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Enhancing Knowledge Sharing in Public Accounting Firms

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SYNOPSIS: The goal of this study is to advance understanding of factors that may enhance or hinder knowledge sharing in public accounting firms and, in the end, provide practical recommendations for the firms. Attention to this topic is warranted for two reasons. First, today's regulatory environment and new auditing standards have broadened and intensified pressures on CPA firms to enhance the quality, effectiveness, and efficiency of the audit process. Second, knowledge and expertise are unevenly distributed among the members of the audit team. Thus, knowledge sharing can help CPA firms in leveraging the skills, knowledge, and best practices of their professional staff. Against this background, CPA firms' ability to effectively deploy knowledge-sharing activities is increasingly vital to their competitive advantage, including gaining tangible benefits in terms of time and cost reductions. We draw upon prior research in accounting, organizational learning, psychology, and knowledge management to examine the role of three factors—information technology, formal and informal interactions among auditors, and reward systems—in encouraging knowledge sharing. We develop recommendations for public accounting firms and suggest several directions for future research.

INTRODUCTION

Over the last decade, knowledge sharing has received widespread attention, both by corporations (e.g., CIGNA, Dow Chemical, Hewlett-Packard, Shell, and Xerox) and by the professional literature (e.g., see Sharp 2003; Kepczyk 2000; Stimpson 1999; Bukowitz and Petrash 1997; Bank 1996; Mullin 1996). This attention reflects an increased recognition that sharing knowledge among employees is the primary intangible source of sustained competitive advantage, economic growth, and corporate value. At the same time, organizational learning and psychology research consistently shows that knowledge sharing within organizations is often limited (Szulanski 2000, 1994; Nonaka and Takeuchi 1995; von Hippel 1994). Our goal is to advance understanding of factors that may enhance or

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hinder knowledge sharing in CPA firms and, in the end, provide practical recommendations for the firms.

Attention to knowledge sharing in CPA firms is warranted for two major reasons. First, today's regulatory environment (e.g., Sarbanes-Oxley Act of 2002, U.S. House of Representatives 2002) and new auditing standards (e.g., the Public Accounting Oversight Board's Auditing Standard No. 2) broaden and intensify pressures on CPA firms to enhance the quality, effectiveness, and efficiency of the audit process.¹ Thus, now more than ever, CPA firms need to create, integrate, share, and use knowledge about their clients' control activities and corporate governance (Vera-Muñoz 2005). Effectively implementing these knowledge-based activities is increasingly vital for CPA firms to maintain their competitive advantage (De Carolis 2003; Grant 1996), including gaining tangible benefits in terms of time and cost reductions (Umamoto et al. 2004). We focus on *knowledge sharing* because it is the cornerstone of knowledge management (Alavi and Leidner 2001; Gupta and Govindarajan 2000; Baxter and Chua 1999; Davenport and Prusak 1998; Szulanski 1996).

Second, most client engagements involve teams of individuals, each performing a discrete part of the audit process. In the course of the audit, knowledge and expertise about the client's environment, industry, business model, and operations are typically distributed unevenly among audit team members (Murthy and Kerr 2004; Harding and Trotman 1999; Rich et al. 1997; Davidson and Gist 1996; Ramsay 1994).² This is because auditors are routinely assigned to different engagements that vary in terms of complexity and industry. Thus, auditors need to share with members of the audit team their knowledge and expertise about industry-specific trends as well as accounting, auditing, and regulatory issues that may impact the conduct and outcome of the audit. The ability of CPA firms to leverage the skills, knowledge, and best practices of their professional staff, to capture knowledge for reuse, and to minimize information overload will determine the quality, effectiveness, and efficiency of their audit and attestation services.

Despite the potential importance of knowledge sharing to CPA firms, accounting practitioners and scholars have made little progress in understanding its anatomy. In this study, we engage prior research in accounting (e.g., Murthy and Kerr 2004; Winograd et al. 2000; Bamber et al. 1989), organizational learning (e.g., see Argote 1999; Hedlund 1994; Epple et al. 1991; Huber 1991), psychology (e.g., see Kraiger et al. 1993), and knowledge management (Earl 2001) to provide a systematic examination of the role of three factors—information technology (IT), formal and informal interactions among auditors, and reward systems—in encouraging or hindering knowledge sharing.

