Knowledge Management: The Effect of Knowledge Transfer on Professional Skepticism in Audit Engagement Planning

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ABSTRACT

The objective of this study is to test how the transfer of auditing knowledge, along with other variables, work together to impact the level of professional skepticism in auditors and answer the crucial question of how auditors’ competencies and expertise jointly interact with the knowledge transfer process. The study attempts to test these components in an empirical model, decomposing them and showing how they affect skepticism by comparing how knowledge is transferred in experts as compared to novices. The results of this study show that the differences between the expert auditors and the novices strengthened support for the role of knowledge and expertise in improving skepticism in engagement planning. The results of our study illustrate that knowledge transfer plays an important role in enhancing auditor professional skepticism, thereby improving the accuracy of auditor judgments. Also, as suggested by Nelson (2009), expert knowledge, position, and judgment were significant factors in the planning of an audit engagement. However, trait effects (as captured by firm effects) were not significant in explaining auditors’ judgments. These results are important in that they illustrate the significance of the role that knowledge transfer functions in facilitating auditors’ exercise of appropriate professional skepticism in audit engagement planning.

Keywords: Knowledge management, organizational learning, knowledge transfer, decision making, expertise, audit planning
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1. INTRODUCTION

Knowledge management is the focus of agile organizations and research has shown that an organization’s competitive advantage is directly affected by its ability to create, identify, share, and apply knowledge (Alavi & Leidner, 2001; Rodgers, 2016). The economy of today requires organizations to use their knowledge assets to create sustainable value for the organization over time (Gold, Malhotra, & Segars, 2001). According to Clow (2010), the ability to “facilitate the transfer of repeatable information and skills from those who have learned it to those who need to learn it” is critical to becoming a learning, thus agile organization. Organizations that are able to transfer knowledge effectively from one unit to another are more productive and more likely to survive than those that are less adept at knowledge transfer (Argote, Ingram, Levine, & Moreland, 2000). Organizations that provide support for organizational knowledge activities find that knowledge becomes a valuable asset to the organization (Wang & Wang, 2016). It is the transference of this knowledge through the organization that transforms organizations into learning organizations. Thus, the knowledge transfer process becomes an important factor in the success of organizations that expect to survive and grow.

Audit firms are a type of organization in which knowledge transfer is important, particularly in the context of audit engagement planning. Audit engagement planning research examines how factors like auditor knowledge, experience, traits, as well as incentives influence auditor decision-making during audit engagement planning (Hurtt, Brown-Liburd, Earley, & Krishnamoorthy, 2013). An important factor in auditor decision-making is professional
skepticism and this study identifies professional skepticism as an important component of knowledge transfer. Simply defined, professional skepticism is ‘an attitude that includes a questioning mind and a critical assessment of audit evidence’ (PCAOB, 2006), a very important element in making sound audit judgments. Audit regulatory bodies have noted that their inspectors continue to observe instances where auditors fail to consistently and diligently exercise professional skepticism during their audits, resulting in sub-optimal audit judgments, therefore it remains a priority for researchers and practitioners to continue to identify ways to enhance professional skepticism among auditors (Rodgers, 2012).

This study explores how knowledge transfer influences auditor decision-making in audit engagement planning. The study provides a basis for testing some useful hypotheses about the factors that mediate auditors’ knowledge transfer in the engagement planning process. While there are studies that clearly show that expertise and knowledge transfer influence individuals’ decisions (Rodgers & Negash, 2007; Tortoriello, Reagans, & McEvily, 2012), it is essential to understand how this happens in an auditing environment in order to improve auditors’ decision making. In addition, this study extends previous research exploring whether auditors’ expertise and knowledge, position within the firm, firm type, and judgments are key indicators for influencing professional skepticism in the planning of an engagement (Nelson, 2009) by actually testing a variant of proposed skepticism models.

The study compared knowledge transfer between expert auditors’ processes and novices’ processes to determine how and why their decisions differed in the task of allocating audit hours to an audit engagement based on their level of professional skepticism. We use a Throughput Model to examine knowledge transfer as an unobservable concept (Bedard, 1989; Rodgers & Housel 2004; Foss & Rodgers, 2011). Transference of knowledge as a construct measured by
two proxies: training (e.g., years of experience) and ability (e.g., years the CPA certificate held) indicators. The model is tested by comparing the judgments and planning decisions of experts to those of novices. Professional skepticism models (see Nelson, 2009 for review) have also been developed based on these studies but no researchers have attempted to empirically test the models. Some interesting causal connections emerged as a result of combining theoretical constructs with the empirical data in this study.

We posit that this task of selecting total hours for an auditing engagement is influenced by auditors’ knowledge transfer, that is, knowledge and expertise contribute to refinement and modification of reasoning processes to produce better judgments. The study involved auditors making an initial judgment of hours required to complete an actual audit engagement and then later making a final decision of how many hours to budget after obtaining information about the actual hours charged.

The results of our study illustrate that knowledge transfer plays an important role in enhancing auditor professional skepticism, thereby also improving the accuracy of auditor judgments. Expert auditors’ estimates of required audit hours were significantly higher than those of novices and also more accurate. Also, as suggested by Nelson (2009), expert knowledge, position, and judgment were significant factors in the planning of an engagement. However, trait effects (as captured by firm effects) were not significant in explaining auditors’ judgments. These results are important in that they illustrate the significance of the role that knowledge transfer plays in facilitating auditors’ exercise of appropriate professional skepticism in audit engagement planning.

Moreover, this study also extends research on how knowledge transfer and experience affect auditor performance in general as the model tested here is similar to that presented by
Libby and Luft (1993). That model put forward that more experienced auditors were able to perform better in certain tasks because of the knowledge that they had acquired through their experience. While Libby and Luft’s model looked at performance in general, the one presented in this study specifically examines performance with respect to professional skepticism. In this study we test the notion that auditors can become more skeptical because of knowledge transfer from different sources like auditing standards and in-house training courses. The focus of this study therefore, was to design and test a model for a task in which professional skepticism played an extensive role.

