of conjoint analysis profiles and traditional scale items reduce the opportunity for the development of response tendencies along with the four procedural steps.

Following the above procedural efforts to control common method bias, the statistical Harman one-factor test was performed on survey results to assess the presence of problematic levels of common method bias (Babin, Griffin, & Hair Jr., 2016; Lanivich, 2015; Steinbart, Raschke, Gal, & Dilla, 2013). The test calculates one factor from all the variables in the measurement model to determine if the one factor captures and explains more than 50% of the variance for all the variables; the criteria is more than 50% indicates the existence of problematic common method bias (Lanivich, 2015; Steinbart et al., 2013). The items in the current research extracted a Harman one-factor variance percentage of 19.430. The single factor explained a variance amount significantly below the 50% threshold and thus does not indicate the presence of problematic common method bias.

Moreover, processes to advance the methodology established a sound basis for the full study. This included the selection of a well-matched multivariate technique, metric conjoint analysis, with the research subject, non-malicious IT misuse intention (Hanisch & Rau, 2014). In addition, cluster analysis and ANOVA are very suitable statistical techniques for measuring effects in the measure model (Lohrke et al., 2010; Shepherd, 1999; Zacharakis & Shepherd, 2001). It was noted that full-profile presentations, as used in the present study, require sufficiently engaged participants (Hair et al., 2009). Hence, significant effort was made to check validity and reliability of respondents. The pilot confirmed the methodology and review of respondent quality in support of the full study.

Full Study Data

Qualtrics LLC was used to administer the survey to their panel of participants controlled by this study's selection criteria for respondents. Qualtrics was selected based on their recognition for representative panels and strong functionality for user design, monitoring, and control of survey quality (Brandon, Long, Loraas, Mueller-Phillips, & Vansant, 2014; Smith, Roster, Golden, & Albaum, 2015). Likewise, multiple studies reported success using Qualtrics' functionality to control for quality of surveys from panel participants (Carneiro & Faria, n.d.; Jiménez & Mendoza, 2013; Leonhardt, Catlin, & Pirouz, 2015).

Initially, Qualtrics provided 150 respondents. Data were reviewed for quality and validity. The review identified outliers in three groups. Six surveys were straight-lined; eight surveys were completed using repeating response patterns; and nine respondents were identified as speeders, compared to the survey's design, pretests, and pilot (Smith et al., 2015). These responses were removed to result in 127 surveys to be evaluated based on their validation profiles.

A net of 97 respondents met the 80% target hit rate and passed validation screening. A sample size of 97 is considered strong for metric conjoint analysis where many empirical studies use 50 - 75 respondents (Hanisch & Rau, 2014; Wood & Williams, 2014). Robustness is generated with conjoint analysis since respondents provide multiple data points to generate reliability for assessing influence of attributes/variables (Hanisch & Rau, 2014; Wood & Williams, 2014). The 97 respondents for this study provided 1,552 (97 x 16) data points to support analysis.

CHAPTER 4

ANALYSIS AND FINDINGS

The path for analyzing results included a rigorous review of data validity and reliability, confirmatory factor analysis (CFA), cluster object identification, cluster analysis, and ANOVA metrics. Multiple steps were necessary due to the nature of the effects between the independent variables (attributes) and the dependent variable. The hypotheses required respondents to evaluate high/low qualities of the attributes contained within profile sets. Afterwards, respondents evaluated the collective impact of the attributes on a corporate employee's intention to non-maliciously, misuse IT applications while performing job duties. These activities required meaningful evaluation of profiles by engaged respondents. Steps were taken to clean the data of outliers and test validation profiles which promoted the inclusion of engaged participants (Hair et al., 2009). In addition, survey results needed a valid and reliable basis for grouping participants to assess mean differences in profile responses and control variables (Hair et al., 2009). Act/rule utilitarian ethical views made a primary contribution to the basis for grouping respondents (Beauchamp & Bowie, 1997). Due to the need for engaged participants and properly grouped respondents, considerable steps were taken to establish validity and reliability of the responses.

In the previous section, the full study data were rigorously reviewed for outliers and validity. In the following analyses, confirmatory factor analysis (CFA) is applied to properly confirm act/rule utilitarian variables to support valid grouping of respondents.

With sound bases for identifying groups, the application of cluster analysis is then presented. The above phases provided the foundation for subsequent discussions of the primary analysis using ANOVA techniques.

Descriptive Statistics

Demographics of respondents indicated that a representative sample of 97 was captured. Respondents consisted of 53% females and 47% males. Based on participants' ages and years working, experienced employees were reflected in the sample, as designed in the survey (see Appendix D). In addition, more than 90% of respondents indicated that at least half of their workday involved IT use (Appendix D). The sample reflected the desired profile of individuals experienced with IT.

A review of management/non-management demographics provided good insight given the nature of this research and the focus on employee influences at the staff level through middle management. One subject did not respond. In remaining respondents, 77% indicated management experience and 22% had not managed people (Appendix D). The majority of management experience was acquired at department or unit levels, where 66% of respondents had managed 30 or fewer employees (Appendix D). No participants indicated executive level management. This is the profile desired for this study because, as discussed previously, first line supervisors and middle managers are very relevant since they conduct and manage transactional IT level activities (Zaccaro & Klimoski, 2001). Thus, management/non-management descriptives aligned with the purpose of the current study. Other educational, industry, departmental, and company size demographics likewise reflected a representative sample as provided in Appendix D.

Confirmatory Factor Analysis

Using SPSS AMOS, confirmatory factor analysis was performed on the four act utilitarian scale items, and three rule utilitarian items. The purpose was to test and confirm the theoretical defined grouping of scale items based on results from the actual survey data (Hair et al., 2009). By maintaining their relationships, the scale items would properly measure and assess act and rule variable influence to confirm the theory. The resulting act and rule utilitarian factors were then used in the cluster analysis and evaluation of conjoint analysis results.

First, the seven scale items were reviewed for their overall CFA model fit. The size of indicator loadings were reviewed based on a criteria of .707; qualitative criteria was also considered to maintain a representative number of indicators (Hair et al., 2009). In the initial Table 5, items 1, 2, and 5 were removed due to their low loading and to improve model fit. The CFA was recalculated and the resulting regression weights supported the CFA model (Figure 2) which consisted of items 3, 4, 6, and 7 (see Table 6). However, item 6 was below the .707 criteria but was maintained due to the qualitative criteria to keep at least two items. Both variables were significant in their formation (see Table 7).