In the next two sections, we discuss knowledge as a theoretical construct and the various factors affecting knowledge sharing, respectively. Based on this discussion, we offer three major recommendations. First, while the emergence and proliferation of new information technologies increase the ability of CPA firms to share knowledge, effective knowledge sharing requires more than a technological solution. Successful knowledge sharing further demands an organizational solution that includes the firm's employees, their practices, and their know-how. Second, to encourage knowledge sharing, CPA firms need to develop and

¹ On June 17, 2004, the Securities and Exchange Commission approved the PCAOB's Auditing Standard No. 2, which governs the independent auditor's audit and reporting on management's assessment of the effectiveness of internal control over financial reporting. This standard must be used by auditors to satisfy their obligations under Section 404 of the Sarbanes-Oxley Act.

² For example, seniors are likely to have, and rely heavily on, strong technical knowledge and audit procedures. Relative to seniors, managers generally have more fully developed knowledge of the client and its industry, and are likely to use this knowledge for directing audit efforts. Partners, typically, are likely to use their knowledge in a relatively more evaluative mode than team members at other levels.

nurture a culture that simultaneously rewards knowledge sharing and discourages knowledge hoarding as a source of power or job security. Finally, to enhance the prospects of knowledge sharing in team-based settings, CPA firms should seek synergistic ways of combining extrinsic motivation with intrinsic motivation. We discuss these recommendations in detail in our concluding section and offer several suggestions for future research.

KNOWLEDGE AS A THEORETICAL CONSTRUCT

Knowledge

According to the *Merriam-Webster's* dictionary, knowledge is the awareness and understanding of facts, truths, or information gained through reasoning in the form of experience or learning. Knowledge is an appreciation of interconnected details that, in isolation, are of lesser value. Researchers use diverse expressions to define knowledge. For instance, a common definition is that knowledge consists of "justified true belief" (Nonaka 1994, 15). Knowledge has also been defined as stock of expertise (Starbuck 1992) and information in action (Elliott and O'Dell 1999). In the training literature, Goldstein (1993) defines knowledge as an adequate understanding of facts, concepts, and their relationship, and as the basic foundation of the information a person needs to perform a task. Bartol and Srivastava (2002, 65) consider knowledge to include information, ideas, and expertise that have purpose or use, and are thus relevant for tasks performed by individuals, teams, work units, and the organization as a whole. As such, knowledge is anchored on the cognitive abilities, beliefs, and commitment of the person who holds it (Nonaka and Takeuchi 1995, 58–59).³

Various characteristics determine the value of knowledge within an organization. First, knowledge is portable and the speed at which knowledge moves determines its value. Second, knowledge appreciates in value when shared with others. This contradicts the tendency of people to resist sharing knowledge out of the belief that "knowledge is power." While limiting the distribution of knowledge may be beneficial to individuals, it is almost always destructive for the firm as a whole. This is because the value of knowledge can increase exponentially when it is networked, reused, and quickly integrated into business practices and processes.

Sharing Explicit and Tacit Knowledge

Polanyi (1966) classified knowledge into two categories: explicit and tacit. Explicit knowledge, or "know-what," can be captured, codified, categorized, and stored, and is easy to transmit in a formal language (Bartol and Srivastava 2002, 65; Stenmark 2000, 10). Tacit knowledge, or "know-how," is embodied in the habitual practices and mental models of individuals (Lakoff and Johnson 1999; Polanyi 1997; Nonaka and Takeuchi 1995). As such, tacit knowledge is not easily articulated because it is subconsciously understood and applied, and it resides in people's minds as intuitions, insights, beliefs, or values (Ambrosini and Bowman 2001; Ancori et al. 2000; Sternberg 1994, 28; Polanyi 1976).⁴

Reportedly, 90 percent of the knowledge in any organization is embedded and synthesized in people's heads (Bonner 2000; Lee 2000; Wah 1999). A survey by Ernst & Young reports that 87 percent of executives identified knowledge as critical to competitiveness, yet 44 percent reported that they were poor or very poor at sharing knowledge within their

³ The study of knowledge is called epistemology. For a detailed theoretical discussion of knowledge, see Ancori et al. (2000).

