Quality and Quantity of Motivation in Functional and Dysfunctional Knowledge Sharing*

By

Cam Cockrell
University of Kentucky

Committee Members:
Dr. Dan Stone (Chair)
Dr. Bob Ramsay
Dr. Clyde Holsapple
Dr. Melody Carswell

6/20/07

*This paper reports the results from the first of two studies from my dissertation.

I appreciate the financial support of this project by the Institute of Management Accountants, and the University of Kentucky. I also appreciate the useful feedback received from workshops and presentations at the University of Kentucky, the Knowledge Management Doctoral Consortium at Queen's University, and the Third International Self-Determination Theory Conference at the University of Toronto.

ABSTRACT

This dissertation explores the motivational effects of incentives and knowledge culture on accountants' and other professionals' knowledge sharing behavior within professional services firms (PSF). Two theories yield economic and psychology-based predictions regarding the effects of quantity and quality of motivation on useful, useless, and harmful knowledge sharing behavior. I conduct a web-based survey with university student interns (n = 160). Results indicate that monetary incentives do increase the strength of motivation to share professional knowledge, which in turn increases useful knowledge sharing, but at the cost of also increasing harmful knowledge sharing. Increasing organizational support for self-determination increases the quality of motivation to share knowledge, which also increases useful knowledge sharing, but without the harmful side-effect, in fact significantly decreasing harmful knowledge sharing behavior. Theoretical contributions of this dissertation include synthesizing the economic view of incentives with the psychology-based view of self-regulation to form a more complete model of knowledge sharing behavior. Pragmatic contributions of this dissertation include exploring the antecedents of functional and dysfunctional knowledge sharing in both accounting and non-accounting PSF.

INTRODUCTION

Advocates portray knowledge sharing as a source of competitive advantage, corporate identity, and functional knowledge (Bennet and Bennet 2003; Liebowitz and Chen 2002). Professional service firms (PSF) often proclaim its value to firm self-management and in delivering superior "best practice" client service. But ethical and legal restrictions limit professional service firm knowledge sharing. For example, sharing client-specific information, trade secrets, firm strategies, and other "forbidden" knowledge can violate professional codes of conduct (e.g., AICPA, IMA), firm policy, and societal expectations.

I conduct a web-based survey to explore the nature, quantity, and antecedents of interns' useful, useless, and "forbidden" knowledge sharing motivations and behaviors in PSF. Two theories offer predictions with different foci regarding the effects of the strength and type of motivation on knowledge sharing. Generalizing from self-determination theory (SDT), I expect that higher intrinsic and autonomous extrinsic motivation (AEM) (i.e., external motivators that have been internally regulated) should increase useful and possibly useless, but not "forbidden" knowledge sharing. Controlled extrinsic motivation (CEM) (i.e., external motivators that have not been internally regulated) to share knowledge should reduce (i.e., "crowd out") intrinsic motivation, reducing useful knowledge. In contrast, a strict interpretation of economic-based theories predicts that financial incentives should increase only rewarded knowledge sharing. The predictions made by SDT and economic-based theories are based in differing assumptions regarding the environmental factors and mediating variables that best predict knowledge sharing behaviors. These environmental factors and mediating variables are the principle focus of this study.

This dissertation makes several contributions to the accounting and information technology literatures. One contribution is its exploration of the possibility of the "dark side" of knowledge sharing in PSF. Furthermore, this study explores the joint effects of incentives and knowledge culture (e.g., technologies, norms of sharing, knowledge management initiatives) on the nature of organizational knowledge sharing. This dissertation also proposes the type of motivation as an alternative mediating variable to the traditional behavioral and economic variable of effort in explaining the effects of incentives on behavior (Bonner and Sprinkle 2002).

MOTIVATION AND BACKGROUND

Accountants contribute to the creation and measurement of incentive-based compensation plans. Employees perceive a stronger causal link between their actions and internally generated accounting data than they do between their actions and market data (Indjejikian 1999). Accordingly, accountants play an important role constructing employee compensation plans. Bonner and Sprinkle (2002) point out the importance of conducting accounting research on incentives:

> (Accounting) research directed toward understanding how properties of incentive schemes affect effort and performance can help uncover the characteristics of incentive schemes that best align the employees' interests with those of the organization and, therefore, can help determine the most effective compensation arrangements (331).

Despite the value of studying the relationship between effort and performance, using accounting measures to reward performance can lead employees to take a short-term perspective and "game" the system, as these measures are based on past performance (Indjejikian 1999). Recent accounting scandals (e.g. Enron, Tyco, and HealthSouth) can be explained, at least partially, as the consequences of ill-conceived incentive systems. One way to address such problems may be

to reward certain behaviors, such as knowledge sharing, that lead to future accounting profitability.

Knowledge sharing captures knowledge that might otherwise be lost (Bennet and Bennet 2003). Firms that share knowledge more effectively should maintain higher profitability relative to firms who lose this knowledge. Additionally, firms that more effectively manage knowledge gain an advantage relative to firms that do not by securing mature knowledge, and integrating new knowledge from incoming employees. Over time, intensive knowledge-sharing firms should have higher profitability and return on assets. Sprinkle (2003) underscores the importance of accounting research to investigate how accounting actions:

> (1) affect employees' propensity to help co-workers; (2) lead employees to voluntarily enhance their knowledge, skills, and abilities; (3) affect conscientious work habits; (4) promote adherence to rules and regulations; (5) enhance loyalty to the organization; and (6) affect employees' propensity to change, innovate, and learn (299).

Several of the above categories listed are knowledge management activities. Examining how incentives affect knowledge sharing is an important focus of this dissertation.

Evidence suggests that PSF face problems in enticing professionals to share their knowledge within the firm. For example, KPMG realized a need to shift away from rewarding individual performance to a culture of knowledge sharing in order to persuade their professionals to consistently and willingly share their knowledge and insights within the firm (Alavi 1997). However, despite the increasingly favorable view by PSF on knowledge management and its potential to improve business functions such as audit and tax, accounting firms tend to begin their initiatives with the consulting function. The degree to which these types of initiatives have carried over to non-consulting branches of PSF since that time is unclear, particularly in light of the consulting spin-offs from audit firms in the wake of Sarbanes-Oxley. Additionally, many

competitive workers still act in accordance with the bureaucratic view of Max Weber – that one gains power by hoarding and keeping their knowledge and intentions secret (Bennet and Bennet 2003).

Although the modes of knowledge sharing may span from asynchronous formal published documents to real-time person-to-person conversation, the lack of formal knowledge management systems in many PSF precludes a dominant focus herein on formal knowledge management and sharing systems. As a result, I focus primarily on *informal and interactive* (i.e., tacit) knowledge sharing within PSF. Furthermore, I restrict my focus to the effects of incentives and knowledge culture on the motivation of individuals to share their professional knowledge. This perspective directs the scope of the research away from examining organizational communication issues such as the direction of information flow, the mode of communicating shared knowledge, and toward the settings in which knowledge sharing are more likely to occur. Such a perspective is in line with the view of Vera-Munoz, Ho, and Chow who, in their study of knowledge sharing in public accounting firms, state that "an organizational culture that rewards knowledge hoarding as a source of power or job security creates an obstacle to knowledge sharing" (2006, 145), continuing with an example of how auditors may be more likely to share knowledge informally via face-to-face discussion rather than through formal channels.

Firms who seek to build a knowledge sharing culture often face difficulty. Corporate culture and incentives may both influence the success of knowledge management initiatives. Employees whose ideas have not been valued in the past are unlikely to quickly share their knowledge without motivation (Holton 1998). Broadly stated, the degree to which employees share knowledge with others depends on reward systems, evaluation systems, organizational leadership, culture, and purpose (Holsapple and Joshi 2002).

Not all knowledge sharing contributes to organizational goals. I posit three types of knowledge sharing: useful, useless, and harmful (see Table 1 for examples). Many stakeholders (e.g. outside organizations, investors, creditors, etc…) could be considered with respect to this taxonomy. However, I focus only on the sharer's actions and their effects on the sharer's organization. For example, knowledge might be shared that benefits the sharer, and some outside organization, but places the sharer's organization at a competitive disadvantage would be unambiguously classified as harmful knowledge sharing, since it harms the sharer's organization.

Useful knowledge sharing directly contributes to the sharer's organization's goals. Examples of useful knowledge sharing include providing direct help so that others may achieve organizational objectives, contributing knowledge to a repository that helps others achieve organizational objectives, and sharing knowledge that helps management make better organizational decisions (See Table 1).

Useless knowledge sharing neither directly contributes to, nor directly detracts from the organization's goals (c.f. Garud and Kumaraswamy 2005). This type of sharing exists when employees share knowledge with their co-workers that does not help to directly achieve any organizational objective. This may be done knowingly, for example when the employee attempts to mask the knowledge as useful to gain reward or favor with the company or their coworkers. It may also occur unknowingly, when employees over-estimate the value of their useless contributions (see Table 1). In these cases, the sharing of useless knowledge might seem benign. But excessive contributions can create knowledge overload (Garud and Kumaraswamy 2005). This may cause violations in trust between employees as they are forced to go through meaningless conversation to find helpful knowledge, thus increasing search time. Useless knowledge sharing can increase search time. Alternatively, sharing useless knowledge may help

create an uninhibited organizational culture, in which employees feel free to interact with each other and openly share their useful ideas as well.