Table 5

Initial Standardized Regression Weights (N = 97)

Item	Unobserved variable	Estimate
Q7_7	Act_Utilitarianism	2.427
Q7_5	Act_Utilitarianism	.063
Q7_3	Act_Utilitarianism	.282
Q7_1	Act_Utilitarianism	.070
Q7_6	Rule_Utilitarianism	.623
Q7_4	Rule_Utilitarianism	.612
Q7_2	Rule_Utilitarianism	.177

Table 6

Final Standardized Regression Weights

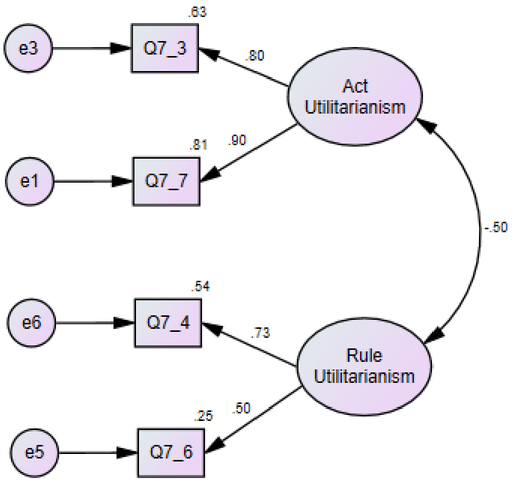
Item	Unobserved variable	Estimate
Q7_7	Act_Utilitarianism	0.899
Q7_3	Act_Utilitarianism	0.796
Q7_6	Rule_Utilitarianism	0.500
Q7_4	Rule_Utilitarianism	0.734

Table 7

Final Regression Weights with Significance

Item	Unobserved variable	Estimate	S.E.	C.R.	P
Q7_7	Act_Utilitarianism	1			
Q7_3	Act_Utilitarianism	0.898	0.214	4.193	***
Q7_6	Rule_Utilitarianism	1			
Q7_4	Rule_Utilitarianism	1.434	0.623	2.301	0.021

Figure 2. Confirmatory Factor Analysis Model



Assessment of Model Fit and Validity

Next, several indices and scores were assessed to confirm the model for fit, reliability, and significance (see Table 8). The evaluation of CFA utilizes a composite of measurement criteria to confirm its theoretical foundation (Hair et al., 2009). For example, fit is evaluated across three measures – absolute, incremental, and parsimony fit measures (Hair et al., 2009). As discussed previously, qualitative elements were also considered in the assessment of the CFA. Parsimony fit indices, adjusted goodness-of-fit and parsimony normed fit, had low values for the two variables modeled in the CFA. The unacceptable levels were most likely due to modeled items that were already in a simple design without complexity (Hair et al., 2009).

Table 8

CFA Evaluation Criteria Summary

Statistics Element	Criteria
Chi-square	Expect > .05 based on observed and estimated covariances, but produced .043, did not indicate best model fit. (However, see standardized residual covariances.) (Hair et al., 2009).
Standardized residual covariances	Standardized residual covariances did not reflect any large residuals >= 4.0, which indicated some degree of fit (Table E1) (Hair et al., 2009).
CMIN	Chi-square difference between the covariances, the minimum discrepancy of the values (CMIN/DF), was 4.112, within acceptable range between 2 and 5. (Table E2) (Hair et al., 2009).
GFI	Absolute fit measure in the goodness-of-fit index (GFI) was at .979, a sizable value above the .90 recommended minimum, indicated the variables' ability to explain the covariances. (Table E3) (Hair et al., 2009).
CFI	Incremental fit measure comparative fit index had a strong value of .967, significantly above the .90 minimum criteria.(Table E4) (Hair et al., 2009).

Construct convergent and discriminant validity were then assessed to determine how well the scale items represented the theorized act and rule utilitarian variables. Average variance extracted (AVE) of .7209 (see Table E5) for act utilitarianism was well above the .50 acceptable criteria, to indicate adequate convergent validity (Hair et al., 2009). Likewise, the construct reliability for act utilitarianism had an acceptable value of .837, above the .70 minimum criteria (Hair et al., 2009). However, rule utilitarianism had an unacceptable AVE of .3944 (see Table E6) and a lower construct reliability of .557 (Hair et al., 2009). A strong significance score for rule utilitarianism (see Table 7) mitigated these weaker values. In addition, favorable covariances, CMIN/DF, GFI, and CFI fit indices for the overall model, and a sufficient discriminant validity assessment for rule utilitarianism (see Table E6) also offset the weak convergent validity values for rule utilitarianism. Discriminant validity had items that were more aligned with the act and rule utilitarian variables they were measuring since the AVE was greater than the squared interconstruct correlation (SIC) (Hair et al., 2009).

Lastly, the act and rule interconstruct correlation was -.50 at a .029 significance level. Overall, the -.50 correlation is in line with the previously tested EFA during the pilot, and the theory based different focus of act utilitarians compared to rule utilitarians (Beauchamp & Bowie, 1997). Assessments consistently supported the theory based CFA model and identified act/rule utilitarian items for use in subsequent cluster analysis.

Cluster Analysis

As previously discussed, ANOVA was selected as the principle statistical technique for evaluating the conjoint analysis results (Lohrke et al., 2010; Shepherd, 1999; Zacharakis & Shepherd, 2001). Moreover, ANOVA is very useful for measuring group means of main effects as designed in the model of this current study (Green & Krieger, 1996; Il-Horn Hann et al., 2007; Priem, 1992). Hence, a primary goal of the present research was to assess group mean differences for influences of the five hypothesized relationships. To provide better explanatory power of the influences, act/rule utilitarian theory was also applied to the groups (Beauchamp & Bowie, 1997). Cluster analysis is established as a suitable basis for identifying and forming the groups for ANOVA techniques (Green & Krieger, 1996; Il-Horn Hann et al., 2007; Priem, 1992). In conjunction, the CFA components formed in the previous discussions of this current study provided a premium basis for the objects necessary, and to be used in cluster analysis.