This study advances the literature by focusing on knowledge transfer between experts and novices in audit engagement and internal control system planning. Audit engagement and internal control systems planning is viewed as a necessary task to be performed by an IS design that reduces errors as well as alerting auditors that more examination may be required before issuance of financial information. Therefore, we argue that knowledge transfer is a crucial component that concerns interpersonal (or intergroup or inter-organizational) transfer of information and know-how (Argote et al., 2000; Chang, Gong, & Peng, 2012) receptivity, transparency, and coordination strategies (Cohen & Leventhal, 1990; Muthusamy & White, 2005). The theory of knowledge management suggests that successful knowledge transfer relies on the characteristics of not only the source of the knowledge, but also the recipient, for successful audit engagement and internal control systems planning (Argote et al. 2003).

Results showed that an IS depicting knowledge transfer and expertise has a significant positive influence on auditors’ decision-making in audit engagement system planning, and is therefore an essential element of knowledge transfer during the decision making process.
2. LITERATURE REVIEW

2.1 Knowledge management and transfer

Organizations have invested significant resources to understand and support what it means to be an agile organization. The agility of their businesses depends on their ability to best leverage the knowledge resources of their organizations with an eye toward gaining competitive advantage (Sambamurthy & Subramani, 2005). Alavi and Tiwana (2002) describe knowledge management and knowledge management systems as “necessities for organizational effectiveness and competitiveness in the new millennium.”

In the last twenty years, two major streams of research have emerged in relation to how organizations become agile through learning. The first examines the actual processes that take place during organizational learning (Iyengar & Montealegre, 2015). In this approach, structured frameworks are developed to explain the organizational learning process. The major shortcoming of this approach is that it does not provide good descriptions for measuring constructs and thus is not easily quantifiable (Robey, Boudreau, & Rose, 2000). This limits the quantity of empirical studies and constrains comparison of results.

The other approach is a knowledge-based view, which focuses on content theories (Pavlou, et al., 2005). Studies such as Vera, Crossan, and Apaydin (2011) concentrate on the outcomes of learning, which include knowledge transfer, knowledge sharing, and absorptive capacity (Iyengar et al., 2015). Practitioners and researchers alike have focused on the most efficient and effective methods to transfer knowledge throughout their organizations. Knowledge transfer is viewed as an event through which an individual or organization learns from informational sources (Argote, 1999). Improving knowledge transfer focuses on facilitating
knowledge sharing among individuals, specifically from knowledgeable individuals to others. According to Wei, Lin, Chin, An, & Weh (2015) “knowledgeable individuals often can answer questions, point to definitive sources or specialists, as well as perform needed functions requiring special knowledge, skills, and experiences” (p. 325). The knowledge-transfer framework provides a sound theoretical basis for describing how individuals’ adoption of new knowledge is influenced by refining and innovating of previous experiences and information sources.

Firms which focus on knowledge sharing behavior in the workplace foster a work environment that facilitates knowledge transfer within the organization (Bock, Zmud & Kim, 2005). It is vital that organizations recognize and understand their knowledge sharing mechanisms as well as appropriate antecedents (Navimipore & Charbrand, 2016). Barriers to knowledge sharing include insecurity in one's level of knowledge, the fear of losing a job, the perceived cost, unfamiliarity with the topic, individual attitude and perspective, and distrust (Titi, 2013).

Easterby-Smith, Lyles and Tsang (2008) considered the process of knowledge transfer at different levels of analysis including that on the individual level. Liyanage, Elhag, Ballal, and Li (2009), extended this idea when they stated that “knowledge transfer is the conveyance of knowledge from one place, person or ownership to another.” (p.122). Thus, organizational learning can be seen as depending on the interpersonal transfer of knowledge and in part on a person’s ability to integrate their own experiences with the experience of others. (Moskaliuk, Bokhorst, & Cress, 2016).

Knowledge transfer is aided by expertise, which has generally been defined in previous research as number of years of experience or practice in a particular domain (Andersson, 2004;
Bedard & Chi, 1993). To support this, Rodgers and Negash (2007) found that expertise affects knowledge transfer in that knowledge transfer showed a higher retention rate in experts compared to novices. In a study by Dogusoy-Taylan & Cagitay (2014) it was found that experts and novices followed different patterns of concept map development processes. We thus propose in this study, that knowledge transfer from accounting standards is more effective in expert auditors compared to novice auditors, hence expert auditors will exhibit more professional skepticism than novices in their audit judgments.

Experts have advanced reasoning skills that differ from the way a novice may transfer knowledge from a source. Experts link concepts in meaningful ways and memories are categorized by whether they are concept-, context-, and content-addressable (Boland, Singh, Salipante, Aram, Fay, & Kanawattanachai, 2001; Chi, Feltovich, & Glaser, 1981). They generally have very clear explanations as to why a solution is the correct one and use strategies and methodologies to derive appropriate solutions. Experts also cluster knowledge structures to improve their decision making ability. Because experts can resolve inconsistencies, they are more adept at finding solutions (Dufresne, Leonard, & Gerace, 2014). This may be because, as found by Brand-Gruwel, Wopereis, & Vermetten, (2005), experts spend more time defining the problem and use their prior knowledge and experience to regulate the entire decision making process.

Bouwman, (1984) found that experts have complex sequencing patterns in the way they process decision making information while Leonardi and Bailey (2008) found that an imbalance in expertise led to problems in knowledge transfer. Dew, Read, Sarasvathy, and Wiltbank (2009) also found that situational awareness, practice, and domain knowledge enable them to correctly
identify the decision problem and adjust accordingly. These attributes produce the situational knowledge experts need to analyze knowledge structures.

In the auditing context, Raborn (2007), found that forensic auditors develop knowledge transfer skills in deductive reasoning. Deductive reasoning provides the tools needed to form inferences about the motives that people may have in problem-solving. The ability to form inferences is an important part of the decision making process in the initial knowledge transfer phases. An expert must be able to develop an appropriate solution tableau based on the initial evidence and in situations where there is significant uncertainty, be able to deduce outcomes based on imperfect information. Experts, through their background and experience, are much better equipped to “connect the dots” and to correctly assess the situation.

The audit forecasting (planning) process resulting from knowledge transfer and utilization is an integral part of the standard operating procedures of audit firms. It is a task typically performed by expert auditors and appears to be appropriate and offers opportunities to trace the knowledge transfer process employed. In line with this, our study investigates whether, when they are asked to decide on a proposed engagement budget, managers’ and partners’ (experts) decisions are affected by knowledge transfer, their position with the firm, and type of firm.