Finally, harmful knowledge sharing directly detracts from achieving their organization's goals. Examples of harmful knowledge sharing include leaking information that weakens the sharer's organization, engaging in information piracy, and sharing confidential information. A court case, *Wagenheim v. Alexander Grant & Co.* (AG) (Wagenheim v. Alexander Grant & Company 1983) illustrates an example of harmful knowledge sharing. While auditing Consolidata Data Services (CDS), AG found that CDS was in financial difficulty. The court ruled that AG breached their duty of client confidentiality by warning other clients against conducting business with CDS. Regardless of intent, AG shared confidential client information that may have benefited their other clients (and perhaps even AG) but harmed CDS. Table 1 provides additional examples of harmful knowledge sharing.

NEO-CLASSICAL ECONOMIC THEORY AND HYPOTHESIS DEVELOPMENT

In their literature review on the effect of monetary incentives on effort and performance, Bonner and Sprinkle (2002) identify four general theories that posit incentive effects.[1] Of these, agency theory lends itself to an analysis of the impact of incentives on outcomes in the context of knowledge sharing. This subsection overviews agency theory, discusses how knowledge sharing fits within an agency context, and develops hypotheses based on neo-classical economic theory.

In a typical agency model, a principal engages an agent to perform a task for the principal. Agents are assumed to be rational utility maximizers motivated by self-interest, where wages and leisure (i.e. nonpecuniary income) are considered sources of utility, and effort a

[1] The four theories identified by Bonner and Sprinkle are expectancy theory, agency theory, goal-setting theory, and social cognitive theory.

source of disutility (Alchian and Demsetz 1972; Jensen and Meckling 1976). Optimally, agents operate at the level where their marginal rate of substitution between leisure and effort equals their marginal rate of substitution for consumption (Alchian and Demsetz 1972). However, to the extent that effort is unobservable, or too costly for principals to monitor, agents will shirk or consume more perquisites than the principal would like (or has contracted for). Therefore, the principal may attempt to minimize shirking by providing monetary incentives for the agent to perform the task at a desired level of production.

Within an agency theory framework, monetary incentives clearly effect an agent's utility (through effort) for performing a particular task. Although this theory does not address the cognitive effects of changes in motivation and changes in effort (Bonner and Sprinkle 2002), it does imply that the strength of motivation caused by monetary incentives should covary with expended effort. Bonner and Sprinkle (2002, 308) describe this relationship by stating that:

> "Monetary incentives increase an individual's desire to increase performance and concomitant pay. In turn, this desire motivates individuals to exert costly effort because increases in effort are presumed to directly lead to increases in expected performance."

Based on this assessment, strength of motivation may proxy for effort in modeling the relationship between monetary incentives and performance. To the extent that firms use financial incentives to reward employees who share their professional knowledge, employees should be motivated to do so.

> **H1:** Monetary incentives increase the strength of motivation for employees to share their professional knowledge.

Although agency theory does not explain how strength of motivation would affect outcomes, it does suggest that increasing effort will increase the likelihood of achieving desired outcomes. If strength of motivation proxies for effort, then as the strength of motivation

increases, so too should sharing useful knowledge. In addition to the increase in useful knowledge sharing, the strength of motivation to share knowledge may also affect other knowledge sharing behaviors. As one's motivation to share knowledge increases, one may become more likely to share non-specialized (i.e. common knowledge), or useless knowledge as well.

If the principal seeks to spur the agent to perform a task, the incentive should directly link to task performance, yet not lead to undesirable behaviors on the part of the agent. However, in practice the strength of motivation to engage in an intended behavior triggered by an incentive often leads to unforeseen actions as well. For example, Baker, Jensen, and Murphy (1988) argue that incentives work too well. Specifically, they state that incentives usually "generate unintended and sometimes counterproductive results because it is difficult to adequately specify exactly what people should do and therefore how their performance should be measured" (597).

An incentive designed to increase useful knowledge sharing contributions may also have an effect of increasing undesirable knowledge sharing behaviors. Baker et al. (1988) observes that employees will generally game the system by acting to optimize their payout based on contractual rather than intended measures. In the case of sharing knowledge, PSF employers seek to engage employees to share their knowledge with the firm. If PSF provide incentives for employees to share useful knowledge, then employees should be motivated more strongly, and ultimately share more useful knowledge than in the absence of incentives. However, assume it is possible for agents to "mask" useless knowledge to the firm as useful knowledge. If it is costly for the firm to distinguish useless from useful knowledge sharing, then agents will act opportunistically, by making and masking useless knowledge sharing contributions as useful. This deception strategy benefits the agent, since they achieve the same wage under either

deceptive or honest knowledge sharing, but they provide less effort when sharing useless knowledge, and thus achieve higher utility. Some evidence exists that useless knowledge sharing occurs in practice. For example, Garud and Kumaraswamy (2005) document a large number of useless knowledge sharing contributions made to a repository resulting from incentives.

Although a monetary incentive may intend to encourage useful knowledge sharing, there are economically rational reasons, as presented through this discussion, to believe that counter productive behavior (e.g. deception) may also obtain. Specifically, agency theory predicts that agents will act with guile and mimic desired behaviors to receive a payoff. However, within this taxonomy of useful, useless, and harmful knowledge sharing, agency theory does not imply a prediction related to harmful knowledge sharing. Given the risk of mimicking harmful knowledge sharing contributions as useful ones, it seems less likely that agents will increase harmful knowledge sharing relative to useless knowledge sharing.

> **H2a:** As the strength of motivation to share professional knowledge increases, useful knowledge sharing increases.

> **H2b:** As the strength of motivation to share professional knowledge increases, useless knowledge sharing increases.

The strength of motivation plays a key role in the relationship between incentives and performance. Strength of motivation in this proposed model proxies for effort in the traditional neo-classical economic model. Based on the agency and neo-classical economic models, I expect that the strength of motivation will mediate the effect of incentives on knowledge sharing outcomes.

> **H3:** Strength of motivation to share professional knowledge will mediate the relationship between monetary incentives and knowledge sharing behaviors.

Figure 1 summarizes the above neo-classical economic predictions.

SELF-DETERMINATION THEORY AND HYPOTHESIS DEVELOPMENT

Traditional economic models focus on the motivating impact of money on behavior, and consider internal motivation irrelevant (Bonner and Sprinkle 2002). Some psychological theories, like self-determination theory, posit that how individuals' internalize external motivators matter more than the actual external motivators, like money. Whereas the key independent variable in neo-classical economic theory is monetary incentives, environmental factors beyond money affect the predictions of self-determination theory (SDT). SDT posits that perceived support for autonomy, competence and relatedness act as determinants of the "type" of motivation, constructive social development, and, personal well-being (Ryan and Deci 2000). Within SDT, autonomy does not refer to independence, but rather to the ability of individuals to act with their own volition, as opposed to being controlled. Competence means that individuals believe they are capable of positively effecting outcomes (i.e. efficacy). Relatedness refers to how connected individuals feel to colleagues and co-workers. Under SDT, individuals are viewed as organisms that seek to grow and share their ideas. However, their environment may encourage or thwart growth and integration. While controversial (e.g., see Cameron and Pierce 2002), Ryan and Deci (2000) argue that monetary incentives reliably undermine intrinsic motivation, and often lead to decreased levels of performance and impaired well-being.

Characteristics of the knowledge management culture may affect individuals' feelings of autonomy, competence, and relatedness. To the extent that the environment values and emphasizes extrinsic drivers of behavior, such as salary differences, bonus pay, and praise delivered in a controlling style, individuals are more likely to feel controlled. Likewise, environmental factors, or culture, can promote autonomy, competence, and relatedness through

encouraging such attributes as teamwork, openness and trust building with respect to knowledge sharing. This suggests the following predictions:

> **H4:** Knowledge cultures that encourage knowledge sharing through the use of praise delivered in a controlling style, punishment, and performance dependent monetary incentives diminish feelings of autonomy, competence, and relatedness relative to knowledge cultures that encourage knowledge sharing by promoting trust, teamwork, and openness.

The more autonomously extrinsic an individual's motivation, the more likely they will thoroughly work toward completion of tasks (Koestner and Losier 2002). Through "self-regulation", extrinsic motivators may align with what the individual views as personally important. Self-regulation refers to the degree to which individuals integrate social norms and other external factors with personal values and motivation. Higher levels of internal synthesis indicate a more autonomous form of extrinsic motivation. In complex and creative tasks, the environmental factors of autonomy, competence, and autonomy should lead to higher degrees of self-regulation. The following prediction is a manipulation check of self-determination theory:

> **H5:** Feelings of competence (incompetence), autonomy (being controlled), and relatedness (alienation), increase (decrease) self-regulation.

Ryan and Deci (2000) describe a continuum between amotivation (extreme disinterest) and intrinsic motivation that explains individuals' self-regulation. Amotivation exists when an individual will not do a task and nothing compels them to do so. Individuals may self-regulate external motivators to varying degrees. The most extreme example of controlled extrinsic motivation is *external* regulation. This occurs when an individual does not want to act, but an external force (e.g. boss) impels them to perform it. The next level of synthesis is *introjected*, which occurs when the individual does not want to act, but does so because they feel internal pressure, or guilt. A more autonomous level of synthesis, *identified* regulation occurs when an outside force presents a goal, but the individual's values align with that goal. The most

autonomous form of extrinsic motivation is *integrated*. This state occurs when an individual fully integrates task importance into their beliefs. Finally, *intrinsic* motivation occurs when the individual's own volition compels them to achieve some goal.