⁴ For example, knowledge of generally accepted accounting principles (GAAP) regarding fair value requirements is explicit knowledge. On the other hand, an auditor's insights as to how a client's management develops fair value estimates and whether those estimates conform to GAAP represent tacit knowledge.

organization (Stimpson 1999, 36). Knechel (2000, 706) posits that audit firms face a similar situation:

[A]uditors often “know” more about clients than traditional audit methods recognize, including knowledge of the quality of people, processes, and business plans. Although this knowledge is rarely documented and often difficult to link to specific assertions or audit risks, it is nevertheless vital for conducting an efficient and effective audit.

Consistent with the discussion above, individuals can share explicit and tacit knowledge. Explicit knowledge can be shared through verbal or written communication and, thus, passed on to other members of the organization, who in turn must convert it into tacit knowledge before they can use it (Salisbury 2003, 132). On the other hand, tacit knowledge is typically shared through socialization, such as highly interactive conversations, apprenticeship (e.g., observation), storytelling, analogies, and shared experiences and activities (Smith 2001; Stenmark 2000, 10; Zack 1999b, 46; Nonaka and Takeuchi 1995; Nonaka 1994, 1991). Thus, tacit knowledge is effectively shared by allowing the recipient maximum possible opportunities to work alongside the source of the knowledge.⁵

The preceding discussion suggests that sharing knowledge, whether explicit or tacit, requires effort on the part of the individuals doing the sharing. Thus, for CPA firms to leverage the skills, knowledge, and best practices of their professional staff, they must create conditions conducive to people sharing what they know (Read and Thibodeau 1999, 59). Furthermore, CPA firms need to devise creative ways of capturing the knowledge of their seasoned professional staff in a manner that facilitates efficient retrieval by others (McGrath and Argote 2001).

FACTORS AFFECTING KNOWLEDGE SHARING

Our underlying premise is that valuable knowledge resources will be wasted unless CPA firms support efforts to gather, sort, transform, record, and share the collective knowledge of their employees. However, if the majority of knowledge exists in the minds of their professional staff, then CPA firms must first understand the factors that may enhance or hinder knowledge sharing. Based on prior research in accounting, organizational learning, psychology, and knowledge management, we delineate and discuss three factors that affect knowledge sharing in organizations: information technology, formal and informal interactions within teams of auditors, and the role of reward systems. To guide and organize our discussion, we summarize these factors and selected literature citations in Table 1.

Information Technology

Public accounting firms increasingly use information technology (e.g., group support systems, database management, Internet, intranets) for capturing and retrieving data, information, and knowledge (Banker et al. 2002). Staff can access industry best practices studies, surveys, statistics, expert knowledge for specific problems, and point-to-point knowledge (i.e., information from previous client work shared by auditors) (Silvi 2002, 2; Winograd

⁵ The notion of tacit knowledge approximates, but is not exactly the same as, the notion of procedural knowledge (for a detailed discussion, see Ambrosini and Bowman 2001, 814). Procedural knowledge consists of if-then rules that provide situation-specific solutions to problems (e.g., see also Kim et al. 2003, 263; Kogut and Zander 2003, 520; Salisbury 2003, 132; Vera-Muñoz et al. 2001, 408; Zack 1999b; Anderson 1985). A main distinction between procedural and tacit knowledge is that the former can be acquired in school through formal instruction and multiple practices with the problem. In contrast, as discussed above, tacit knowledge is not directly taught in school; instead, it is learned through interactions with others and observations of others' behaviors and others' reactions to one's own behavior (Tan and Libby 1997).

TABLE 1
Factors Affecting Knowledge Sharing in Public Accounting Firms and Selected Citations from the Accounting, Organizational Behavior, Psychology, and Knowledge Management Literatures

Factors	Summary of Effects	Literature Citations
A. Information Technology (IT)	<ul style="list-style-type: none"> • Employees' practices and know-how determine whether IT enhances knowledge sharing. 	Banker et al. (2002) Douglas (2002) Irmer et al. (2002) Murthy and Kerr (2004) Salisbury (2003) Winograd et al. (2000)
B. Formal and Informal Interactions among Auditors	<ul style="list-style-type: none"> • Organizational culture 	Brown and Starkey (1994) Chow et al. (2000) De Long and Fahey (2000)
• Procedural justice and trust	<ul style="list-style-type: none"> • Organizational culture can be either a major inhibiting or enabling factor of knowledge sharing. • Norms and practices that emphasize teamwork encourage knowledge sharing. • Fair processes that ensure trust and commitment encourage knowledge sharing. 	Barney and Hansen (1994) Chan (1997) Kim and Mauborgne (1996) Ring and Van de Ven (1994) Bamber et al. (1989) Cohen (1980) Major et al. (1995) Viator (2001)
• Role conflict and role ambiguity	<ul style="list-style-type: none"> • High role conflict and role ambiguity associated with lower quality exchanges between superiors and subordinates cause stress, frustration, and anxiety, in turn inhibiting knowledge sharing. 	