Before beginning the process of obtaining and planning audit engagements, auditors require a general understanding of the overall sequence of forecasting audit activities. This general understanding is helpful for at least three reasons. First, audit activities depend on other activities that are normally performed at an earlier time. Second, to improve the efficiency of the audit, many activities should coincide with other activities. Third, individual activities are generally easier to understand if they can be related to the overall audit process. Research
suggests that this understanding of processes is likely to be more prevalent in experts. The first step in an audit engagement is for an auditor to use his/her knowledge structures to understand his/her client’s operations (Rodgers & Housel, 2004). For example, what are the key financial statement items? Which financial and nonfinancial statistics does the expert’s client routinely maintain? An expert auditor makes such inquiries before making preliminary assessments of risks associated with the engagement. The auditor then has to develop an audit plan where he determines the amount of hours that would be sufficient to spend on the engagement. Auditors rely on the preliminary information that they have about a proposed engagement as well as their existing knowledge structures to make this determination of the appropriate audit hours necessary to complete the engagement. In order to be effective in this task, auditors need to be appropriately skeptical in their evaluation of the available evidence.

2.3 Professional Skepticism

Professional skepticism, is traditionally defined, as “an attitude that includes a questioning mind and a critical assessment of audit evidence”, and according to the Public Company Accounting Oversight Board (PCAOB) which oversees the audits of public companies, “Professional skepticism is essential to the performance of effective audits…” (PCAOB, 2012). Professional skepticism is one component of situational decision making and is often described in auditing literature as a continuum ranging from complete doubt to complete trust (Glover & Prawitt, 2014). If for instance, the auditor is not sufficiently skeptical, they may assume that the risks associated with the engagement are low and therefore plan on, and allocate an insufficient number of hours to the engagement or vice versa. Therefore, according to Glover and Prawitt (2014) the behaviors and actions appropriate for professional skepticism must be appropriate across a range of different views, applications, and opinions. The appropriate level
of professional skepticism must fit each individual situation after appropriate analysis of the auditing environment.

Most of the research on professional skepticism examines how skepticism influences audit judgments involving the actual performance of the audit for instance, evaluation of audit evidence (Rodgers, Söderbom & Guiral, 2014). However, professional skepticism is also required in the planning of the audit, particularly in deciding on the appropriate audit hours to allocate to an audit and its various components. One common measure for skepticism therefore in auditing literature is the auditor’s inclination to perform extensive testing and this can be indicated by hours budgeted for the audit tasks (Shaub & Lawrence, 1999; Hurtt et al., 2008).

A considerable amount of auditing research is devoted to examining ways in which professional skepticism can be improved. Notwithstanding, the PCAOB has in recent inspection reports still continued to express concern over auditors failing to carry out their work with sufficient professional skepticism (PCAOB, 2012). In a PCAOB practice alert, appropriate assignment of personnel to engagement teams is identified as a key factor in promoting professional skepticism (PCAOB, 2012). The practice alert suggests that knowledge and expertise will enhance professional skepticism and this is consistent with extant research (Glover, Jiambalvo, & Kennedy, 2000; Hammersly, 2006). The main purpose of this study therefore is to examine the role that knowledge transfer plays in auditors’ skepticism and consequently, overall auditor effectiveness in the context of engagement planning.

While some studies have looked at individual determinants of skepticism, several studies (see Nelson 2009 for a review) have attempted to model skepticism, taking into account the various determinants. Nelson (2009) in particular proposes a model of professional skepticism in which knowledge and expertise play an important role. This study proposes a similar model in
which knowledge transfer and expertise are the major component, the others being position in firm and firm type. The study proceeds to experimentally test each component and then also test the overall validity of the model.

3. HYPOTHESIS DEVELOPMENT

3.1. Effect of knowledge transfer and expertise on judgment

The knowledge transfer from auditing material (e.g., training courses, auditing standards, etc.) to auditors may influence the importance of professional skepticism (Baum, McEvily, & Rowley, 2012). Further, the overlap in knowledge and expertise should make it simpler for auditors to operationalize professional skepticism (Tortoriello et al., 2012). For example, Bedard and Chi (1993) posit that experts know more about their domain and appear to have more meta-knowledge than novices. Neves and Anderson (1981) argued that one effect of experience is that simple domain facts are proceduralized into specific rules for using them, and that rules for controlling reasoning are composed and generalized. They referred to this effect as “knowledge compilation.” In other research (Boritz, Gaber, & Lemon, 1987; Ellis, Reus, Lamont & Ranft, 2011), experience effects were used as a surrogate for expert knowledge. For example, the hierarchical structure of certified public accounting (CPA) firms reflects the importance of this variable. Also, the charge-out rates used by professional accounting firms are based upon expertise equated with years of experience.

Research has shown that when comparing knowledge transfer mechanisms, experts are superior to novices in the areas of recall, categorization, and chunking (Rodgers, 1999; Lehmann & Norman, 2006). Experts produce better abstract representation of information (e.g., by concepts or a “deep structure”) (Hinds, Patterson & Pfeffer, 2001; Dufresne et al., 2014), and a
more cohesive representation of information (e.g., randomly sorts ordered script activities faster) (Pryor & Merluzzi, 1985; Lesgold, Rubinson, Feltovitch, Glaser & Wang, 1988). They also show better clusters (meaningful groupings) of presented information (Halpern & Bower, 1982), as well as greater inferential capability (Ceci & Liker, 1986; Graeff, 1997). When auditors make audit planning judgments involving the amount of audit time to allocate to an engagement, they are using a large amount of imprecise information. They have to synthesize, process and interpret the information and make their judgment ensuring that they take into consideration all the important points. It would appear that such a task would require auditors to rely on their knowledge transfer of existing structures of auditing processes. The differences in information processing and judgment between experts and novice detailed here would lead us to the first hypotheses:

**Hypothesis 1 a.** The judgments and decision choices of experts will be less varied than those of novices indicating a higher level of professional skepticism.

**Hypothesis 1 b.** The judgments of experts will be more accurate than those of novices indicating a higher level of professional skepticism.