At issue in this study is the degree to which individuals will share useful, useless, and "forbidden" knowledge as a function of their self-regulation of knowledge sharing. Drawing from SDT, more intrinsic and internalized self-regulation should increase useful knowledge sharing relative to more extrinsic self-regulation. Specifically, autonomous extrinsic motivation (AEM) should increase useful knowledge sharing relative to controlled extrinsic motivation (CEM), as individuals who internalize the value of knowledge sharing should share more and better quality knowledge relative to those who do not. Also, extrinsic incentives to share knowledge should increase controlled motivation, resulting in less sharing of useful knowledge.

It is possible that individuals with higher AEM may inadvertently share more useless knowledge than otherwise expected, as they err on the side of sharing "too much" knowledge relative to withholding what, in their minds, may be possibly relevant knowledge. However, it is not clear from SDT whether higher AEM will lead to any difference in useless knowledge sharing relative to higher CEM.

Drawing from SDT, individuals with high AEM for knowledge sharing believe that knowledge sharing is valuable and important – more so than do individuals with high CEM. Therefore, individuals with high AEM to share knowledge likely understand the values of that activity, and are more aware of the perils of sharing "forbidden" knowledge relative to individuals with high CEM. Also, individuals with high CEM are more driven by external outcomes that are separable from the intrinsically desirous aspects of knowledge sharing. These

factors lead to the prediction that individuals with high CEM will share more "forbidden" knowledge than individuals with high AEM.

> **H6a:** Individuals with high self-regulation for knowledge sharing will share more useful knowledge than individuals with low self-regulation for knowledge sharing.
>
> **H6b**: Individuals with high self-regulation for knowledge sharing will share less harmful knowledge than individuals with low self-regulation for knowledge sharing.

Within the SDT model of knowledge sharing, self-regulation plays an important role. In addition to testing the above hypotheses, I also test the model's presumption that self-regulation mediates the relationship between perceived environment and knowledge sharing outcomes.

> **H7:** Self-regulation will mediate the relationship between the basic needs of autonomy, competence, and relatedness and knowledge sharing outcomes.

Figure 2 summarizes the SDT predictions.

SYNTHESIS OF THEORIES

While neo-classical economic theory and SDT do not completely contradict one another, they do assume differing mediating constructs. Neo-classical economic theory posits that external incentives "pull" agents by either creating or strengthening agents' motivation to perform some action. On the other hand, SDT posits that increasing internal feelings of competence, relatedness, and autonomy, increases individuals' beliefs about the importance of their actions, which "pushes" them to perform some action. As applied to knowledge sharing in this dissertation, both theories hypothesize that environmental variables affect motivation which leads to specific knowledge sharing outcomes. Neo-classical economic theory makes specific predictions regarding the effects of financial incentives on motivation, while SDT does not. While Deci et al. (1999) argue that monetary rewards undermine intrinsic motivation, SDT does

not posit that incentives inherently reduce intrinsic motivation, but rather that they alter perceptions of whether the environment fosters internal autonomy or external control. Neo-classical economic theory is silent on issues of autonomy and control, instead focusing on monetary incentives as the driver of effort, and therefore motivation. While neo-classical economic theory assumes that monetary incentives are the primary predictor of behaviors, SDT assumes that internal perceptions are the primary predictor of behaviors.

Ultimately, the models differ in the mechanism that mediates knowledge sharing behaviors. Neo-classical economics theorizes that strength of motivation is the dominant mediator in the relationship between monetary incentives and knowledge sharing outcomes, while SDT theorizes that self-regulation is the dominant mediating variable (see Figure 3).

SDT predicts a negative relationship between monetary incentives and internal self-regulation, but no relationship between strength of motivation and self-regulation. However, a substantial number of SDT based studies find evidence of a "crowding out" effect, where extrinsic motivation essentially acts as if motivated solely by the extrinsic reward. If there is a positive relationship between self-regulation and the strength of motivation to share knowledge, it would provide evidence of the crowding out effect.

Under neo-classical economic theory, extrinsic incentives drive behavior – not the degree of internal self-regulation (see Figure 4). Because neo-classical economic theory exists outside of the context of SDT, to model the relationship between self-regulation and strength of motivation requires the following supposition. If monetary incentives increase the degree of external regulation, then under neo-classical economics, the degree of external regulation must increase the strength of motivation. In the presence of extrinsic incentives, individuals' strength of motivation is higher than in their absence. In his theoretical economic investigation of the

crowding out effect of intrinsic motivation by external rewards, James (2005) identifies the salience of the agent's reward as a negative influence on intrinsic motivation. In other words, if the reward becomes salient enough, the agent responds by rationally acting as if he or she performs the task to obtain the incentive attached to it. The following are competing hypotheses that result from the two theories:

> **H8a**: (NCET) There is a negative (positive) relationship between internal (external) self-regulation and strength of motivation to share knowledge.
>
> **H8b**: (SDT) There is *a positive* relationship between self-regulation and the strength of motivation to share knowledge.

Although synthesizing these theories is nontrivial, it becomes possible to reconcile the models and determine which portions of each dominate in a knowledge sharing environment.

METHOD

This study explores the relationships between monetary incentives and perceived environmental factors, and knowledge sharing behaviors among former interns.[2] Specifically, this study seeks to determine the effects of monetary incentives and feelings of autonomy, competence, and relatedness on useful, useless, and harmful knowledge sharing contributions. In doing so, this study also proposes two potential mediating variables – regulatory style (quality of motivation) and strength of motivation. Regulatory style is evaluated using the relative autonomy index (RAI) formed by the self-regulation subscales, where each style of regulation is scored as follows: external -2, introjected -1, identified +1, integrated +2 (Grolnick and Ryan 1989). This method allows the combination of subscale items to measure regulatory style, where more controlled styles of regulation are weighted with larger negative scores, and more autonomous styles are weighted with larger positive scores.

[2] See Appendix A for descriptions of the constructs and variables used in this study.

This study uses an internet-hosted survey to test the related hypotheses developed in the theory section. Students with prior internship experience serve as the participants. An instrument consisting of approximately 100 questions measures the applicable constructs (see Appendix A). This study relies upon interns' perceptions to measure the constructs of interest. Each question uses a Likert scale ranging from "strongly disagree" to "strongly agree."

The instruments used are a combination of previously validated measures adapted for these studies and new measures designed to measure previously unexamined constructs. A panel of five accounting Ph.D. students assisted in determining the face validity of the operationalized measures to their constructs by completing a pilot instrument and providing comments on ambiguous or misleading questions. In addition to this process, I conducted a pilot study (n = 24) with former interns to determine the validity and reliability of the measures.

To test the non-mediating hypotheses driven by each theory (H1, H2, H4, H5, and H6), I use a general linear model (GLM) design. For the mediating hypotheses (H3 and H7) I use a SOBEL test for mediation (MacKinnon et al. 2002). If the dependent variable is significant affected by the independent and mediating variables (outside the presence of each other), and the mediator significantly affects the dependent variable, then a reduced effect of the independent variable on the dependent variable in the presence of the mediating variable confirms a mediating relationship. I test H8 with a two-tailed bivariate correlation test for significance.

In order to ensure construct validity, I perform a principal components analysis with varimax rotation to identify the number of factors present and the measures associated with them. I also measure the reliability of measures, investigating those with a Cronbach's alpha of less than .60 for potential problems.

DEMOGRAPHICS AND RELIABILITY

One hundred ninety students in undergraduate and masters' level accounting courses participated in study one. Of these students, 30 respondents indicated having less than three months of work experience. These responses are omitted from the analysis presented in this results section. Ninety-three males and 67 females chose to participate in the study for course credit. The average age and years of college experience of the sample is 21.74 years and 3.41 years respectively. Of the 160 participants, 88 identified themselves as accounting majors.

For each of the constructs examined in these studies, factor analysis is used to identify the constructs that emerge from the instrument, and Cronbach's alphas are reported in Appendix A to assess the internal validity of the scales and subscales in the instrument.

NEO-CLASSICAL ECONOMIC PREDICTION RESULTS

Hypothesis 1 predicts that monetary incentives increase the strength of motivation for employees to share their professional knowledge. Neo-classical economic theory serves as the basis for this prediction. Participants were asked a series of questions relating to monetary incentives at their internships and their strength of motivation to share their professional knowledge (see Appendix A). The results of the ANOVA testing this hypothesis provides support that monetary incentives increase the strength of motivation to share knowledge ($F = 8.322$, $p < .002$ in a one-tailed test; see Figure 5).

Hypothesis 2 makes two separate predictions, and implies one null relationship, based on the effect of strength of motivation on each dependent variable. H2a posits that as the strength of motivation to share professional knowledge increases, useful knowledge sharing increases. H2b predicts that as the strength of motivation to share professional knowledge increases, useless knowledge sharing increases. In addition to these two specific hypotheses, an association

between strength of motivation to share professional knowledge and harmful knowledge sharing is not expected. The results of the ANOVA finds mixed results for this set of hypotheses. With respect to H2a, a significant relationship exists between the strength of motivation to share professional knowledge and useful knowledge sharing ($F = 102.447$, $p < .001$ in a one-tailed test; see table 4.2) supporting that prediction. However, contrary to H2b, the relationship between strength of motivation to share knowledge and useless knowledge sharing is not significant ($F = .863$, $p = .177$ in a one-tailed test; see table 4.2). Also, despite the implied prediction of no relationship between strength of motivation to share knowledge and harmful knowledge sharing, a significant relationship exists ($F = 5.118$, $p < .025$ in a two-tailed test; see Figure 5).