(continued on next page)



TABLE 1 (Continued)

Factors	Summary of Effects	Literature Citations
<p>B. Formal and Informal Interactions among Auditors</p> <ul style="list-style-type: none"> • Supervision and feedback 	<ul style="list-style-type: none"> • A close working relationship between supervisors and subordinates can facilitate knowledge sharing. 	<p>Brazel et al. (2004) Dreher and Ash (1990) Gibbins and Trotman (2002) Patten (1995)</p>
<ul style="list-style-type: none"> • Individual characteristics 	<ul style="list-style-type: none"> • A fit between a firm's culture and an auditor's individual characteristics may lead to higher organizational commitment, resulting in more knowledge-sharing. 	<p>Bamber and Bylinski (1987) Bonner and Pennington (1991) Bonner and Walker (1994) Harding and Trotman (1999) Hyatt and Prawitt (2001) Libby (1995) Ramsay (1994) Solomon and Shields (1995) Taylor et al. (2001)</p>
<p>C. Reward Systems</p>	<ul style="list-style-type: none"> • In team-based settings, intrinsic motivation devices may increase knowledge-sharing in CPA firms. • CPA firms may combine extrinsic motivation synergistically with intrinsic motivation to enhance prospects for knowledge sharing. 	<p>Deci (1975) Osterloh and Frey (2000) Young and Lewis (1995)</p>

et al. 2000; Zack 1999a, 1999b; Gladstone 1991).⁶ These systems provide auditors at all levels with access to external expertise contained in third-party databases as well as internal expertise.

In addition, firms use the “codifying of experiences” model, which consists of making the audit teams’ research, experiences, processes, and working papers available to the rest of the organization through keyword searches in knowledge bases. For example, Ernst & Young’s PowerPacks consist of customized compilations of best practices information that is constantly updated and made available globally over KnowledgeWeb (Head 2001).⁷ Individual professionals worldwide can download this collective information onto their computers. The firm counts how often PowerPacks are accessed, and the counts indicate the freshness and value of the knowledge in the PowerPacks. Owing to this platform, employees do not have to “reinvent the wheel” every time a common problem arises. Thus, by facilitating processes like these and providing the means for electronic collaboration, IT enables knowledge sharing.⁸

Information technology systems enhance access to important materials and documents throughout the company, which should improve efficiency and decision making. For instance, computer-mediated communication tools, such as group support systems (e.g., Lotus Notes and similar web-based systems), combine communication, computer, and decision technologies to support group decision-making and related tasks (Jessup et al. 1990). These systems also enable auditors to work in “virtual teams” that are not bound by time and distance constraints; they also support electronic meetings (Murthy and Kerr 2004, 141). Thus, the use of Lotus Notes, electronic mail, instant messaging, and video conferencing allowed teams in Europe and the United States to collaborate in real-time on the Vivendi Universal SA Sarbanes-Oxley 302 Certification project that PricewaterhouseCoopers led in 2002.⁹ Also, technological advancements allow auditors on engagement teams to conduct electronic reviews of clients’ workpapers while in their offices or from remote locations (Brazel et al. 2004).

Providing an IT-based expert knowledge system, however, does not automatically guarantee effective knowledge sharing due to several limitations. First, a significant amount of knowledge in CPA firms can be difficult to document. For example, identifying a firm’s best practices faces at least two major challenges: (1) the large gap between what a task looks like in a process manual and how it is deployed in reality; and (2) the gap between what people think they do and what they really do. Actual work practices are full of tacit improvisations that the employees who carry them out would have trouble articulating. As discussed earlier, tacit knowledge is part of total job-relevant knowledge (Schmidt and Hunter 1993), and it often can only be observed and recognized through professional interactions (Schon 1983, 296).