3.2. Effect of knowledge transfer and expertise on employment position

Auditing standards and materials are incorporated in auditors’ knowledge structures and can be viewed as professional network cohesion (Reagans & McEvily, 2003). The source can be viewed as education, professional training, and auditing experience. We emphasize the importance of network cohesion since prior research has established the importance of network relationships in facilitating knowledge transfer (Szulanski, 1996; Uzzi, 1996). Such a transformation is an essential part of the knowledge transfer and acquisition process (Rodgers & Negash, 2007).
Auditors’ knowledge generally consists of general domain, subspecialty, and world knowledge (Bonner and Lewis 1990). General domain knowledge is acquired by decision makers through instruction and experience in an IS domain. Subspecialty knowledge is acquired through formal instruction and experience, and is specific to decision makers in that subspecialty area (Danos, Eichenseher, & Holt, 1989). World knowledge is accumulated through individual life experiences and instruction, and, it is unlikely that all decision makers at a given experience level will possess it equally. While world knowledge might not significantly differ across experience levels, general domain and subspecialty knowledge, which are key components of auditing tasks are likely to be possessed by experts but tenuous in novices.

Our model assumes that auditors who are experienced and have acquired subspecialty knowledge are those who are likely to have achieved higher positions in the accounting firms (managers and partners), while those who are novices occupy the lower positions in the firms. Assuming that the more subspecialty knowledge possessed, the higher the position held, it is likely that there will be a significant difference in this kind of knowledge between managers and partners. Since subspecialty knowledge is a key component of an auditing task, it can be posited that different levels of this type of knowledge would also result in different judgments. Conversely, general domain and world knowledge, which are likely to be possessed by novices, are not as important in auditing judgment tasks therefore differing levels of this type of knowledge would not be expected to necessarily yield different judgments. Also, because this type of knowledge is not necessarily relevant to auditing, it is unlikely to influence the position that they hold in the firm. This leads to the second hypothesis:

**Hypothesis 2.** Expert (novice) auditors’ knowledge transfer will (will not) significantly affect their employment position and judgment.
3.3. Knowledge transfer effect of position on judgment

Recall that in the case of auditing expertise, the assumption is that the more knowledge auditors have, the more likely it is that they hold a higher position, and also being better at knowledge transfer due to experience will mean that they make different (better) decisions than someone with less knowledge. For example, managers may be influenced to include built-in slack time as part of an audit budget. On the other hand, partners desire more efficiencies in an audit budget and may want to reduce the total hours by carrying out less detailed tests. Novices however, only have general domain and world knowledge which is not so relevant to auditing tasks, therefore it will affect neither their position nor their judgment. Assuming that H2 holds, it can therefore be expected that the position that an expert holds would significantly influence judgment while the position held by a novice would not.

Hypothesis 3. Expert auditors’ (novice) employment position with the firm will (will not) significantly affect their judgment.

3.4. The knowledge transfer effect of judgment on decision

The view of knowledge transfer in this section is that learning involves acquisition and exploitation of new knowledge by decision makers and organizations (Cohen & Levinthal, 1990). For instance, where auditors make an initial judgment about audit hours, it is merely an estimation of what they think would be adequate given some facts about the proposed audit. In the case that they obtain additional information that is relevant and helpful to their decision, they may be compelled to modify this initial judgment by incorporating the new information. This is usually the case because auditors first estimate the hours for the engagement (judgment) and then after final consultation with partners (or higher level managers), a final decision choice is made regarding the hours for the engagement. The decision choice can be influenced by consultation
with the firm’s management and/or competitive bidding from other firms. Because of this, it is important to examine the relationship between the auditor’s initial judgment and the final decision that is ultimately made regarding audit hours.

In transferring knowledge, professionals rely more on deep features such as auditing standards or procedures, and novices’ rely more on surface features or common factors (Chi et al., 1981; Wu & Lin, 2006). Nonetheless, any new information being considered is match-processed with expert auditors’/novices’ existing models such that the resulting judgment is still based on the initial judgment. Thus we can expect that all auditors will match-process any new information they obtain from final consultations against their original estimates of audit hours resulting in final decisions being related to original judgments, leading to the fourth hypothesis:

**Hypothesis 4.** For both expert auditors and novices, judgments will significantly affect decision choice.

### 3.5. Embedded Knowledge Transfer in Firm Effects

A potential knowledge recipient is more likely to effectively procure knowledge from a source when the source and recipient overlap in what they know (Tortoriello et al., 2012). Further, knowledge transfer may be more successful since the source (auditing firm) and the recipient (partner or manager) overlap in terms of ideas, methods, and procedures (Cohen & Levinthal, 1990). As a result, the auditing firm and partners/managers are more likely to be acclimated to communicating with their respective associates via knowledge transfer. For example, previous research has shown that knowledge transfer as depicted by firm effects, has a significant impact on auditors’ judgments (Francis, Maydew, & Sparks, 1999; Geiger & Rama, 2006). Large firms particularly wish to promote an image of product homogeneity therefore they emphasize consistency of audit approach. This can be achieved through extensive adoption of
checklists, structured working papers, decision aids and staff training programs. This consistency of audit approach usually means that auditors from one firm will tend to do things differently from another firm, and the differences in firm audit approach may then result in significant differences in audit judgment. In the context of engagement planning, it may then be expected that auditors’ professional skepticism may be influenced by the training received from, and firm policies employed in different firms. This leads to the final hypothesis:

**Hypothesis 5.** Professional skepticism in terms of firm effects will significantly affect partners/managers’ judgments.

### 4.0 Modeling Knowledge Transfer and Professional Skepticism

This study presents expert knowledge as a latent concept measured by both training (e.g., years of experience) and ability (e.g., years the CPA certificate held) indicators. A crucial feature involving the use of information is whether the information fits into a causal link that eventually affects decision choice (Tversky & Kahneman, 1974). Rodgers (1991b) advocated that this approach permits a detailed, substantive tracking of the decision-making process under investigation which may lead to improved artificial intelligence techniques and expert systems. Einhorn and Hogarth (1981) emphasized that predictions and actions, as well as outcomes should be represented as a causal process model. Thus, the hypotheses predicted above were used to build a model of professional skepticism. Before the discussion of the proposed model structure, a summary of the variables used in this model is in order.