Subsequent analysis clarifies these somewhat puzzling results with respect to useless and harmful knowledge sharing. In addition to collecting data on the strength of motivation to share knowledge, I also gathered data on the strength of motivation to hoard knowledge. Post-hoc testing of useless knowledge sharing on a particular type of useless knowledge sharing – useless knowledge masked as useful knowledge, shows a significant relationship between the two ($F = 4.081$, p-value < 0.045, in a two-tailed test; see table 2). This result is not surprising insomuch as it was the theoretic argument for H2b. The effect was not found as it was hidden by the strength of motivation to share knowledge, and the other sub-types of useless knowledge sharing (social interaction, and gossip).

To explore the surprising significant effect between strength of motivation to share knowledge and harmful knowledge sharing, I tested each type of harmful knowledge sharing (intentional and unintentional) to see if one was driving the results. The results indicate a significant relationship between strength of motivation to share knowledge and unintentional harmful knowledge sharing ($F = 9.970$, $p < 0.002$ in a two-tailed test; see table 2).

The mediating supposition of neo-classical economic theory, posits that strength of motivation mediates the effect between monetary incentives and knowledge sharing behaviors. Mediation occurs if:

1) Monetary incentives has a significant effect on strength of motivation
2) Monetary incentives has a significant effect on knowledge sharing behaviors
3) Strength of motivation has a significant effect on knowledge sharing behaviors
4) The effect between monetary incentives and knowledge sharing behaviors shrinks with the addition of strength of motivation to the model.

I employ a SOBEL test of mediation to perform this analysis (Preacher and Hayes 2004). The results of the test support H3, meeting each of the four conditions for mediation ($Z = 2.751$, $p < 0.006$ in a two-tailed test; see table 3). These results indicate that the strength of motivation to share knowledge fully mediates the relationship between monetary incentives and useful knowledge sharing.

In addition to the test of mediation between strength of motivation to share knowledge and useful knowledge sharing, I also subsequently test for the possibility of a mediating relationship of strength of motivation to share knowledge between monetary incentives and unintentional harmful knowledge sharing. The results provide support for a partially mediated relationship ($Z = 1.866$; $p < 0.062$ in a two-tailed test; see table 3). This finding provides an indication that monetary incentives do carry an unintended consequence when it comes to knowledge sharing.

SELF-DETERMINATION PREDICTION RESULTS

Hypothesis 4 predicts that knowledge cultures that encourage knowledge sharing through the use of praise delivered in a controlling style, punishment, and performance dependent monetary incentives diminish feelings of autonomy, competence, and relatedness relative to knowledge cultures that encourage knowledge sharing by promoting trust, teamwork, and

openness. Participants were asked a series of questions relating to their organization's knowledge sharing culture, and their perceptions about their own feelings of competence, autonomy, and relatedness at work (see Appendix A). The results of the ANOVA provides support that the organization's knowledge culture significantly impacts individual's perceptions of their own competence, autonomy, and relatedness ($F = 27.116$, $p < .001$ in a one-tailed test; see Figure 5).

Hypothesis 5 posits that the feelings of autonomy (control), competence (incompetence), and relatedness (alienation) increase (decrease) self-regulation for knowledge sharing. In order to analyze self-regulation, I use the relative autonomy index (RAI) formed by the self-regulation subscales where each style of regulation is scored as follows: external -2, introjected -1, identified +1, integrated +2 (Grolnick and Ryan 1989). These scores are then combined to form the RAI score. The ANOVA result provides support that the feelings of autonomy, competence, and relatedness increase the degree of internal self-regulation for professional knowledge sharing ($F = 13.517$, $p < .001$ in a one-tailed test; see Figure 5).

Hypothesis 6 makes two specific predictions and implies one null relationship between self-regulation and knowledge sharing behaviors. H6a predicts that higher AEM leads to more useful knowledge sharing. H6b posits that higher AEM leads to less harmful knowledge sharing. The theory does not argue for any difference between levels of autonomous extrinsic motivation and an overall difference in useless knowledge sharing. The results of the ANOVA provide support for each of these predicted relationships. With respect to H6a, the results support a significant effect of AEM on useful knowledge sharing ($F = 6.142$, $p < .007$ in a one-tailed test; see table Figure 5). The results for the ANOVA between AEM and harmful knowledge sharing indicates a significant negative relationship as predicted ($F = 6.147$, $p < .007$ in a one-tailed test; see Figure 5).

In order to explore the possibility that a significant relationship exists between self-regulation and useless knowledge sharing, I conducted a series of post-hoc tests. None of these tests indicated any significant results. The overall ANOVA showed no support for a significant relationship between these constructs ($F = 1.083$, $p = .300$ in a two-tailed test; see Figure 5).

The SDT mediating hypothesis predicts that self-regulation mediates the effect between autonomy, competence, and relatedness, and knowledge sharing outcomes. Mediation occurs if:

1) Perceived autonomy, competence, and relatedness has a significant effect on self-regulation for knowledge sharing.
2) Perceived autonomy, competence, and relatedness has a significant effect on knowledge sharing behaviors.
3) Self-regulation for knowledge sharing has a significant effect on knowledge sharing behaviors.
4) The effect between perceived autonomy, competence, and relatedness and knowledge sharing shrinks with the addition of self-regulation for knowledge sharing to the model.

The SOBEL test of mediation indicates that self-regulation does not mediate the relationship between autonomy, competence, and relatedness and useful knowledge sharing ($Z = .914$, $p = .361$ in a two-tailed test; see table 4). In the SOBEL test, it appears that this result is driven by the shrinking relationship between self-regulation for knowledge sharing and useful knowledge sharing with the inclusion of competence, autonomy, and relatedness as a covariate. The results of this test seem to indicate that *something* presently captured within the model is mediating the relationship. The plausible explanations seem to be that either 1) competence, autonomy, and relatedness actually mediate the relationship between self-regulation for knowledge sharing and useful knowledge sharing, or 2) only some portion of the self-motivators mediate this relationship. Given the theoretical underpinnings the first alternative seems unreasonable – it is difficult to argue, theoretically or otherwise, that personal perceptions of

autonomy, competence, and relatedness are somehow developed after one regulates their external motivations to share knowledge. It seems much more likely that some sub-type of individual motivation mediates this relationship, such as "high quality" motivators.[3]

SYNTHESIS PREDICTION RESULTS

Hypothesis 8 encompasses competing predictions about the relationship between mediators based on neo-classical economic theory and SDT. The prediction guided by neo-classical economic theory, H8a predicts a negative relationship between self-regulation and strength of motivation. The SDT version, H8b predicts a positive relationship between the degree of self-regulation and strength of motivation. The data show support for H8b – a significant positive relationship between strength of motivation and self-regulation ($r = .328$, $p < .001$).[4]

CONTRIBUTIONS AND LIMITATIONS

In addition to the contributions of this dissertation, several limitations exist. The methods chosen for data collection limit the internal validity of the study relative to that of an experiment. Quasi-experiments are not as well suited to reliably test the link between theory and outcomes like experiments are. Because cross-sectional survey research lacks random assignment, omitted correlated variables threaten the results more seriously than studies employing random assignment. Individuals self-select into their professions, meaning that there could be some

---

[3] To further investigate whether mediation exists between competence, autonomy, and relatedness and useful knowledge sharing, I explore the possibility that only "high quality" knowledge sharing motivators mediate this relationship. High quality motivators are defined as identified and internally regulated extrinsic motivators (see Appendix A for a description of these motivators). After changing the mediating variable in the model from self-regulation (as measured by the RAI index) to high quality self-regulation (internal and identified motivators only – excluding introjected and external motivators), the SOBEL test supports the existence of a mediating relationship ($Z = 3.169$, $p < .002$; see table 4).

[4] ANCOVAs for each of the non-mediating NCET and SDT tests were also conducted post-hoc to test the robustness of results. Each model was tested with the number of years in college, work experience, gender, and accounting majors as covariates. Although certain control variables were significant within some of these models, the overall significance for each test remained unchanged.

factor not captured in the study that may explain differences detected between accountants' and non-accountants' knowledge sharing behaviors and environmental perceptions. Additionally, since many of the measures used in this work are perceptual measures, they may be subject to self-perception biases of the participants.

This dissertation makes several contributions to the accounting and information technology and psychology literatures. Economic research theorizes that strength of motivation mediates the relationship between incentives and performance. This dissertation explores the possibility that a psychology-based concept of self-regulation serves as a more meaningful mediator between both monetary and non-monetary variables and outcomes. In addition, this work synthesizes the neo-classical economic view of incentives with the psychology based view of self-regulation to form a more complete model of knowledge sharing behavior than either of these theories would predict in the absence of the other. This dissertation also calls into question the meaning of strength of motivation. Where the literature seems to assume that this variable means the strength of motivation to perform some outcome, the data in this dissertation do not confirm that association. Perhaps the effort construct in much of the existing incentives literature might be more correctly specified as the effort to capture the incentive, rather than the effort to perform a task. Furthermore, this study explores the effects of incentives and knowledge culture on the nature of organizational knowledge sharing. This dissertation also contributes by exploring the environmental and organizational conditions that give rise to functional and dysfunctional knowledge sharing. It examines the possibility of a negative side to knowledge sharing initiatives in PSF. Not all knowledge sharing is good, and by exploring the possible links between incentives, motivation, and forbidden knowledge sharing, this dissertation examines the potential negative outcomes that result from these conditions.