Basis in Summary Conjoint Analysis Results

The overall results of the metric conjoint analysis produced utilities that aligned with the new theoretical framework of this study and hypothesized relationships (see Table 9). The impact on the dependent---non-malicious IT misuse intention---is reflected in the mean scores. A negative mean indicates a reduction in the dependent; a positive mean denotes and increase in the dependent. In summary, Table 9 conjoint analysis results support the hypothesized effects and the following attributes and levels were predicted to reduce non-malicious IT misuse intention:

1. Management compliance modeling – High, generated a -0.589 effect.
2. Policies and procedures effectiveness – High, had a -0.479 influence.
3. IT applications effectiveness – High, produced a -0.327 effect.
4. Training awareness – High, had a -0.384 influence.
5. Perceived organizational job demand stress – Low, generated a -0.258 effect.

In addition, Table 10 depicts the overall mean percentage value of the calculated importances of the attributes/independent variables. For each respondent, conjoint analysis uses the participant's evaluation of profiles to calculate the percentage of importance for each attribute, based on its weighted importance out of 100%. All the weights were sizeable, ranging from 17.0 to 23.9%, and thus, supported the basis for testing their influence and including them in the new theoretical framework of the current study. Moreover, in the context of the current research focus on management and organizational influences, the strongest weighted attribute is management compliance modeling. It is followed by policies and procedures which represent the directives and intent of management.

Table 9

Metric Conjoint Analysis Part-Worth Utilities (coefficients)

Source	Minimum	Maximum	Mean	Std. deviation
Intercept	1.875	7.750	4.898	1.048
Management compliance modeling-High	-2.250	1.188	-0.589	0.772
Management compliance modeling-Low	-1.188	2.250	0.589	0.772
Policies and procedures effectiveness-High	-3.542	3.615	-0.479	0.856
Policies and procedures effectiveness-Low	-3.615	3.542	0.479	0.856
IT applications effectiveness-High	-1.563	1.948	-0.327	0.552
IT applications effectiveness-Low	-1.948	1.563	0.327	0.552
Training awareness-High	-1.708	1.292	-0.384	0.631
Training awareness-Low	-1.292	1.708	0.384	0.631
Perceived organizational job demand stress-High	-0.792	1.646	0.258	0.533
Perceived organizational job demand stress-Low	-1.646	0.792	-0.258	0.533

Table 10

Attribute Importances

Source	Minimum	Maximum	Mean	Std. deviation
Management compliance modeling	0.000	66.949	23.869	15.340
Policies and procedures effectiveness	0.000	68.548	22.998	13.412
IT applications effectiveness	0.658	54.412	16.950	11.888
Training awareness	0.000	51.429	18.932	10.668
Perceived organizational job demand stress	0.000	70.952	17.251	16.416

The metric conjoint analysis results were tested for fit prior to further cluster and group means analysis. The fit was measured by Root Mean Square Error (RMSE), which evaluates predictive error based on the dependent scale (Dewan, Ganley, & Kraemer, 2009; Shmueli & Koppius, 2011). The overall RMSE had an acceptable mean value of 1.30, or 14.4% variance against the 9-point dependent scale. The 14.4% is within the current study’s 20% variance or 80% hit-rate (Mulye, 1998; Schlereth et al., 2011). The overall Adjusted R^2 had a mean of .43 but some weak minimum values were generated. In line with these results, responses from 57% of participants were found significant, while 43% were not significant. However, even with some non-significant responses, due to the high number of data points, metric conjoint analysis is robust enough to identify reliable overall (see Tables 9 and 10) utilities and attribute importances (Hanisch & Rau, 2014; Wood & Williams, 2014). Accordingly, with a larger number (57%) of strong responses, weaker responses can be maintained and assessed for drivers of their differences.

The strength of metric conjoint analysis allows this assessment functionality because it measures overall results of the model and those of each individual (Hair et al., 2009). All 97 participants passed the validation/holdout testing, indicating reliability of their responses. Consequently, the differences in significance scores indicated the presence of other influences. Most importantly, metric conjoint analysis is akin to experimentation (Hair et al., 2009) and discerning the effects on the different respondent groups simulates the real-world corporate environments in which the respondents are members. Accordingly, cluster analysis and ANOVA were used as the primary tools to assess impacts of the attributes/independent variables on the respondent groups.

As previously discussed, cluster analysis provides a basis for identifying different groups of respondents that could drive differences in measurement values (Green & Krieger, 1996; Hair et al., 2009; Il-Horn Hann et al., 2007; Priem, 1992). ANOVA provides the statistical technique for measuring the resulting differences in cluster group means (Hair et al., 2009; Lohrke et al., 2010; Shepherd, 1999; Zacharakis & Shepherd, 2001). The use of cluster analysis and ANOVA served to identify underlying influences and respondent characteristics in reference to part-worth utilities, attribute importances, and R^2 values.

Cluster Objects

In developing cluster objects, the analysis utilized the act and rule utilitarian components created from the final CFA solution (see Table 6), and which were converted to summated scales. In addition to act and rule utilitarian components, the R^2 and significance measurements (p-values) of the individual respondents were reviewed to develop the clusters. The evaluation of these four objects for cluster formation was significant since R^2 and p-value provide a direct connection for assessing characteristics of model influence and performance.

Correlations were accordingly evaluated for relationships across all four items (see Table 11). Rule utilitarianism and p-value were the only items with significant correlations between each of the other items. In addition, three important pattern types were noted from the review of the correlations and they remained key aspects throughout cluster and ANOVA analysis.

First, rule utilitarianism was negatively and significantly correlated with act utilitarianism. This relationship provides meaningful insight for understanding act/rule utilitarianism theory, where act utilitarianism focuses on the task or act to be completed, over the directives of abiding by rules (Beauchamp & Bowie, 1997). On the other hand, rule utilitarianism strives to complete initiatives, but only if they can be performed in accordance with rules/policies (Beauchamp & Bowie, 1997). This relationship provided a basis for evaluating the influence of the management and organizational attributes in the current research and act/rule utilitarianism based respondent group compliance behavior intention.

Next, rule utilitarianism and R^2 had a positive and significant correlation. This relationship indicated that respondents who reflected more rule utilitarian traits found the attributes in the present study to be more relevant to the desired compliance behavior. Conversely, act utilitarianism and R^2 were negative correlated at the .085 level of significance. Overall, participants that indicated more act utilitarian based characteristics had a weaker relationship with the intended influence of the attributes in the present study. Rule utilitarianism again depicted differences in respondent groups.