We posit that expertise and knowledge transfer will have a significant effect on judgment, that is, a knowledge base acquired in a formal learning environment should affect auditors’ judgment. Next, auditors’ positions (ranks) within the firm are considered as a significant factor
influencing knowledge transfer and utilization, and revisions of tentative strategies (i.e., professional skepticism judgments). While this is not a variable necessarily examined in previous models such as those presented by Nelson (2009) and Libby and Luft (1993), in this study it is considered to have a significant influence on auditors’ judgment, and to also mediate the relationship between knowledge transfer and auditors’ judgments.

The judgment variable represents an auditor’s search for, or design of possible solutions, and the decision choice represents his/her selection of an action. Judgment thus mirrors skeptical judgment and decision choice mirrors skeptical action in the model presented by Nelson (2009). Finally, firm effects are included in this model, because previous research points to the significance of these variables.

Causal analysis is influenced immensely by two versions of the representative heuristic model (Nisbett & Ross, 1980; Rodgers, 1991a; Rodgers, 1991b). First is the mandate that features of any causal factor resemble the characteristics of the effect to be explained. This study shows that an auditor’s position in a firm is affected by his/her expert knowledge of budgetary requirements before making decisions concerning accepting an engagement with a minimum amount of total hours.

Second is the requirement that a cause resemble a causal factor in a theory which explains the effects in question. For example, auditors are assumed to make inferences on the basis of their knowledge of auditing procedures and to store these as abstract concepts and rules for decision making (Bedard & Chi, 1993; Rodgers & Housel, 2004). This study suggests that auditors consider their expert knowledge important and relevant in evaluating proposed audit engagement budgets and may clarify how auditors select the total hours for engagement budgets, as mediated by their position in the firm and by a more in-depth analysis they perform in the
judgment stage. Therefore, this study proposes a four-stage model for decision making that supports IS design (Figure 1).
Figure 1 - Auditor’s Knowledge Transfer Causal Processes

During the first stage, auditors’ expert knowledge has a direct effect on position as well as on judgment. Position has a direct effect on judgment in the second stage. The third stage of processing involves the effects of auditors’ judgments on their decision choices. This stage depicts the auditor with access to organized memories, derived from prior preferences and firm effects, which allow the auditor to compare current budgetary engagements with expectations distilled from the use of expert knowledge. Auditors’ fourth stage represents their selection of a minimum total of budgetary hours for an engagement. These minimum hours represent auditors’ final decision after a negotiation process has taken place. These types of decisions are referred to as constructions, in which an individual tries to assemble the most satisfactory alternative possible (Yates, 1990).

5. METHODOLOGY

5.1 Participants

Data for this study was obtained by conducting an experiment with 64 practicing auditors from the ‘Big 4’ CPA firms as well as 33 Summer school business students. Of the 64 auditors who represented the ‘experts’, 26 were managers and 38 were partners. The business students who were enrolled in a graduate credit analysis course at the University of California (who participated in this study for extra credit), represented novices as they reported having no previous supervisory audit experience.

5.2 Experimental Task
The experimental task involved time budget preparation for an audit engagement and was developed from an actual audit engagement completed by one of the “Big 4” CPA firms. This engagement had been obtained in a competitive bidding and had resulted in the CPA firm billing the client for a total of 462 hours for the audit.

The audit planning task was deemed appropriate because it can be viewed as a decision-making variable that captures knowledge transfer. This is because it involves deciding, based on knowledge acquired from sources like auditing standards, education and training, on factors such as the appropriate number of audit hours to allocate to audit tasks. The task is also considered appropriate to test knowledge transfer effects because it is one that requires more skill and knowledge, and is not likely to be made the sole responsibility of inexperienced audit staff, which is an essential factor in enhancing the validity of test results (Libby & Luft, 1993). Auditors make initial judgments about the risk of material misstatement of an assertion and use those judgments to decide on the areas where they will focus their audit efforts and how to judiciously allocate the time and other resources they have available to that audit engagement. As with any other audit judgment, auditors are expected to exercise professional skepticism in this task, therefore it is appropriate that professional skepticism be evaluated within this context of engagement planning (PCAOB, 2007, 2008). When auditors exercise professional skepticism, it is expected that this professional skepticism is reflected in planned audit hours for their audit engagements.

5.3 Procedure

Case materials were delivered to the practicing auditors at their offices while the students received the case material during class and were told to treat the case as an in class assignment. The participants were told that their responses would be held in the strictest confidence and were
instructed to work independently and not discuss the study with others. Further, they were instructed that they did not have unlimited time for the audit.

Participants were told that they had been assigned as a partner/manager in charge of a new client that had never been previously audited, and they were provided with information on the client relating to general history, credit arrangements, accounting policies and procedures, and employment policies and compensation. They were instructed to estimate the total hours needed to complete the audit without the knowledge of the actual total hours spent on the audit engagement (this represented their judgments). Estimation of hours needed was to be done by assigning (budgeting) time (in man hours) to each of 24 “audit areas,” based on the information provided in the case. Then all the participants were given the actual total hours spent on the audit. Finally, they were asked to estimate the minimum number of hours that they would need to perform the audit engagement (decision choice).

In addition to estimated hours needed to complete the engagement, demographic information on the participants was also collected.

5.4 Variables

All five constructs in this model were captured on a questionnaire that was completed by each participant. Each of the five constructs was measured, or indicated, by questionnaire items. Questions were chosen to have a specified degree of variability in content so that the latent variable that unified each set of questions would have a reasonable degree of meaningful generality.

Expert knowledge was assessed by auditors’ experience (how many years of auditing experience they had) and the year the CPA certificate was obtained (number of years the CPA
certificated has been held). Novices’ expert knowledge was assessed by number of accounting courses taken and type of education (bachelor=1; bachelor and above=2). Position for experts was indicated by whether they were managers (coded “1”) or partners (coded “2”). For novices, position was indicated by whether they had a supervisory experience (coded “1”) for supervisory experience and “2” for non-supervisory experience. Firm effects were indicated by which of the Big Four CPA firms the participants belonged and these were coded “1” through “4” with each number representing a Big 4 CPA firm.