Alavi, Maryam. 1997. KPMG Peat Marwick U.S.: One Giant Brain. *Harvard Business School*:1-21.

Alchian, Armen A., and Harold Demsetz. 1972. Production, Information Costs, and Economic Organization. *American Economic Review* 62 (5):777-795.

Baker, George P., Michael C. Jensen, and Kevin J. Murphy. 1988. Compensation and Incentives: Practice vs. Theory. *Journal of Finance* 43 (3):593.

Bennet, David, and Alex Bennet. 2003. The Rise of the Knowledge Organization. In *Handbook on Knowledge Management*, edited by C. W. Holsapple. New York: Springer-Verlag.

Bonner, Sarah E., and Geoffrey B. Sprinkle. 2002. The effects of monetary incentives on effort and task performance: theories, evidence, and a framework for research. *Accounting, Organizations & Society* 27 (4/5):303.

Cameron, Judy, and W. David Pierce. 2002. *Rewards and intrinsic motivation : resolving the controversy*. Westport, Conn.: Bergin & Garvey.

Chow, Chee W., F. Johnny Deng, and Joanna L. Ho. 2000. The Openness of Knowledge Sharing within Organizations: A Comparative Study of the United States and the People's Republic of China. *Journal of Management Accounting Research* 12:65.

Deci, Edward L., Richard Koestner, and Richard M. Ryan. 1999. A Meta-Analytic Review of Experiments Examining the Effects of Extrinsic Rewards on Intrinsic Motivation. *Psychological Bulletin* 125 (6):627-668.

Deci, Edward L., Richard M. Ryan, Marylene Gagne, Dean R. Leone, Julian Usunov, and Boyanka P. Kornazheva. 2001. Need Satisfaction, Motivation, and Well-Being in the Work Organizations of a Former Eastern Bloc Country: A Cross-Cultural Study of Self-Determination. *Personality and Social Psychology Bulletin* 27 (8):930-942.

Fargo. *https://www.wellsfargo.com/com/focus/sox/* 2005 [cited.

Fickel, Louise. *Know-It-Alls*, November 1, 2001 2001 [cited.

Garud, Raghu, and Arun Kumaraswamy. 2005. Vicious and Virtuous Circles in the Management of Knowledge: The Case of Infosys Technologies. *MIS Quarterly* 29 (1):9-33.

Geisel, Roseanne White 2005. Keeping Information Safe. *HRMagazine* 50 (2):66.

Grolnick, Wendy L., and Richard M. Ryan. 1989. Parent Styles Associated With Children's Self-Regulation and Competence in School. *Journal of Educational Psychology* 81 (2):143-154.

Ho, Joanna L.Y. , Sandra Concepcion Vera-Munoz, and Chee W. Chow. 2002. Towards a Framework for Understanding the Antecedents of Knowledge Sharing in Large CPA Firm Audits. *Working Paper, http://ssrn.com/abstract=383601*:1-49.

Holsapple, Clyde W. 2002. *Knowledge and Its Attributes*. Edited by C. W. Holsapple. 1st ed. 2 vols. Vol. 1. Heidelberg: Springer-Verlag.

Holsapple, Clyde W., and K. D. Joshi. 2002. A Knowledge Management Ontology. In *Handbook on Knowledge Management*, edited by C. W. Holsapple. Heidelberg: Springer-Verlag.

Holton, Lisa. 1998. Sharing the Wealth -- of Knowledge -- "Information Traffic Cops" Keep Ideas Flowing. *Chicago Tribune*, 1.

Indjejikian, Raffi J. 1999. Performance Evaluation and Compensation Research: An Agency Perspective. *Accounting Horizons* 13 (2):147.

James Jr., Harvey S. 2005. Why did you do that? An economic examination of the effect of extrinsic compensation on intrinsic motivation and performance. *Journal of Economic Psychology* 26 (4):549-566.

Jensen, Michael C., and William H. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3 (4):305-360.

Koestner, Richard, and Gaetan F. Losier. 2002. Distinguishing Three Ways of Being Internally Motivated: A Closer Look at Introjection, Identification, and Intrinsic Motivation. In *Handbook of Self-Determination Research*, edited by E. L. Deci and R. M. Ryan. Rochester: University of Rochester Press.

Leibowitz, Wendy R. 2002. Knowledge Management in the Law Firm.

Liebowitz, Jay, and Yan Chen. 2002. Knowledge Sharing Proficiencies: The Key to Knowledge Management. In *Handbook on Knowledge Management*, edited by C. W. Holsapple. Heidelberg: Springer-Verlag.

MacKinnon, David P., Chondra M. Lockwood, Jeanne M. Hoffman, Stephen G. West, and Virgil Sheets. 2002. A Comparison of Methods to Test Mediation and Other Intervening Variable Effects. *Psychological Methods* 7 (1):83-104.

Preacher, Kristopher J., and Andrew F. Hayes. 2004. SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers* 15:717-731.

Ryan, R. M., and J.P. Connell. 1989. Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology* 57:749-761.

Ryan, Richard M. , and Edward L. Deci. 2000. Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *American Psychologist* 55 (1):68-78.

Sprinkle, Geoffrey B. 2003. Perspectives on experimental research in managerial accounting. *Accounting, Organizations and Society* 28 (2-3):287-318.

Vera-Munoz, Sandra C., Joanna L. Ho, and Chee W. Chow. 2006. Enhancing Knowledge Sharing in Public Accounting Firms. *Accounting Horizons* 20 (2):133-155.

Wagenheim v. Alexander Grant & Company. 1983. Court of Appeals of Ohio, Tenth Appellate District, Franklin County.

Wingfield, Nick. 2005. Apple Can Seek Sources of Articles; In a Blow to Advocates Of Free Speech, Judge Rules 'Blogs' Held Trade Secrets. *Wall Street Journal*, March 14, 2005, B.3.

Yang, Jen-Te. 2004. Job-related knowledge sharing: comparative case studies. *Journal of Knowledge Management* 8 (3):118-126.

Figure 1: Relationship between Neo-Classical Economic Model Predictions and Predictions Made by the Generalized Economic Model

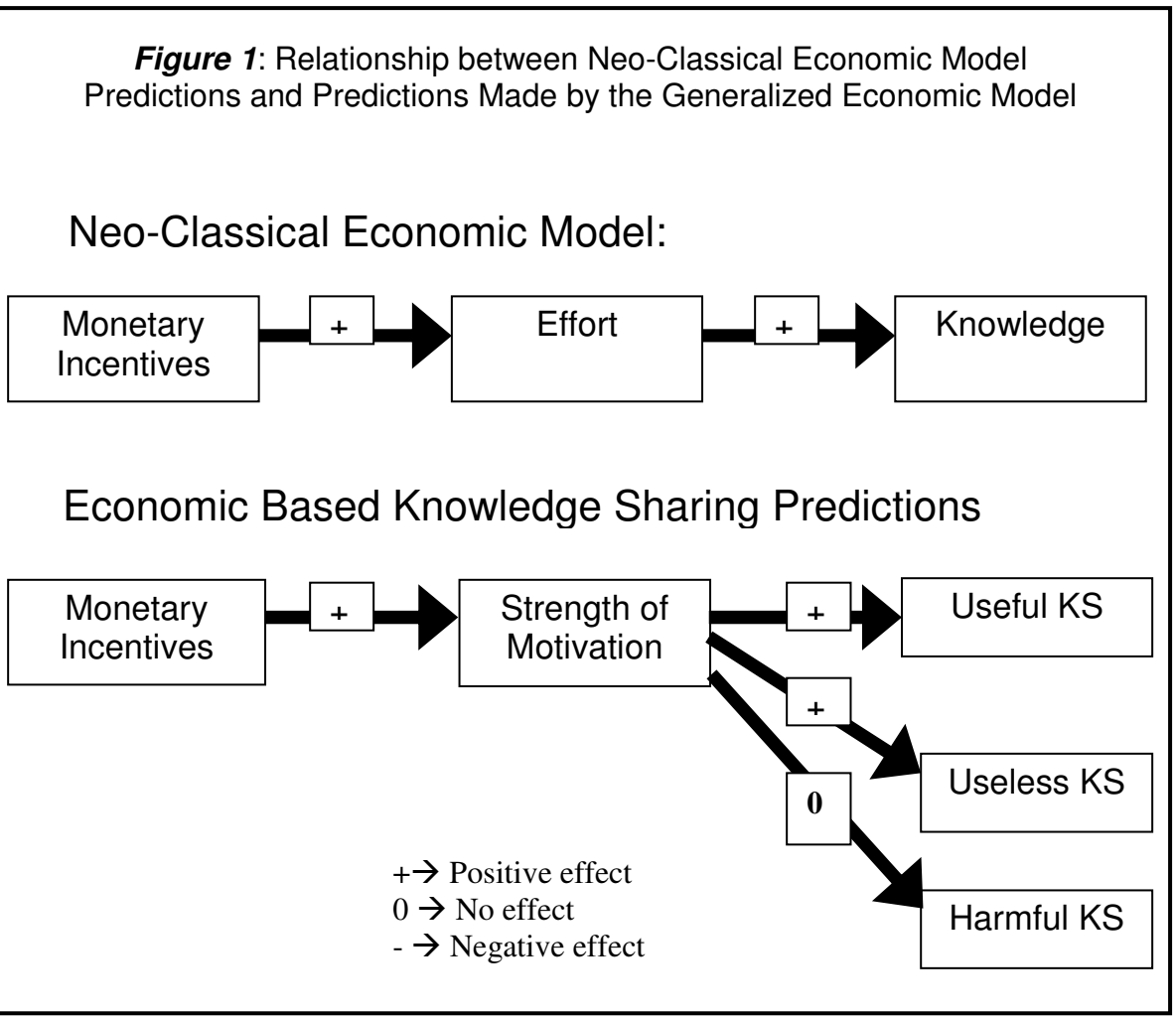


Figure 2: Relationship Between Self-Determination Theory Model Predictions and Knowledge Sharing Predictions Made by the Generalized Economic Model.