Finally, participants who demonstrated more rule utilitarian characteristics produced a significant and negative correlation with p-value, to thereby, drive the influence of the research model toward significance for influencing non-malicious IT misuse intention. However, respondents who expressed more act utilitarian traits produced a significant and positive correlation with p-value to drive influence of the research model toward being insignificant. These relationships between act/rule utilitarianism and p-value provide instrumental insight for understanding respondent groups and results of the research model. This understanding is most important since a research goal of the current study is to understanding how to strengthen employees as key members of Level-1 controls in the protection against cyber-attacks. Based on the consistent correlation results of rule utilitarianism and p-value across the other items, rule utilitarianism and p-value were selected as cluster objects.

Identification of Clusters

Hierarchical cluster analysis with the Ward’s method was used because it tends to produce same sized homogeneous clusters (Hair et al., 2009). In addition, hierarchical cluster analysis using Ward’s method is efficient and clear in presenting solutions for

Table 11

Correlations for Cluster Analysis

Item	Description	Act_Utilitarianism	Rule_Utilitarianism	RSq	p-value
Act_Utilitarianism	Pearson Correlation	1			
	Sig. (2-tailed)				
Rule_Utilitarianism	Pearson Correlation	-.331**	1		
	Sig. (2-tailed)	.001			
RSq	Pearson Correlation	-.176	.299**	1	
	Sig. (2-tailed)	.085	.003		
p-value	Pearson Correlation	.230*	-.296**	-.926**	1
	Sig. (2-tailed)	.024	.003	.000	

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

*. Correlation is significant at the 0.05 level (2-tailed).

grouping subjects (Hair et al., 2009). Squared Euclidean distance was used as the similarity measure. In addition, since differing R^2 values and rule utilitarian scale measures were being compared, values were standardized using Z scores (Hair et al., 2009). Based on the theoretical objectives, a single solution of two clusters was selected, and saved. Two clusters were to represent or compare responses indicating model significance and non-significance. An agglomeration schedule was also generated to confirm the two cluster selection (see Appendix F). An agglomeration schedule allows the assessment of the coefficient change resulting from moving from one number of clusters to a lower number (Hair et al., 2009). The change in coefficients represents the increase in heterogeneity within clusters and a large increase normally represents a stopping point (Hair et al., 2009). It is noted that an agglomeration schedule normally shows a large increase and stopping point at two clusters and is not as meaningful (Hair et al., 2009). From Appendix F, a four cluster solution also had a high proportionate increase at 52%. However, as previously expressed, a two cluster solution was used and aligns with the theoretical framework of this study.

Cluster Profiles

The two clusters were evaluated to identify distinguishing characteristics and confirm their grouping using ANOVA (Hair et al., 2009). The cluster ID for the two cluster solution was used as the independent factor, and rule utilitarianism and p-value were assigned as dependent items. From the descriptives, rule utilitarianism and p-value had distinct differences in mean values for the two clusters (see Table 12). For rule utilitarianism, Cluster-2 had a mean value 24% higher than Cluster-1; for p-value, the mean value was much lower and significant for Cluster-2 at .027. In addition, the variances between the two cluster groups were statistical different and supported the basis in rule utilitarian and p-value as cluster objects (see Table 13).

Cluster Based Analysis of Conjoint Analysis Results

The clusters were also used to assess characteristics of act utilitarianism, RMSE, and R^2 results (see Table 12). In the assessment, clusters retained significant statistical differences across all elements (see Table 13). Most notably, Cluster-2 revealed exceedingly strong support for all five hypothesized relationships, and identified a key relationship between rule and act utilitarianism. In Cluster-2, the rule utilitarianism mean was 96% above the lower act utilitarianism mean; in Cluster-1, the rule utilitarianism mean was only 28% stronger than its act utilitarianism mean, which value was larger than in Cluster-2. This connection aligned with the negative correlation of rule utilitarianism and act utilitarianism found in Table 11. In terms of evaluating the hypotheses, this relationship indicates that outside of the five attributes/independent variables, the act/rule utilitarian ethical position of the employee also plays a role in their non-malicious IT misuse intention. The selected clusters were very successful identifying key mean differences and characteristics of respondent groups.

Most importantly, with the lower measure for act utilitarianism, Cluster-2 produced a much higher 64% R^2 mean, versus the low 15% R^2 mean for Cluster-1. In addition, Cluster-2 represented a better fit with a 1.182 RMSE mean. The 1.182 RMSE generated a 13% variance based on the current study's 9-point dependent variable scale. The 13% is a strong percent for conjoint study fit and estimates (Mulye, 1998; Schlereth et al., 2011). However, the RMSE for Cluster-1 also calculated a reasonable fit at 16%. The RMSE fit for both Cluster-1 and Cluster-2 indicates that the model adequately captures the weaker effect for Cluster-1respondents and strong influence for Cluster-2 respondents. As a consequence, (a) with a model fit for Cluster-1 and Cluster -2, all hypotheses were supported under the full set of 97 respondents and, (b) the presence of stronger rule utilitarian characteristics contributed to Cluster-2's better, more significant influence over the dependent.

Table 12

Descriptives of Key Cluster Measures

						95% Confidence			
				Std.		Lower	Upper		
Item	Cluster	N	Mean	Deviation	Std. Error	Bound	Bound	Minimum	Maximum
Act_Utilitarianism	1	42	4.048	1.545	0.238	3.566	4.529	1.000	6.500
	2	55	3.282	1.747	0.236	2.809	3.754	1.000	7.000
	Total	97	3.613	1.698	0.172	3.271	3.956	1.000	7.000
Rule_Utilitarianism	1	42	5.190	0.987	0.152	4.883	5.498	2.500	7.000
	2	55	6.427	0.504	0.068	6.291	6.563	5.500	7.000
	Total	97	5.892	0.969	0.098	5.696	6.087	2.500	7.000
RSq	1	42	0.148	0.322	0.050	0.048	0.248	-0.395	0.755
	2	55	0.641	0.187	0.025	0.591	0.692	0.175	0.938
	Total	97	0.428	0.352	0.036	0.357	0.499	-0.395	0.938
p-value	1	42	0.369	0.298	0.046	0.276	0.462	0.001	0.975
	2	55	0.027	0.054	0.007	0.012	0.041	0.000	0.237
	Total	97	0.175	0.262	0.027	0.122	0.227	0.000	0.975
RMSE	1	42	1.442	0.550	0.085	1.271	1.614	0.465	2.918
	2	55	1.182	0.429	0.058	1.066	1.298	0.465	2.230
	Total	97	1.295	0.500	0.051	1.194	1.396	0.465	2.918