Expert auditors’ and novices’ judgments were measured by the total hours they indicated were needed to complete the engagement (without participants’ knowledge of actual bid hours for the engagement). Their decision choices were measured by the minimum hours they indicated that they would accept the auditing engagement for (after their knowledge of actual bid hours).

5.5 Development of an Expert Model

The methodology used to analyze the theoretical model consists of an application of developed procedures of causal modeling (Foss & Rodgers, 2011; Bentler, 1983; Guiral, et al., 2015; Rodgers & Housel, 1987; Rodgers & Housel, 2004; Rodgers & Johnson, 1988) to correlational data obtained from a sample of auditors. Multivariate analysis with latent variables is employed to estimate simultaneously the parameters of a causal model and a measurement model. The causal model specifies linear influences hypothesized to be present in a group of latent variables. These latent variables are not measured directly; rather, they are inferred from the measured variables.

The measurement model denotes the linear relations of these latent variables to the observed variables. For example, in Fig. 1 the causal parameters (regression weights) are
depicted by unidirectional arrows between the latent variable indicated in a circle and measured variables indicated in boxes. The measurement parameters are not indicated. The smaller, single-ended arrows illustrate residuals or unexplained variances.

Figure 3 shows a possible measurement structure for the only latent expert knowledge construct. The $x$’s are observed variables; the arrows between the $x$’s and the latent variable indicate factor loadings, whereas the other arrows designate error variances. The auditor’s expert knowledge is not observed, but its effects are expressed in the observed variables. This approach to expert knowledge as a latent variable is consistent with the idea of decision makers’ processes as a hypothetical variable (Rodgers & Housel, 1987; Rodgers & Housel, 2004).

![Figure 2 – Measurement Model for Knowledge Transfer Influencing Skepticism in Engagement Planning](image)

Since all of the variables to be analyzed are ordinal as well as interval, a moment matrix of polyserial correlations was performed before testing the causal model (Olsson, 1979). This was done because when some of the variables are ordinal, the only correlation matrices which are
meaningful are moment matrices, since ordinal variables do not have an origin or a unit of measurement (Muthen, 1984). The assumption of normality was derived by testing each pairing of variables which previously met the test of significant correlation.

5.6 Analysis

Maximum likelihood was used to estimate our model by the computer program LISREL (Joreskog & Sorbom, 1988). A goodness-of-fit index and a root mean square residual were used to evaluate the efficacy of the model. When close to 1.00, the goodness-of-fit index indicates that the model has captured most of the information about relationships between the observed variables as given in the sample variance/covariance matrix (Bentler, 1983). The root mean square residual measures the average of the residual variances and covariances. Values less than 2.00 indicate a good fit of the model.

6. RESULTS

Table 2 reports the mean and standard deviations for the expert auditors and novices. The measurement model parameters of Tables 2 and 3 represent factor loadings. The factor loadings are the standardized regression weights for predicting observed variables from latent constructs. The factor loadings are high and consistent for each of the latent variables under investigation. Consequently, it can be concluded that the model assesses the theoretical constructs hypothesized to exist at the level of latent factors with a reasonable degree of precision, and that the observed variables are adequate indicators of these factors.
Table 2
Expert Auditors’ and Novices’ Data

EXPERT AUDITORS’ DATA

<table>
<thead>
<tr>
<th>CPA Certificate</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td>Obtained</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
</tr>
<tr>
<td>Std. Dev.</td>
<td></td>
</tr>
</tbody>
</table>

Mean

<table>
<thead>
<tr>
<th>CPA Certificate</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td>Obtained</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
</tr>
<tr>
<td>Std. Dev.</td>
<td></td>
</tr>
</tbody>
</table>

NOVICES’ DATA

| Number of accounting courses | Supervised vs. | Decision |
|------------------------------|-----------------|
| Number of education courses  | Education       | Non-supervised | Firm | Judgment | Choice |
| Mean                         |                |          |      |          |        |
| Std. Dev.                    |                |          |      |          |        |

Mean

| Number of accounting courses | Supervised vs. | Decision |
|------------------------------|-----------------|
| Number of education courses  | Education       | Non-supervised | Firm | Judgment | Choice |
| Mean                         |                |          |      |          |        |
| Std. Dev.                    |                |          |      |          |        |
### Table 3

**Expert Auditors’ Standardize Parameter Estimates**

#### Measurement Model Parameters

<table>
<thead>
<tr>
<th>Factor and Variables</th>
<th>Factor Loading</th>
<th>Error Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert Knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td>-1.047</td>
<td>0.033</td>
</tr>
<tr>
<td>Year CPA obtained</td>
<td>0.907</td>
<td>0.038</td>
</tr>
</tbody>
</table>

#### Causal Model Parameters

<table>
<thead>
<tr>
<th>Regression Weights</th>
<th>Standard Weight</th>
<th>Critical Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP</td>
<td>0.786</td>
<td>9.132*</td>
</tr>
<tr>
<td>EJ</td>
<td>0.436</td>
<td>2.666*</td>
</tr>
<tr>
<td>PJ</td>
<td>-0.534</td>
<td>-3.030*</td>
</tr>
<tr>
<td>JD</td>
<td>0.715</td>
<td>8.116*</td>
</tr>
<tr>
<td>FJ</td>
<td>-0.099</td>
<td>-0.817</td>
</tr>
</tbody>
</table>

Where, E=Expert Knowledge, P=Position, J=Judgment, D=Decision Choice, and F=Firms

**Residual variances**

- Position: 0.382
- Judgment: 0.882
- Decision choice: 0.489

Coefficient of determination ($R^2$) = 0.646

Chi-square with 7 df=13.03

Goodness of fit index = 0.852

Root mean square residual = .120

* $p < .05$
### Table 4

Novices’ Standardize Parameter Estimates

**Measurement Model Parameters**

<table>
<thead>
<tr>
<th>Factor and Variables</th>
<th>Factor Loading</th>
<th>Error Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert Knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td>0.660</td>
<td>0.226</td>
</tr>
<tr>
<td>Year CPA obtained</td>
<td>0.813</td>
<td>0.281</td>
</tr>
</tbody>
</table>