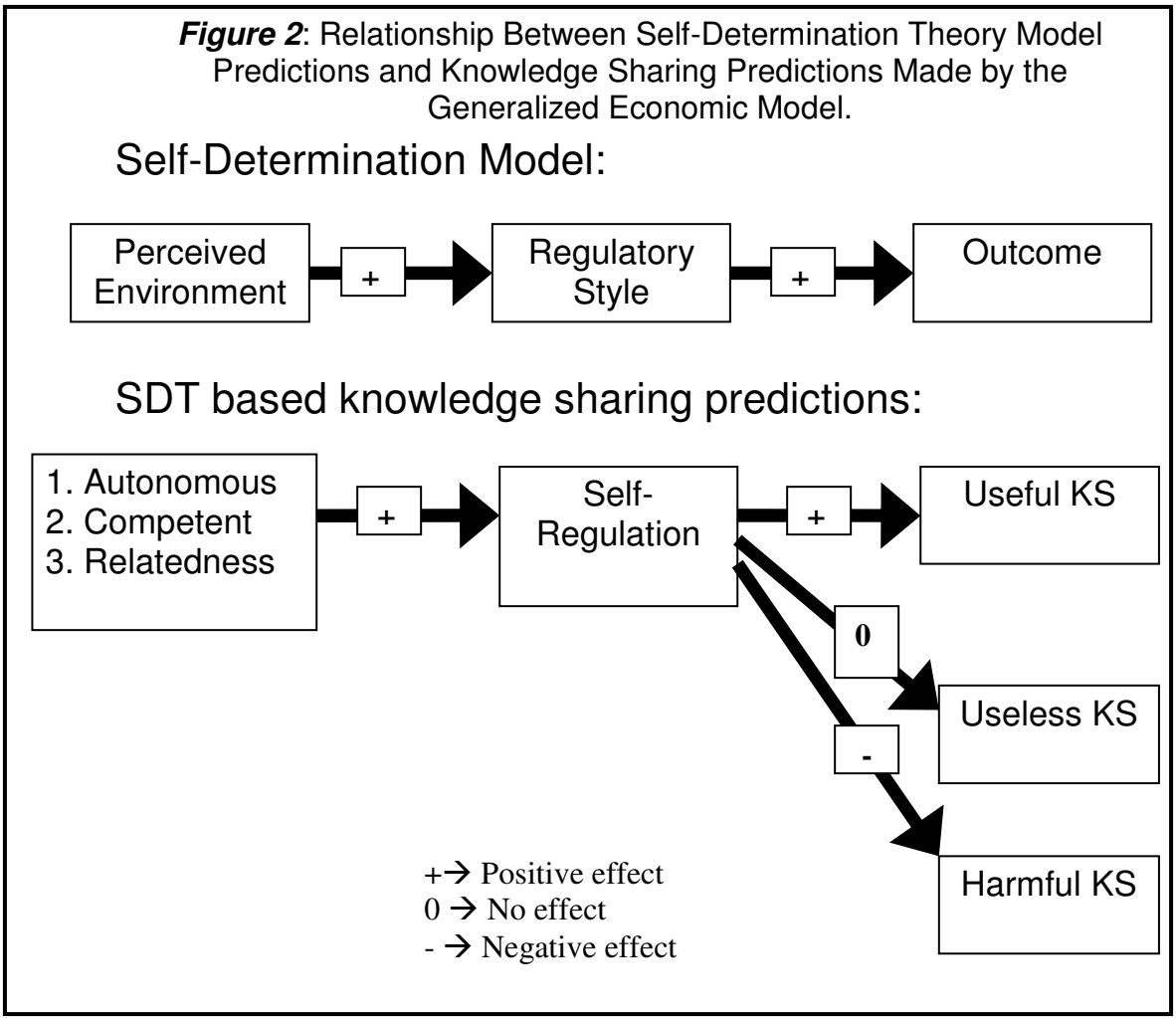
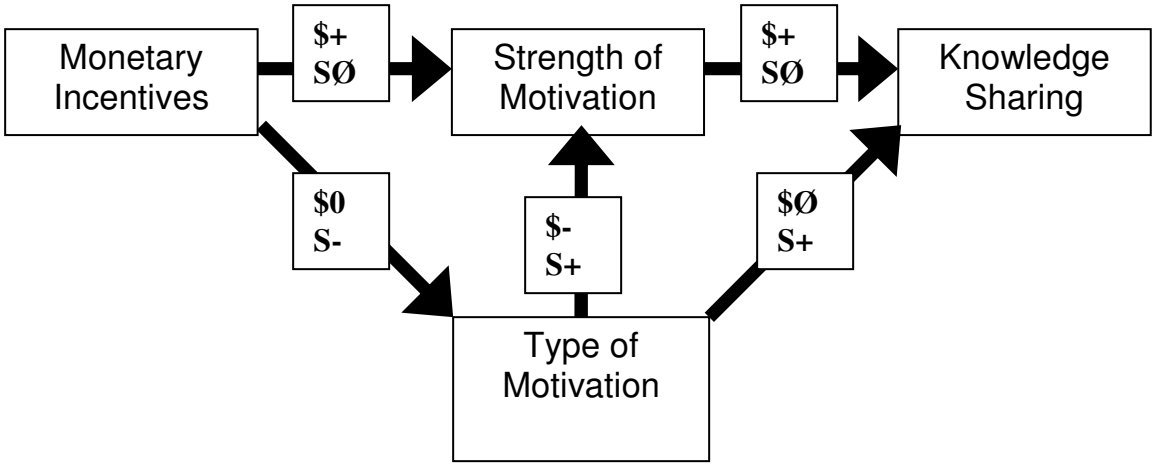


Figure 3: Synthesis of Neo-Classical Economics Model with SDT Model Focused on Monetary Incentives.



$ – Neo-classical economic theory
S – SDT
+ – Positive relationship
0 – No relationship
Ø – No theoretic prediction
- – Negative relationship