Table 13

Significance of Key Cluster Measures

Item	Description	Sum of Squares	df	Mean Square	F	Sig.
Act_Utilitarianism	Between Groups	13.966	1	13.966	5.049	0.027
	Within Groups	262.787	95	2.766		
	Total	276.753	96			
Rule_Utilitarianism	Between Groups	36.428	1	36.428	64.462	0.000
	Within Groups	53.685	95	0.565		
	Total	90.113	96			
RSq	Between Groups	5.793	1	5.793	89.696	0.000
	Within Groups	6.135	95	0.065		
	Total	11.928	96			
p-value	Between Groups	2.789	1	2.789	69.829	0.000
	Within Groups	3.794	95	0.040		
	Total	6.583	96			
RMSE	Between Groups	1.610	1	1.610	6.843	0.010
	Within Groups	22.354	95	0.235		
	Total	23.965	96			

The last analysis assessed Cluster-1 and Cluster-2 characteristics across the intercept and part-worths of the five attributes hypothesized to reduce non-malicious IT misuse intention (see Table 14). Several important points were revealed. First, all items, except stress and the intercept, had significant statistical mean differences between the two clusters. For the part-worths with significant mean differences (see Table 15), the variances between Cluster-1 and Cluster-2 were sizeable. The average mean of the Cluster-2 part-worths/coefficients was 224% higher than those for Cluster-1. These differences were considered very meaningful. Since there was no statistical variance in the intercept starting points for Cluster-1 and Cluster-2, the impact of the differences is that Cluster-2 will generate more change based on the high/low influence of the attributes, in order to drive non-malicious IT intention up or down. The power of Cluster-2 is that with its higher presence of rule utilitarian characteristics, it will respond more robustly to hypothesized favorable attributes/variables and reduce non-malicious IT misuse intention. Whereas, Cluster-1, with more act utilitarian characteristics, will work

Table 14

Descriptives of Cluster-1 and Cluster-2 Part-worths

						95% Confidence			
Item	Cluster	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
Intercept	1	42	4.770	1.277	0.197	4.372	5.168	1.875	7.750
	2	55	4.997	0.830	0.112	4.772	5.221	2.188	7.438
	Total	97	4.899	1.047	0.106	4.687	5.110	1.875	7.750
Management_High	1	42	-0.281	0.618	0.095	-0.473	-0.088	-2.031	1.042
	2	55	-0.825	0.799	0.108	-1.041	-0.609	-2.250	1.188
	Total	97	-0.589	0.772	0.078	-0.745	-0.434	-2.250	1.188
Policies_High	1	42	-0.215	0.564	0.087	-0.391	-0.039	-1.552	1.073
	2	55	-0.680	0.982	0.132	-0.946	-0.414	-3.542	3.615
	Total	97	-0.479	0.856	0.087	-0.651	-0.306	-3.542	3.615
IT_High	1	42	-0.147	0.559	0.086	-0.321	0.028	-1.563	1.948
	2	55	-0.464	0.510	0.069	-0.602	-0.326	-1.521	0.740
	Total	97	-0.327	0.552	0.056	-0.438	-0.215	-1.563	1.948
Stress_Low	1	42	-0.245	0.407	0.063	-0.372	-0.118	-1.250	0.583
	2	55	-0.269	0.616	0.083	-0.435	-0.102	-1.646	0.792
	Total	97	-0.258	0.533	0.054	-0.366	-0.151	-1.646	0.792
Training_High	1	42	-0.152	0.502	0.078	-0.308	0.005	-1.125	0.917
	2	55	-0.561	0.665	0.090	-0.740	-0.381	-1.708	1.292
	Total	97	-0.384	0.631	0.064	-0.511	-0.256	-1.708	1.292

Table 15

Significance of Cluster-1 and Cluster-2 Part-worths

Item	Description	Sum of Squares	df	Mean Square	F	Sig.
Intercept	Between Groups	1.229	1	1.229	1.122	0.292
	Within Groups	104.106	95	1.096		
	Total	105.335	96			
Management_High	Between Groups	7.070	1	7.070	13.404	0.000
	Within Groups	50.111	95	0.527		
	Total	57.181	96			
Policies_High	Between Groups	5.147	1	5.147	7.502	0.007
	Within Groups	65.171	95	0.686		
	Total	70.317	96			
IT_High	Between Groups	2.399	1	2.399	8.495	0.004
	Within Groups	26.835	95	0.282		
	Total	29.234	96			
Stress_Low	Between Groups	0.013	1	0.013	0.047	0.829
	Within Groups	27.257	95	0.287		
	Total	27.271	96			
Training_High	Between Groups	3.981	1	3.981	11.058	0.001
	Within Groups	34.196	95	0.360		
	Total	38.176	96			

to mitigate the influence of the hypothesized attributes/ variables in order to complete targeted tasks/acts even with the intention of committing more non-malicious IT misuse to do so.

Next, as previously noted, the influence of stress was statistically the same for Cluster-1 and Cluster-2. There was non-significance in the differences measured at .829 (see Table 15). Moreover, a visual inspection of Table 14 clearly displayed similarity in the stress part-worth coefficients. In metric conjoint analysis, this indicated that as subjects evaluated profiles, the levels for organizational stress were statistical provided the same power of influence by Cluster-1 and Cluster-2 respondents. In a like manner, stress negatively affects Cluster-1 respondents when they are set on accomplishing tasks/acts, and negatively affects Cluster-2 subjects when they are committed to completing work tasks in accordance with policies and procedures.