⁶ Examples include KPMG’s KWorld™, PricewaterhouseCoopers’ TeamAsset™ and KnowledgeCurve™, and Ernst & Young’s KnowledgeWeb™.

⁷ There is an established protocol for creating a new PowerPack. Say an audit team assigned to a new engagement decides it would benefit from creating a new PowerPack. An IT team creates a database to provide an online discussion space where members of the engagement team can contribute ideas, information, and tips. Knowledge coordinators work with the IT team to create and flesh out the PowerPack, which then becomes available to Ernst & Young’s professional staff worldwide (Head 2001). Information compiled in PowerPacks includes outstanding proposals, presentations, models, specialized tools, and a variety of other relevant topics documenting the firm’s expertise in its core competencies.

⁸ See Banker et al. (2002) for a detailed description of an international public accounting firm’s implementation of audit software and groupware for knowledge sharing.

⁹ Based on private discussions with a partner from PricewaterhouseCoopers.

Second, even if a firm manages to collect and codify an extensive array of knowledge, individual auditors still need to sort through the available databases and to exercise judgment about which pieces are applicable to the situation at hand. Doing so efficiently and effectively requires continuous education and training (Banker et al. 2002). Third, anecdotal evidence (Head 2001; Power 2000) and field-based research (Irmer et al. 2002) suggest that knowledge sharing using IT-based expert knowledge systems is not automatically embraced by everyone in an organization. Finally, a recent study suggests that professional employees who experience evaluation apprehension are less likely to share knowledge (Irmer et al. 2002).¹⁰ Importantly, this research suggests that evaluation apprehension is greater when knowledge is shared via collective database-related technologies (e.g., a firm's intranet) than via informal interpersonal contexts, due to the number and characteristics of people with access to the knowledge (Seta and Seta 1983) and the permanency of the record (Cohen 1979).

In summary, technology can facilitate the assembly and distribution of information, but it cannot assure that the information will be accessed or effectively applied. Thus, knowledge sharing is not just a technological issue; rather, it is an organizational issue because its success depends ultimately on people, their practices, and their know-how (Salisbury 2003, 131; Douglas 2002).

Formal and Informal Interactions among Auditors

Much knowledge sharing in CPA firms occurs via personal interactions, which can be formal or informal. Formal interactions can take place within teams or across people working on different teams or divisions. For example, teams and divisions may hold periodic meetings in which the leader seeks the input of employees. In contrast, informal interactions reflect social exchange relationships wherein individuals offer help or information to one another "without negotiation of terms and without knowledge of whether or when the other will reciprocate" (Molm et al. 2000, 1396). Below, we examine factors that can affect knowledge sharing through formal and informal interactions.

Organizational Culture

Organizational culture represents the unspoken norms and shared values, beliefs, and daily practices that shape the patterns and qualities of interactions between employees at different hierarchical levels (Sadler 1988, 118). A number of scholars have argued that the culture of an organization is an important factor affecting attitudes toward communication and communication processes and systems (e.g., see Brown and Starkey 1994; Cyert and March 1992). Many practitioners share this view. For instance, John Hudson, former vice-president of strategic planning and knowledge management at the American Institute of Certified Public Accountants (AICPA), offers the following assessment of how organizational culture affects knowledge sharing:

[T]he obstacle to knowledge sharing is not technology, but a business culture that rewards keeping what you know close to your vest. If I know something that a peer does not know, all things being equal, that gives me a competitive advantage. Since I am measured against my peers, this can impact my advantage and my salary. It sort of implicitly encourages individuals in an organization not to share what they have. (Stimpson 1999, 38–39)

If a CPA firm's cultural norms encourage knowledge hoarding as a source of power or job security, then auditors may refrain from sharing what they know. Conversely, norms

¹⁰ Evaluation apprehension is described as a person's concern that he or she will not receive positive evaluations from others (Rosenberg 1969, 281).

and practices that emphasize openness and teamwork can provide much impetus to knowledge sharing. Thus, if partners demonstrate accessibility and openness to discussing sensitive topics, then auditors at lower ranks are less likely to experience evaluation apprehension, in turn increasing their willingness to proactively seek and share knowledge. Indeed, a field-based study (Chow et al. 2000) and knowledge management scholars (De Long and Fahey 2000) suggest that organizational culture can be either a major inhibiting or enabling factor of knowledge sharing.