Figure 4: Relationship between Strength of Motivation and Self-Regulation

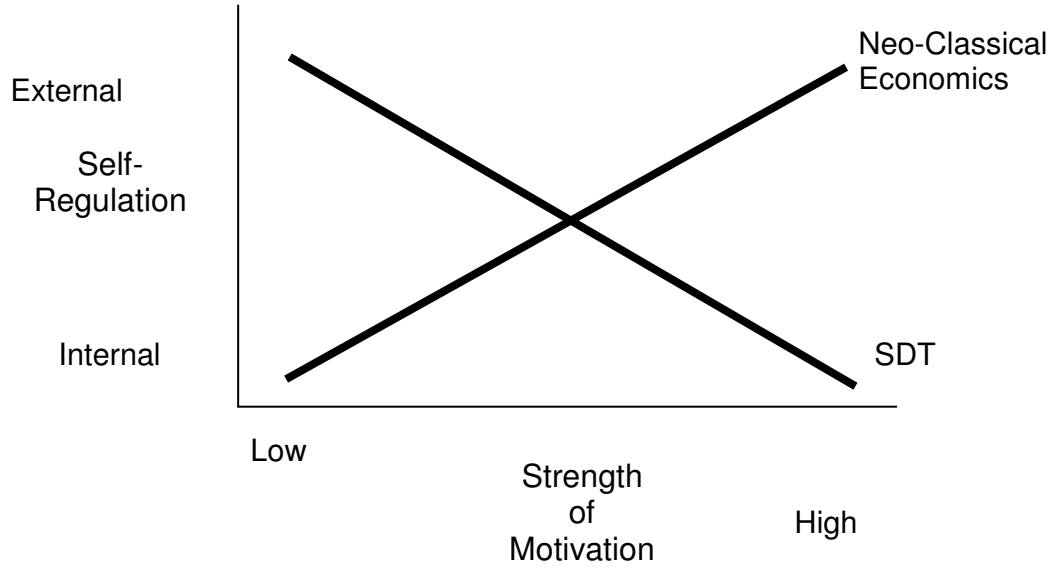


***Figure 5*: Synthesis of models and summary of results with mean-centered coefficients**

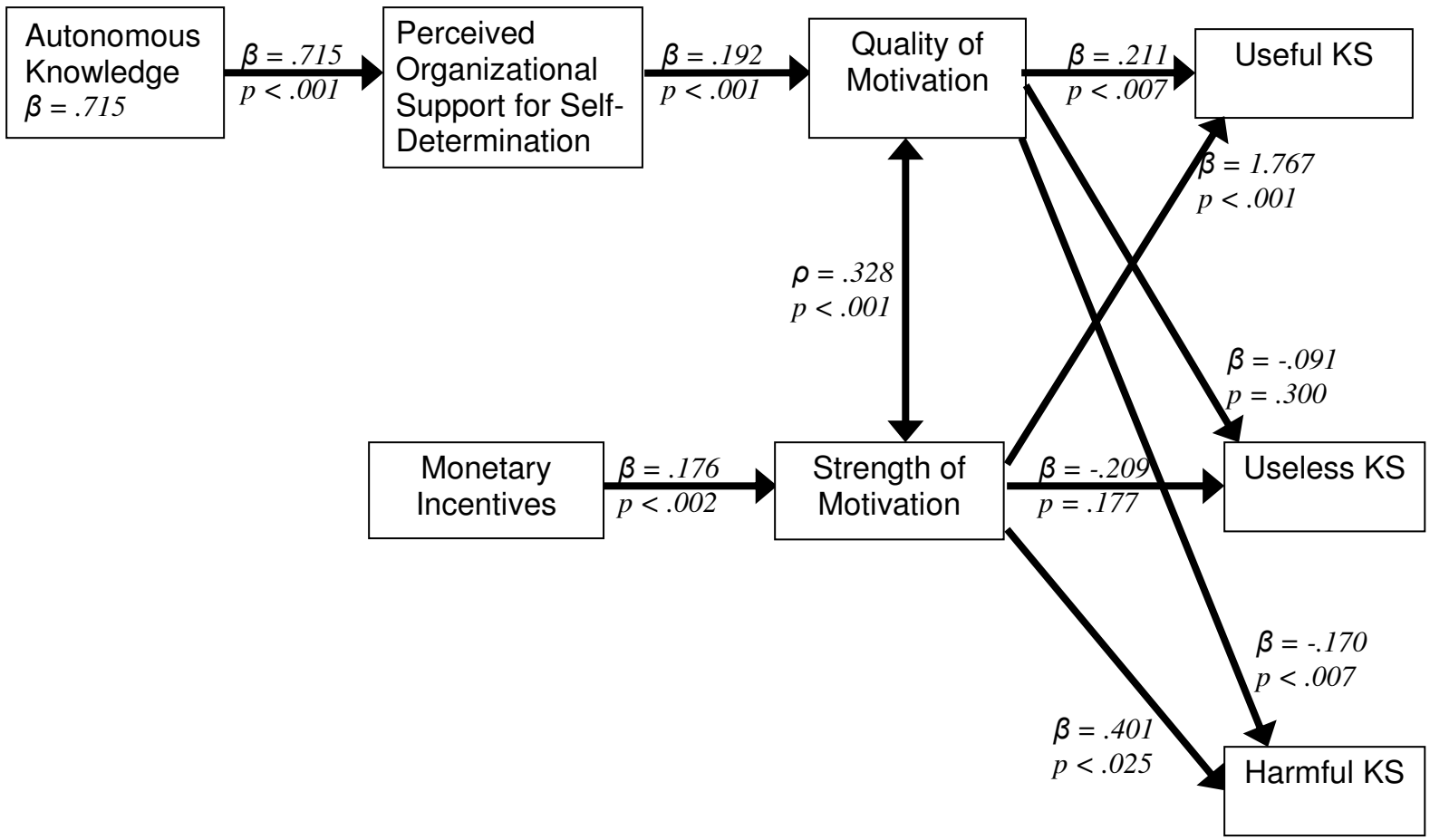


Table 1: Examples of the Three Types of Knowledge Sharing	
Valence of KS	Examples
Useful	1. Meeting with the audit staff at the beginning of field work to exchange information about the client. For example, a manager who shares their knowledge about the client and its industry to a senior who possesses good technical knowledge (Ho, Vera-Munoz, and Chow 2002). 2. Meeting with a client to advise them on Sarbanes Oxley compliance related to the treasury function (Fargo 2005). 3. Sharing knowledge that helps management make better organizational decisions. For example, a sharer observing that an existing, implemented technology should be replaced (Chow, Deng, and Ho 2000).
Useless	1. Submitting knowledge that less efficiently addresses a problem for which a known solution already exists (i.e. "wheel reinvention") (Fickel 2001). For example, copying and distributing within the organization commonly known advice on managing risks related to information systems development. 2. Employees sharing "more than they know" (Garud and Kumaraswamy 2005, 26) or sharing gibberish – knowledge that does not help others achieve organizational objectives; for example, copying and sharing a colleague's spreadsheet template that is only tangentially relevant to solving the current problem. 3. Gossiping about the leadership styles or leadership failures of specific superiors (Yang 2004).
Harmful	1. Leaking trade secrets to online "bloggers" for personal gain (Wingfield 2005). 2. Pirating company information (e.g. theft of personal information such as social security number) (Geisel 2005). 3. An auditor sharing confidential information warning one client against conducting business with another client who is in financial difficulty (Wagenheim v. Alexander Grant & Company 1983).

Table 2 -- Subsequent Analysis Related to H2 (Two-tailed tests)

ANOVA

Model	Adjusted R^2	Std. Error	F	p
1	0.019	4.64	4.081	.045**
2	0.053	4.15	9.97	.002**

Parameter Estimates

Model		β	Std. Error	t	p
1	Intercept	0.000	0.367	0.000	1.000
	SoM_H	0.320	0.158	2.020	.045**
2	Intercept	0.000	0.328	0.000	1.000
	SoM_Sh	0.318	0.101	3.158	.002**

Model 1: Independent Variable -- Strength of Motivation to Hoard Knowledge (SoM_H); Dependent Variable -- Masked Useless Knowledge Sharing (Less_M)

Model 2: Independent Varlable -- Strength of Motivation to Share Knowledge (SoM_Sh); Dependent Variable -- Unintentional Harmful Knowledge Sharing (Harm_U)

Table 3 -- Sobel Test for Mediation (H3)						
Dependent: Useful Knowledge Sharing Independent: Monetary Incentives to Share Knowledge Mediator: Strength of Motivation to Share Knowledge						
Direct and Total Effects						
	Coeff	std. error	t	p (two)		
b(YX)	0.4256	0.1735	2.4536	0.015**		
b(MX)	0.1764	0.0611	2.8847	0.005**		
b(YM.X)	1.7328	0.1793	9.6666	0.000**		
b(YX.M)	0.1200	0.1414	0.8485	0.397		
Indirect Effect and Significance Using Normal Distribution						
	Value	std. error	LL 95 CI	UL 95 CI	Z	p
Sobel	0.3057	0.1111	0.0879	0.5235	2.7508	.006**

Table 4 -- Sobel Test for Medation (H7)

Panel A -- Total Quality of Motivation to Sharing Knowledge

Dependent: Useful Knowledge Sharing
Independent: Support for Self-Determination at Work
Mediator: Quality of Motivation to Share Knowledge

Direct and Total Effects

	Coeff	std. error	t	p (two)	
b(YX)	0.3279	0.0534	6.1348	.000**	
b(MX)	0.1922	0.0523	3.6765	.000**	
b(YM.X)	0.0833	0.0813	1.0248	.307	
b(YX.M)	0.3118	0.0557	5.6014	.000**	

Indirect Effect and Significance Using Normal Distribution

	Value	std. error	LL 95 CI	UL 95 CI	Z	p
Sobel	0.016	0.0168	-0.0169	0.0489	0.955	.340

Panel B -- High Quality Motivators to Share Knowledge

Dependent: Useful Knowledge Sharing
Independent: Support for Self-Determination at Work
Mediator: High Quality Motivators to Share Knowledge

Direct and Total Effects

	Coeff	std. error	t	p (two)	
b(YX)	0.3279	0.0534	6.1348	.000**	
b(MX)	0.2386	0.0466	5.1220	.000**	
b(YM.X)	0.3587	0.0870	4.1245	.000**	
b(YX.M)	0.2423	0.0550	4.4058	.000**	

Indirect Effect and Significance Using Normal Distribution

	Value	std. error	LL 95 CI	UL 95 CI	Z	p
Sobel	0.0856	0.0269	0.0328	0.1384	3.176	.002**

Appendix A Instrument Measures			
	Construct & Cronbach's Alpha	Construct Definition	Operational Measures Measures of monetary rewards for knowledge sharing – adapted from (Leibowitz 2002) and developed for this dissertation. Answer the following questions with respect to the work environment at your organization (five point Likert scale):
a)	**Knowledge Culture** Controlling α = .78 Autonomous α = .85	The degree to which the actual working environment seeks to promote knowledge sharing – can be controlling or autonomous	*Controlling* ❑ The organization promotes and rewards based on contributions of knowledge (or knowledge sharing performance) ❑ The organization punishes employees who withhold knowledge ❑ The organization sometimes fires or fails to promote people who withhold their knowledge from others ❑ Knowledge sharing activities earn praise that indicate what a good employee should do ❑ Knowledge sharing activities earn praise that indicates people are doing their jobs well if they share knowledge *Autonomous* ❑ The organization has a mentoring program that encourages knowledge sharing. ❑ The organization has a knowledge sharing rather than a knowledge hoarding culture. ❑ The organization promotes the trust that is needed to encourage knowledge sharing among employees. ❑ The organization makes it easy to openly share ideas with others. ❑ The organization encourages people who are working groups and teams to openly share knowledge with one another. ❑ Sometimes people who are working in groups and teams have problems that result from failing to share their knowledge with one another. ❑ The organization does things that make sharing knowledge with others fun.