Finally, from Table 16 there was no statistical difference in the importances assigned to attributes by Cluster-1 and Cluster-2 respondents. This indicated that overall attribute importances from Table10 can be applied to both cluster groups. Most importantly, it explains that Cluster-1 does recognize the importance of the attributes, but still works to reduce the impact or effectiveness of the attributes, based on its low part-worth coefficients The two most important attributes influencing employee non-malicious IT misuse intention were management compliance modeling at 23.9%, followed by policies and procedures effectiveness at 23.0%. These two top ranked attributes align with the focus of the new theoretical framework in the current research, which is based on management and organizational driven factors. Out of the five tested attributes, IT applications effectiveness had the lowest importance, even though it was

Table 16

Significance of Cluster-1 and Cluster-2 Attribute Importances

Item	Description	Sum of Squares	df	Mean Square	F	Sig.
Mgt_Importance	Between Groups	574.710	1	574.710	2.480	0.119
	Within Groups	22016.310	95	231.751		
	Total	22591.020	96			
Policy_Importance	Between Groups	80.325	1	80.325	0.444	0.507
	Within Groups	17188.126	95	180.928		
	Total	17268.451	96			
IT_Importance	Between Groups	346.363	1	346.363	2.489	0.118
	Within Groups	13220.539	95	139.164		
	Total	13566.903	96			
Stress_Importance	Between Groups	154.514	1	154.514	0.571	0.452
	Within Groups	25716.952	95	270.705		
	Total	25871.466	96			
Training_Importance	Between Groups	3.590	1	3.590	0.031	0.860
	Within Groups	10922.474	95	114.973		
	Total	10926.064	96			

still sizable at 17.0%. This lower ranking could indicate that respondents view IT applications more as a given in a technologically changing environment. For example, management or the organization could be considered as having less control over industry developed IT applications/ functionality.

Cluster and ANOVA analysis were effective in identifying characteristics to better examine and interpret the metric conjoint analysis results in this study. A basis was established to place reliance on the differences in the part-worth utilities, attribute importances, R^2 results, and significance results. The metric conjoint analysis results demonstrated robustness for utilizing overall scores to assess the research model. Therefore, results from Table 9 were relied upon for summarizing the hypothesized results in Table 17 below.

Table 17

Summary Results of Hypothesized Relationships

Hypothesis	Result
H1: As management's modeling of compliance behavior increases, employees decrease non-malicious IT misuse intention.	Supported
H2: As the effectiveness of policies and procedures increases, employees decrease non-malicious IT misuse intention.	Supported
H3: As the usability of IT applications increases, employees decrease non-malicious IT misuse intention.	Supported
H4: As training awareness increases, employees decrease non-malicious IT misuse intention.	Supported
H5: As perception of job demand stress decreases, employees decrease non-malicious IT misuse intention.	Supported

It was concluded that the conjoint profile designs properly measured the first four negative correlated hypotheses and the fifth positive correlated hypothesis.

CHAPTER 5

DISCUSSION AND CONCLUSION

The current research sought answers to what management and organizational factors reduce employee non-malicious IT misuse intention while performing their job duties. This study considered employees to be instrumental resources for safeguarding IT resources and data since they are part of Level-1 controls. The importance of Level-1is derived from its initial security activities that tend to be self-compliance types, where employees are expected to comply with IT policies and procedures. Improving employee Level-1 behavior intentions should reduce threats reaching more costly Level-2 systematic, programmed, and non-elective type controls. Consequently, this research was undertaken in light of the often noted occurrences of employee non-malicious IT misuse, in a corporate climate of widespread IT adoption (Ayyagari et al., 2011; Greitzer et al., 2014; Siponen et al., 2014).

To understand this phenomenon of employee behavior, many successful studies utilized punishment/reward and deterrence based theories that focused on individual level antecedents (Bulgurcu et al., 2010; Yan Chen et al., 2012; D’Arcy & Devaraj, 2012). The present study did recognize that malicious IT misuse should be deterred, punished, and corrected. However, other studies demonstrated that unlike malicious IT misuse, employee non-malicious IT misuse tended to be driven by more internal factors with performance also being relevant (Guo et al., 2011; Siponen & Vance, 2010). The current research confirmed this understanding of employee non-malicious IT misuse intentions.

The present study was not focused on the influence of senior level executives, but it did theorize and find that a most important influence was how supervisor and middle level managers demonstrated and exhibited compliance with IT policy and procedures. Furthermore, all the management and organizational level constructs were found to have a high level of importance and significance in the influence of employee non-malicious IT misuse intention.

The current research holds that unlike many other studies, this study focused on the sub-set of employees only, versus the broader population of total insiders (Steele & Wargo, 2007). This narrower focus allowed a more valid and reliable assessment of management and organizational influences on employee non-malicious IT misuse intention. Based on the study's experimental type metric conjoint analysis design, the present study put forth the underlying act/rule utilitarian characteristic of an employee as being very significant for non-malicious IT misuse intention.

Many past and even recent studies have reported ongoing non-malicious violations of organizational IT policies and procedures by employees (D'Arcy & Devaraj, 2012; D'Arcy et al., 2014; Siponen et al., 2014; Willison & Warkentin, 2013). Although results of the current study demonstrated the significant influence of management and organizational factors, the present research suggests that a possible underlying source of the ongoing violations found in other studies could be the unaddressed act utilitarian ethical positions of employees. Employees with rule utilitarian characteristics; however, reflected significantly lower non-malicious IT misuse intention. This study demonstrated that even in the face of solid IT policies/procedures and other influential factors, employees who reflect act utilitarian characteristics will demonstrate an intention for non-malicious IT misuse. Using an overall communication and influence style, in the face of wanting tasks accomplished, management must establish the criteria and boundary for completing tasks in accordance with established IT policies and procedures. Otherwise, as developed in the theoretical framework, employees with act utilitarian characteristics will tend to supplant IT policy and procedures to meet task directives of management.

Also, it was not surprising to find that organizational stress influenced employee non-malicious IT misuse intention. However, it was revealing to find that out of the five management and organizational factors in the study, organizational stress was the only factor to similarly influence the non-malicious IT misuse intention of employees with either utilitarian characteristic type. This finding highlights the pervasive impact of organizational stress and the need to address it.

Contributions

The current research successfully blended IT and psychological concepts to gain a better understanding of employee non-malicious IT compliance behavior intention. In an age when employee non-malicious IT compliance behavior too often creates opportunities for cyber-attacks and data breaches, this study provided more insight into how these might emerge in an organization. In addition to punishment/reward and deterrence approaches, theoretical modeling from this study should also be applied. The new theoretical framework would be very suitable since it robustly captured and explained employee non-malicious IT intention. In effect, the new theoretical framework in the present study was developed to identify key interdisciplinary influences on the compliance behavior of employees to reduce non-malicious IT misuse intention.