**Causal Model Parameters**

<table>
<thead>
<tr>
<th>Regression Weights</th>
<th>Standard Weight</th>
<th>Critical Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP</td>
<td>-0.411</td>
<td>-1.880</td>
</tr>
<tr>
<td>EJ</td>
<td>0.392</td>
<td>1.654</td>
</tr>
<tr>
<td>PJ</td>
<td>-0.083</td>
<td>-0.431</td>
</tr>
<tr>
<td>JD</td>
<td>0.411</td>
<td>2.554*</td>
</tr>
</tbody>
</table>

Where, E=Expert Knowledge, P=Position, J=Judgment, and D=Decision Choice

**Residual variances**

| Position             | 0.831           |
| Judgment             | 0.813           |
| Decision choice      | 0.831           |

Coefficient of determination ($R^2$) = 0.282

Chi-square with 4 df=6.40

Goodness of fit index = 0.923

Root mean square residual = .096

*p < .05
The details associated with the causal model parameters of Tables 2 and 3 can be understood in the context of the following notation. Each causal parameter estimate contains a subscript consisting of two letters. These designations are derived from the first letters of the respective factor names communicated by the parameters (E= expert knowledge, P= position, F= firm, J= judgment, and D= decision choice). The subscripts associated with regression weights (directional arrows in the figs.) are ordered so that the first subscript signifies the antecedent variable (or “cause”), while the second refers to the dependent (endogenous) variable.

Overall, it can be seen in Tables 2 and 3 that the causal model’s $R^2$ is moderately high (0.646) for the expert auditors’ model and moderate for the novices’ model (0.282), respectively. Also, the goodness-of-fit index and the root mean square residual (see Tables 2 and 3) results indicated a good fit for both models (see Rodgers and Johnson 1988, for a detail description on model fit).

**Hypothesis 1**

Recall that H1a predicted that the judgments and decisions of partners/managers would be less varied than those of novices, thereby indicating enhanced professional skepticism. A multi-sample analysis (Joreskog & Sorbom, 1988) was used to test this hypothesis. This test determined whether there was any significant difference between the expert auditors and the novices’ model for the decision choice variable. This analysis is similar to MANOVA (see Bray & Maxwell, 1985). In the multi-sample analysis tested in this study, the differences in the expert auditors’ model compared to the novices’ model was equivalent to a test of whether the error variance of decision choice was equal across both groups. In other words, the error variance is constrained to be equal across the two groups, to show, based on chi-square differences, that they
are unequal. Based on these results, the two groups were significantly different on judgment and decision choice ($\chi^2 = 20$, df = 1) at the p < 0.05 level. Also, the expert auditors’ group arrived at less varied predictions for required audit hours, that is, the dispersion of predictions by expert auditors group was statistically lower (see Table 1), hence H1a was supported.

H1b, which predicted that the judgments of expert auditors would be more accurate than those of novices, was also supported (thereby enhancing professional skepticism). Results show that expert auditors’ means for “judgment” (451) are significantly closer to the winning bid of 462 hours than the novices’ mean (394) at the p < 0.05.

**Hypothesis 2**

The second hypothesis was supported in that expert auditors’ knowledge transfer significantly affected their position ($\beta_{EP} = 0.786$) and judgment ($\beta_{EJ} = 0.436$) at the p < 0.05 level. Results show that partners generally possessed more knowledge and expertise as measured by the length of time they had held the CPA certificate, and their years of experience in auditing compared to managers. Also the knowledge transfer influencing the judgments of managers was significantly different from that of partners. Novices’ knowledge transfer did not affect their position ($\beta_{EP} = -0.411$) and judgment ($\beta_{EJ} = 0.392$) at the p < 0.05 level. This outcome can be explained by noting that novices did not have any knowledge transfer of prior experiences to reinforce known auditing rules or previous hypotheses.

**Hypothesis 3**

The third hypothesis was supported: Knowledge transfer of expert auditors’ position with the firm significantly affected judgment ($\beta_{PJ} = -0.534$) at p < 0.05, and novices’ position with the
firm did not significantly affect judgment ($\beta_{pj} = -0.083$) at $p < 0.05$. The negative sign may be an indication that managers, since they are closer to administering an audit engagement, have more expertise in audit planning.

**Hypothesis 4**

There was evidence supporting the fourth hypothesis that both expert auditors and novices' judgments significantly affected decision choice ($\beta_{jd} = 0.715$ and $0.411$, respectively) at the $p < .0.05$ level.

**Hypothesis 5**

Finally, the fifth hypothesis was rejected since the professional skepticism in terms of firm effects pathway ($\beta_{pj} = 0.031$) did not have a significant effect between partners and managers' judgments.

7. **DISCUSSION**

Support for hypothesis 1 suggests that expert auditors appear to be better than novices at knowledge transfer and utilization, information search, and comprehension. Apparently, they are better able than novices in searching through less information and making general interpretations of the data, and building representations of situations from an IS perspective. The initial judgments of expert auditors were significantly closer to the actual hours compared to those of novices. These initial judgments were also significantly higher than those of novices, thereby reflecting higher levels of professional skepticism. Both judgments and decisions of experts were less varied than those of novices, providing evidence that experts generate more cohesive representations of information and are also more consistent in their evaluation of information that resulted in a superior IS design platform. This indicates that experts are more equipped to
sort through the information given, and decide what is important and what is not important to the task at hand. Their ability to weigh and prioritize the available data results in a more accurate assessment of the task. In particular, expert auditors’ representations seem to be larger, taking into account more of the available information. The novices, on the other hand, tend not to probe deeply, and not to look at the long-term implications of the audit planning.

Results of hypotheses 2 and 3 provide evidence for the idea that knowledge transfer and experience, which are reflected in firm position, will generally improve judgment and skepticism (the differences between novices and experts). However, results within the expert group provide further evidence for the notion that sometimes more experienced auditors (partners) may exhibit less skepticism than managers (Shaub & Lawrence, 1999).