	Construct	Construct Definition	Operational Measures Measures of monetary rewards for knowledge sharing – developed for this dissertation (five point Likert scale).
b)	**Monetary incentives** α = .92	Monetary rewards for sharing knowledge	❑ The firm or company rewards employees financially for submitting their ideas to the firm. ❑ The firm or company offers monetary incentives or other financial rewards for sharing knowledge with the firm or other co-workers. ❑ The firm or company offers monetary incentives or other financial rewards for sharing within groups and teams. ❑ The firm or company offers monetary incentives or other financial rewards for sharing between groups and teams. ❑ The firm or company offers monetary incentives or other financial rewards (e.g. raises or bonuses) for contributions made to a knowledge repository or electronic database. ❑ It makes no difference to me, financially, if I share my knowledge with others (reverse scored) ❑ Sharing knowledge with others does not provide any financial rewards at the company or firm (reverse scored).

	Construct	Construct Definition	Operational Measures Three subscales are used in this operationalization. Most measures are adapted from the Basic Need Satisfaction at Work scale (Deci et al. 2001). Most of the autonomy measures were developed for this dissertation (seven point Likert scale):
c)	**Organizational support for self-determination** Autonomy α = .71 Competence α = .71 Relatedness α = .89	Perceived support for self-determination	*Autonomy* ❑ To avoid upsetting my bosses, I need to do my work in the way that they think is best (reverse scored) ❑ Most of the time other people tell me how to do my work (reverse scored). ❑ My bosses and co-workers want to know what I think about how to do my work best. ❑ At work, I am evaluated more on the quality and creativity of my work rather than how much or how quickly I produce. ❑ My feelings are taken into consideration at work. ❑ For problems at work, others want to know my opinion as to how to best address the issue. ❑ I have a lot of say in how I go about doing my work. *Competence* ❑ I do not feel very competent when I am at work (reverse scored). ❑ People at work tell me I am good at what I do. ❑ I have been able to learn interesting new skills on my job. ❑ Most days I feel a sense of accomplishment from working. ❑ On my job I do not get much of a chance to show how capable I am (reverse scored). ❑ When I am working I often do not feel very capable. *Relatedness* ❑ I really like the people I work with. ❑ I get along with people at work (reverse scored). ❑ I pretty much keep to myself when I am at work. ❑ I consider the people I work with to be my friends. ❑ People at work care about me. ❑ There are not many people at work that I am close to (reverse scored). ❑ The people I work with do not seem to like me much (reverse scored). ❑ People at work are pretty friendly towards me.

	Construct	Construct Definition	Operational Measures Measures of strength of motivation – developed for this dissertation (five point Likert scale):
d)	**Strength of motivation** To Share α = .77 To Hoard α = .74	The degree to which individuals consider sharing (or hoarding) knowledge important – regardless of why they feel that way.	*To Share* ❑ Sharing my professional knowledge with my teammates and co-workers at work is important to me. ❑ Sharing my professional knowledge with my employer is important to me. ❑ Sharing my professional knowledge with people at all levels where I work is important to me. ❑ I often seek out people at work to share my professional knowledge with. ❑ I often seek out people outside of work to share my professional knowledge with. *To Hoard* ❑ I do not want to share my professional knowledge with others in the organization, unless it is specifically asked for. ❑ At work, I think that it is sometimes better to keep what you know to yourself. ❑ When it comes to telling other people at work what I know, I believe that "silence" (i.e., not sharing) "is golden."

	Construct	Construct Definition	Operational Measures The four types of self-regulation are external, introjected, identified, and integrated. Measures of self-regulation are adapted from the self regulation scale used by Ryan and Connell (1989). I share my professional knowledge with others (four point Likert scale):
e)	**Self-regulation for sharing knowledge (RAI)** External α = .70 Introjected α = .62 Identified α = .80 Intrinsic α = .82	The degree to which individuals internalize external motivation to share knowledge.	*External* ❑ Because I could lose my job if I didn't. ❑ Because it is required by my job. ❑ Because it would harm my relationships if I did not share what I know with others. ❑ Because I know that I'll get a reward for doing so. ❑ Because I feel like I must or I will be punished. *Introjected* ❑ Because I want my supervisor to think I'm a good employee ❑ Because I feel bad about myself if I don't. ❑ Because I want people to like me. ❑ Because I want people to share their knowledge with me. ❑ Because it makes me feel more intelligent. *Identified* ❑ Because I want others to understand what I know. ❑ Because it is important to me to share knowledge. ❑ Because I think it's important to help others at work. ❑ Because it is satisfying to help others. ❑ Because I believe it is an important personal attribute to share what I know with others. *Intrinsic* ❑ Because it is fun. ❑ Because I enjoy doing so. ❑ Because of the happiness I feel when I share knowledge with others. ❑ Because it is interesting and satisfying to share my professional knowledge. ❑ Because it is interesting to see how my ideas affect the people I share them with.

	Construct	Construct Definition	Operational Measures Measures of useful knowledge – developed for this dissertation (five point Likert scale):
f)	**Useful knowledge sharing** α = .95	Useful knowledge sharing is KS that directly contributes to the sharer's organization's goals. If the contribution made by the knowledge shared is clear and immediate, then the usability of the knowledge is high. If the contribution is marginal or potential, then the usability is low (Holsapple 2002).	❑ I frequently share information with other people at work that helps them solve problems or do their jobs better. ❑ Even though it is not directly related to my job, I frequently share information with other people in the organization that helps them do their jobs better. ❑ I frequently share information with my supervisors that helps them solve problems or do their jobs better. ❑ My knowledge sharing helps other members in the organization solve problems. ❑ My knowledge sharing helps create new business opportunities for the organization. ❑ My knowledge sharing improves work processes in the organization. ❑ My knowledge sharing increases productivity in the organization. ❑ My knowledge sharing helps the organization achieve its performance objectives. ❑ I frequently share information with clients or customers that helps them solve problems and also helps my organization. ❑ I frequently share information with potential clients or customers that helps them do their job better and might lead my organization to get a new client or customer.

	Construct	Construct Definition	Operational Measures Measures of useless knowledge sharing – developed for this dissertation (five point Likert scale):
g)	**Useless knowledge sharing** Masked α = .88 Social α = .79 Gossip α = .75	Useless knowledge sharing neither directly contributes to, nor directly detracts from the organization's goals.	*Masked as Useful* ❑ I sometimes share information that has little value to others because I might still get a reward anyway. ❑ I am willing to share information that has little value to others because I might still get credit for helping others on my job evaluation. ❑ If others would evaluate my useless knowledge as useful, I would share information that has little value to others so that I could increase my job performance evaluation scores. ❑ If others would evaluate my useless knowledge as useful, I would share information that has little value to others so that I could improve my supervisors' perceptions of my job performance. ❑ I would share knowledge with little or no value if it meant I might get a bonus. *Social* ❑ Some of the knowledge I share with my co-workers probably has little or no value to them. ❑ Some of the knowledge that I contribute to the organization probably has little or no value. ❑ I have no problem sharing information that may not have much value to the co-workers that I share it with. ❑ I like to talk with others at work, whether or not these conversations help my organization. ❑ Some of the knowledge that I share with clients or customers probably does little to help my organization. *Gossip* ❑ I like to gossip with co-workers and colleagues. ❑ It may be the case that I sometimes share too much information with co-workers and colleagues, rather than not sharing enough. ❑ Talking about other people at work who aren't there is something that I enjoy.

	Construct	Construct Definition	Operational Measures Measures of harmful knowledge sharing – developed for this dissertation (five point Likert scale)
h)	**Harmful knowledge sharing** Unintentional α = .92 Intentional α = .85	Harmful knowledge sharing directly detracts from achieving their organization's goals.	*Unintentional* ❑ I sometimes wonder if I may do harm to my organization by telling my loved ones about situations at work. ❑ I sometimes wonder if I may do harm to my organization by telling my friends about situations at work. ❑ I sometimes wonder if I may do harm to my organization by telling my loved ones about situations at work that involve client or customer information. ❑ I sometimes wonder if I may do harm to my organization by telling my friends about situations at work that involve client or customer information. *Intentional* ❑ I sometimes share knowledge with other people within my group or team that could harm my organization by inappropriately disclosing client or customer information. ❑ I sometimes share knowledge with other people within the organization that inappropriately discloses client information. ❑ I sometimes share knowledge with other people outside of the organization that inappropriately discloses client information. ❑ I sometimes wonder if I have shared work-related information with other people that I should not have shared. ❑ I would share knowledge that violates my sense of ethics and integrity, and harms the organization that I work for, if I could earn a substantial financial reward for doing so. ❑ I would share knowledge that violates my sense of ethics and integrity, and harms the organization that I work for, if it would help convince others that I am doing an outstanding job at work.