Corporations benefit from this research by gaining insights into how organizational factors and employee ethical positions may affect employee non-malicious IT compliance intention. Corporations will find compliance with IT policies and procedures encompasses factors beyond traditional solutions based solely on meaningful rules, traditional training, and deterrence. For example, training for managers and supervisors should not be so summarized, that it misses the significant compliance role that managers and supervisors play at the transaction level.

In the related area of cyber security, corporations can realize value by improving factors that affect employees' non-malicious IT misuse intention, and thereby, improve overall Level-1 compliance type controls. Strengthening employee Level-1 compliance type controls reduces potential IT threats, and consequently frees more Level-2 resources for harder to defend cyber threats. Thus, this study restates the strategic approach for utilizing employees as key Level-1 resources, in order to support Level-2 controls in defending against data breaches and cyber-attacks.

Limitations and Future Research Opportunities

This metric conjoint analysis study incorporates similar limitations found in experiment like studies based on hypotheticals, such as employees based decisions on hypotheticals in which they might or might not have experience (Lohrke et al., 2010). In a related limitation, respondents were assessed for likely intentions, not past behavior that they had actually committed. To counteract these limitations, profile designs were based on information from prior representative empirical studies (Bulgurcu et al., 2010; Guo et al., 2011; Hu et al., 2012). Another limitation was also created by the cross-sectional nature of this study (Wood & Williams, 2014). IT experience of employees change over time. However, this factor was mitigated by using a three-year minimum experience requirement in the survey screening questions. Finally, a third limitation existed because not all variables that a respondent might consider could be included. This type of limitation was addressed by designing a conjoint study grounded in theory and empirical studies, along with extensive pre-testing and piloting.

In this study, supervisors and middle managers were included in the sample. A full study could be conducted to assess effects on supervisors and middle managers, apart from effects on non-management employees. The current type of study also lends itself to collection of longitudinal data to assess effects of changes in organizations and employee evaluations. Lastly, findings from this study can be adapted to quantitative path analysis studies and qualitative studies in researching employee compliance behavior. Moreover, path analysis could also assess the effects of moderators and mediators.

Concluding Remarks

With the frequently announced occurrences of cyber-attacks and data breaches against corporations, the findings and recommendations in this study are intended to contribute to better understanding of employee non-malicious IT compliance intention. It is recognized that related employee non-malicious IT behavior contributes to the opportunities for breaches of IT security. Improving management and organizational factors that influence employee IT compliance intention should in turn provide a tangible benefit for countering cyber-attacks and data breaches against organizations.

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APPENDICES

Appendix A. Metric Conjoint Survey Profile

The purpose of this study is to understand how management and organizational factors influence employees to reduce non-malicious IT misuse intentions while performing their job. Non-malicious IT misuse intention is when an employee would not mean any harm to the company by their IT misuse to perform job duties.

This survey refers to a U.S. corporate setting where the company is publicly traded, regulated by the Securities and Exchange Commission (SEC). The company would also maintain standard systematic controls such as adequate backups, system-mandated change of passwords every 90 days, and formal setup and tracking of user-names.

INSTRUCTIONS: The profiles below refer to descriptions of a company where five of its management and organizational factors are categorized as HIGH or LOW. You are asked to view and apply these factors to employees who use IT in their normal job duties. Based on your view of the combined impact of the five factors, please answer the question following each profile.

DEFINITION OF FIVE MANAGEMENT & ORGANIZATIONAL ATTRIBUTES:

Management compliance:

High- Management consistently follows policies/procedures and sets a good example.

Low- Management does not consistently follow policies/procedures and sets a weak example.

Perceived job stress:

High - Employee feels job responsibilities contain significant/high levels of stress.

Low – Employee feels job responsibilities contain little stress.

Policies and procedures effectiveness:

High- IT policies and procedures are clear, useful, and easy to follow.

Low - IT policies and procedures are confusing, burdensome, and difficult to follow.

IT/IS applications effectiveness:

High - IT applications are fast, easy to execute, and provide helpful information.

Low - IT applications are slow, difficult to use, and provide limited information.

Training awareness:

High- IT training is available and useful.

Low - IT training is limited and not very useful.

PROFILE DESCRIPTIONS OF COMPANY:

Management and organizational attributes are described as follows:

Management compliance - management consistently follows policies/procedures and sets a good example.	High
Perceived job stress – employee feels job responsibilities contain little stress.	Low
Policies and procedures effectiveness - IT policies and procedures are confusing, burdensome, and difficult to follow.	Low
IT applications effectiveness - IT applications are fast, easy to execute, and provide helpful information.	High
Training awareness - IT training is limited and not very useful.	Low

Based on the attributes described above, how likely is an employee to:

Violate policies and procedures when using IT to perform job duties?

Very unlikely	1	2	3	4	5	6	7	8	9	Very likely

Appendix B. Calculation of Hit Rate Example

Profiles	Actual Rating	Estimated Rating	Actual Rating / 9	Estimated Rating / 9	Absolute Difference
Validation 1	8	6	.89	.67	.22
Validation 2	6	5	.67	.56	.11
Validation 3	4	4	.44	.44	.000
Validation 4	5	6	.56	.67	.11

1.00 - Mean Absolute Difference

= .89 Hit Rate

Appendix C. Act and Rule Survey Utilitarian Scale

When employees face IT policies and procedures, how much importance should they place on the below considerations:

	Very Low 1	2	3	4	5	6	Very High 7
1. (Act) By their actions, create the greatest overall benefit for their department. (Casali, 2011)	❍	❍	❍	❍	❍	❍	❍
2. (Rule) Do not cause problems for other employees. (Casali, 2011)	❍	❍	❍	❍	❍	❍	❍
3. (Act) Actions are okay as long as the consequences affect the majority of stakeholders in a positive way. (Fan et al., 2001)	❍	❍	❍	❍	❍	❍	❍
4. (Rule) Respect organizational IT policies and procedures. (Casali, 2011)	❍	❍	❍	❍	❍	❍	❍
5. (Act) By their actions, create the greatest overall benefit for the organization. (Casali, 2011)	❍	❍	❍	❍	❍	❍	❍
6. (Rule) Guide actions by a set of principles accepted as right within the organization and stand by those principles regardless of the consequences. (Perry & Nixon, 2005)	❍	❍	❍	❍	❍	❍	❍
7. (Act) Sacrifices of IT policies and procedures are sometimes needed to ensure the greatest benefit for the most number of stakeholders. (Fan et al., 2001)	❍	❍	❍	❍	❍	❍	❍