The results from hypothesis 4 simply show that auditors, regardless of their knowledge transfer and experience, will incorporate new information into their initial judgments in a reasonably consistent manner. Auditors’ final decision choices for audit hours were influenced by initial estimates, suggesting that auditors’ skepticism reflected in the initial judgments is carried through to the final decision, and not overly influenced by new information from partner consultations. This reinforces the idea that experts are able to weigh the importance of information and to make judgments as to the impact of information on final outcomes. On the other hand, novices, even when faced with new (arguably better) information, were apparently unwilling to significantly modify their initial positions, showing an inferior ability to weigh the importance of information, and appropriately incorporate it in their decision-making.

Another important finding in this study is that firm effects were not significant in explaining auditors’ judgments. Also note the regression weight of 0.031 for $\beta_{FJ}$ in Table 2. This means that style or varied training from different accounting firms does not influence the
expertise of auditors (or skepticism). Undoubtedly, expert auditors’ professional skepticism depicted in their judgments is quite similar across firms. For future IS design, this finding supports the notion that differences in audit “style” are not necessarily reflected in audit judgments regarding internal control systems.

The model differences between the expert auditors and the novices strengthened support for the role of knowledge and expertise in improving skepticism in engagement planning. For the expert auditors’ model, it is apparent that expert knowledge, or some unidentified antecedents, are contributing significantly to the occurrences of position type and judgment without the regulation of firm effects.

In the third stage of the expert auditors’ model, position has a significant effect on judgment and a significant indirect effect on decision choice of -0.386 (p < 0.05), that is, the role of position type in inducing future behavior is, for the most part, mediated by judgments. These findings in general, appear to point to the importance of factors besides judgments for the prediction of behavior in an engagement planning setting. Position type and judgment contribute significantly to the ability of expert auditors to assess the initial information and to make accurate assessments based on their experience and knowledge. Their level of professional skepticism contributes to their ability to make judgments about the value of data and its relevance to the audit planning phase.

The arrows in a diagrammatic representation of the causal model (Figure 1) imply theoretical causal influences. The empirical parameter estimates must be carefully compared to theoretical expectations. That is, neither the causal regressions of expert knowledge and position on judgments nor the expert knowledge effect on position is positive. Consequently, one may conclude both that judgments may be altered by factors other than expert knowledge and
position, and that changes in auditors’ decision-making processes underlying an engagement planning setting process may be affected by their use of heuristic and cognitive simplification strategies (Joyce & Biddle, 1981; Tversky & Kahneman, 1974). It is hypothesized that such negative effects might be expected in those situations where auditors’ strategies serve them well, even though undesired systematic biases may occur in some tasks. For example, a conclusion reached in a major review of the judgment literature in psychology (Slovic & Lichtenstein, 1971) is applicable in the context of budget setting: “Judges have a very difficult time weighing and combining information, be it probabilistic or deterministic. To reduce cognitive strain, they resort to simplified strategies, many of which lead them to ignore or misuse relevant information” (p. 735). Therefore, the exact extent to which auditors’ expert knowledge and position relate to other types of auditing tasks remains an empirical question that requires further research.

8. CONCLUSIONS

The aim of this study was to examine knowledge transfer in expert and novice auditors to determine how and why their decisions differed in the task of allocating audit hours to an audit engagement. The study involved auditors making an initial judgment of hours required to complete an actual audit engagement and then later making a final decision of how many hours to budget after obtaining information about the actual hours charged.

Overall, this study concluded that the transfer of information or know-how may affect audit decisions. Thus, the study takes the IS literature one step further by positing the predictability of
audit decisions on the basis of knowledge transfer components as depicted by the model in Figure 1.

More specifically, the study finds the judgments of expert auditors are more accurate and exhibit higher levels of professional skepticism, thus expert auditors appear to be better than novices at knowledge transfer and utilization, information search, and comprehension. These findings add to the understanding of the role of expertise in audit judgments, as existing research has not examined audit judgments in the context of knowledge transfer. Similarly, this extends our understanding of the applicability of knowledge transfer concepts in the area of audit planning.

The finding that superior knowledge transfer in expert auditors led to more skeptical audit judgments adds to the research on professional skepticism. This is important as trending research focuses on how auditors can exhibit higher levels of professional skepticism, and these findings suggest strong associations between skepticism and knowledge transfer. Thus, examining ways to improve knowledge transfer in auditors may improve professional skepticism, making this a fertile area for future research.

Considering that much of the knowledge that auditors acquire is from training courses, auditing standards and auditing manuals, findings from this study highlight the limited value of exposure to those sources of knowledge, helping to better calibrate the expectations from novice auditors. This study suggests that the transfer of knowledge from different sources is best accomplished in experts, so training alone cannot substitute for actual expertise, thus certain higher level tasks still need to be allocated to experts, regardless of exposure to knowledge sources.

Another important finding of this study was that auditor judgments were consistent across different audit firms. This suggests that the model used can serve as a “starting point” for
describing and understanding that different audit practices do not necessarily lead to different audit judgments for internal control systems. In other words there may be many ways to a mean. As with programming languages, programs can be written a thousand different ways and still accomplish the same task. Also, the model may be useful for investigators in the determination of how IS may effectively use knowledge transfer in order to weight and combine information to make evaluations, predictions and choices of audit engagement and internal control system budgets. In big data analysis, the use of artificial intelligence based algorithms could provide much more efficient and effective models in the future.

This study used multivariate analysis with the latent variable of expert knowledge, the benefits being, (1) the results are freed from the arbitrary levels of reliability or error variance in the variables, (i.e., estimates of effects are not biased as they are in path analysis with observed but unreliable variables); and (2) greater generalizability is obtained in that the latent constructs are more general than any particular measured variable (see Bentler, 1983). Thus, this study has proposed an IS model that may be more reflective of decision makers’ processes underlying engagement and internal control system planning behavior.

While the results reflected in this study may not necessarily amount to verified theory, they do suggest a potential direction, which may provide fertile areas for future IS theory development and research, especially in the areas of professional skepticism, knowledge transfer and utilization.
REFERENCES


This research project did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
Highlights

Title: Knowledge Management: The Effect of Knowledge Transfer on Professional Skepticism in Audit Engagement Planning

- Explores how auditors’ interact with the knowledge transfer process.
- Illustrates how knowledge transfer improves the accuracy of auditor judgments.
- Highlights the significance of knowledge transfer in audit engagement planning.
- Uses an empirical model to test how skepticism is utilized in experts vs novices.