Appendix D. Respondent Profile

Category	Frequency (n = 97)	Percent	Cumulative Percent
Sex			
Male	46	47.4%	-
Female	51	52.6%	-
Ages			
Less than 24	5	5.2%	5.2%
25 - 34	39	40.2%	45.4%
35 - 44	30	30.9%	76.3%
45 - 54	17	17.5%	93.8%
55 and over	6	6.2%	100.0%
Education Level			
High school degree	23	23.7%	23.7%
Community college degree	13	13.4%	37.1%
Undergraduate degree	34	35.1%	72.2%
Masters level degree	15	15.5%	87.6%
Doctorate level degree	3	3.1%	90.7%
Other	7	7.2%	97.9%
Prefer not to respond	2	2.1%	100.0%
Industry Classification			
Construction - Building, General, Heavy	1	1.0%	1.0%
Manufacturing	10	10.3%	11.3%
Regulated - Transportation, Communications, Electric, Gas, Sanitation	8	8.2%	19.6%
Wholesale Trade (including wholesale IT)	3	3.1%	22.7%
Retail Trade - Materials, Merchandise, Food, Automotive, Gasoline, Retail IT, Miscellaneous	25	25.8%	48.5%
Finance, Insurance, Real Estate	14	14.4%	62.9%
Health Care	10	10.3%	73.2%
Hospitality and Travel	4	4.1%	77.3%
Other	20	20.6%	97.9%
Prefer not to respond	2	2.1%	100.0%
Company size, number employees			
Less than 499	11	11.3%	11.3%
500 - 999	11	11.3%	22.7%
1,000 - 2,499	12	12.4%	35.1%
2,500 - 9,999	26	26.8%	61.9%
More than 9,999	34	35.1%	96.9%
Prefer not to respond	3	3.1%	100.0%
Years working with current company			
Less than 5	23	23.7%	23.7%
5 - 9	37	38.1%	61.9%
10 - 19	28	28.9%	90.7%
20 - 29	5	5.2%	95.9%
30 - 39	4	4.1%	100.0%

(continued on next page)

Appendix D. Respondent Profile (continued)

Category	Frequency (n = 97)	Percent	Cumulative Percent
Department/area of work			
Accounting and Finance	8	8.2%	8.2%
Sales and Marketing	15	15.5%	23.7%
Technology	17	17.5%	41.2%
Benefits and Human Resources	6	6.2%	47.4%
Engineering	10	10.3%	57.7%
Production	12	12.4%	70.1%
Other	28	28.9%	99.0%
Prefer not to respond	1	1.0%	100.0%
Years working in current position			
Less than 5	35	36.1%	36.1%
5 - 9	37	38.1%	74.2%
10 - 19	18	18.6%	92.8%
20 - 29	6	6.2%	99.0%
30 - 39	1	1.0%	100.0%
Level of IT use per day			
1 - Very low, < 2hrs	2	2.1%	2.1%
2	3	3.1%	5.2%
3	4	4.1%	9.3%
4	8	8.2%	17.5%
5	15	15.5%	33.0%
6	23	23.7%	56.7%
7 - Very high, > 6 hrs	42	43.3%	100.0%
Have managed people			
Yes	75	77.3%	77.3%
No	21	21.6%	99.0%
Prefer not to respond	1	1.0%	100.0%
Number of people managed			
Less than 10	31	32.0%	32.0%
10 - 20	24	24.7%	56.7%
21 - 30	9	9.3%	66.0%
31 - 40	4	4.1%	70.1%
More than 40	7	7.2%	77.3%
Have not managed people	21	21.6%	99.0%
Prefer not to respond	1	1.0%	100.0%
Level of management			
Middle Manager	28	28.9%	28.9%
First Line Supervisor	44	45.4%	74.2%
Have not managed people	21	21.6%	95.9%
Prefer not to respond	4	4.1%	100.0%

Appendix E. Confirmatory Factor Analysis Tables

Table E1. Standardized Residual Covariances

	Q7_4	Q7_6	Q7_3	Q7_7
Q7_4	.000			
Q7_6	.000	.000		
Q7_3	-.314	.766	.000	
Q7_7	.144	-.354	.000	.000

Table E2. CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	9	4.112	1	.043	4.112
Saturated model	10	.000	0		
Independence model	4	99.996	6	.000	16.666

Table E3. Goodness-of-Fit Index (GFI)

Model	RMR	GFI	AGFI	PGFI
Default model	.065	.979	.795	.098
Saturated model	.000	1.000		
Independence model	.848	.682	.470	.409

Table E4. Comparative Fit Index

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.959	.753	.969	.801	.967
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

(continued on next page)

Appendix E. Confirmatory Factor Analysis Tables (continued)

Table E5. Convergent Validity

	Factor Loadings			
Items	Act Utilitarianism	Rule Utilitarianism	Item Reliabilities	Error
Q7_7	0.899		0.808	0.192
Q7_3	0.796		0.634	0.366
Q7_6		0.500	0.250	0.750
Q7_4		0.734	0.539	0.461
Average Variance Extracted	72.09%	39.44%		
Construct Reliability	0.837	0.557		

Table E6. Discriminant Validity

Unobserved Variable	Average Variance Extracted	Squared Interconstruct Correlation
Act Utilitarianism	0.721	0.249
Rule Utilitarianism	0.394	0.249

Appendix F. Extract of Agglomeration Schedule

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage	Proportionate Increase in Heterogeneity to Next Stage	Increase in Coefficient to Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2			
1	48	97	0.000	0	0	13	0.0%	0.000
2	33	96	0.000	0	0	14	0.0%	0.000
|	|	|	|	|	|	|	|	|
|	|	|	|	|	|	|	|	|
91	2	16	27.702	86	80	94	40.0%	11.071
92	3	8	38.773	88	83	96	29.0%	11.244
93	1	6	50.017	82	90	95	52.0%	26.011
94	2	12	76.028	91	89	95	48.0%	36.494
95	1	2	112.522	93	94	96	70.6%	79.478
96	1	3	192.000	95	92	0		