Procedural Justice and Trust

Procedural justice is the extent to which the dynamics of the decision process are judged to be fair (e.g., see Lind and Tyler 1988). Three criteria have been found to consistently capture procedural justice in business settings: engagement, explanation, and clarity of expectations (Kim and Mauborgne 1997, 69). Engagement means getting individuals involved in decisions by asking for their opinions and allowing them to refute the merits of one another's assumptions and ideas. Engagement communicates management's respect for individuals and their ideas. Explanation means helping individuals understand the reasons for the final decision, thereby helping to build employee *trust* in managers' intentions even if their own ideas have been rejected.¹¹ It also enhances learning by providing feedback. Expectation clarity means making explicit the rules of the game.

In a study of strategic decision making in multinational corporations, Kim and Mauborgne (1996) find a direct link between processes, attitudes, and behavior. Many top executives in their sample were frustrated by the uncooperative behavior of the senior managers of their local subsidiaries. In particular, the senior local managers often failed to share knowledge and ideas with the top executives. Managers who believed the company's processes were fair displayed a high level of trust and commitment, which, in turn, engendered active cooperation. Conversely, when managers felt that a fair process was absent, they hoarded knowledge and ideas and dragged their feet in making decisions and executing them.

Procedural justice research suggests that to achieve a fair process, the specifics of the new rules and policies matter less than that they are clearly understood. Further, people care as much about the fairness of the process through which an outcome is produced as they do about the outcome itself (Thibaut and Walker 1975). In general, a fair process builds trust and commitment and they, in turn, produce voluntary cooperation (Kim and Mauborgne 1998; Chan 1997). Voluntary cooperation drives performance, thus leading people to go beyond the call of duty by sharing their knowledge and applying their creativity. Taken together, the above discussion suggests that to create a climate in which employees volunteer their knowledge, CPA firms need to build trust. Fair processes help the CPA firm to develop and nurture that necessary trust.

Role Conflict and Role Ambiguity

Role conflict and role ambiguity are two of the most common characteristics of work stress that affect job satisfaction (Jackson and Schuler 1985) and work performance (Kahn and Byosiere 1992). Role conflict occurs when different groups or persons with whom an individual must interact (e.g., supervisors, co-workers, subordinates, clients) hold conflicting expectations about that individual's behavior (Rizzo et al. 1970; Kahn et al. 1964). For

¹¹ Trust is broadly defined as "confidence in the goodwill of others" (Ring and Van de Ven 1994, 93), or as an "attribute of a relationship between partners" (Barney and Hansen 1994). From an economic viewpoint (Das and Teng 1998), trust is defined as "an expectation, and it pertains to circumstances in which agents take risky actions in environments characterized by uncertainty or incomplete information" (James 2002, 291).

instance, in the post-Enron/Sarbanes-Oxley era, the PCAOB stresses the importance of auditor independence in fact and in appearance. Auditors have incentives to remain independent, owing to reputation concerns and to avoid lawsuits (e.g., see Krishnan et al. 2005). However, because the boundaries on the scope of nonaudit services established by Sarbanes-Oxley may not be completely transparent to some controllers and corporate managers—particularly those of small companies—they may still view auditors as business advisers and, thus, continue to ask for their advice on nonaudit-related issues that may compromise auditor independence.

In public accounting firms, role conflict is also related to the adequacy of communication and authority, adaptability, and workflow coordination (Bamber et al. 1989). For example, proper time allocation is a persistent issue that frequently results in a conflict of expectations between a client and the auditor's supervisor. This is because an auditor is typically assigned to multiple client engagements, thus requiring a careful and thoughtful coordination and management of engagement schedules. Often, unanticipated delays in completing audit assignments are unavoidable due to demands and circumstances beyond an auditor's control, such as missed deadlines in receiving client information, unresponsiveness of client personnel, and the need for more research to address complex technical issues. A significant delay with a particular client engagement may cause auditors to miss important deadlines with other client engagements. Timely and accurate sharing of engagement progress reports among the auditors, clients, and audit supervisors are an integral component for aligning expectations between and among them.

Role ambiguity refers to uncertainty, on the part of the employees, about key requirements of their jobs (Baron 1986). Typically, auditors in public accounting firms are simultaneously assigned to multiple engagements and work for multiple supervisors with differing or sometimes conflicting management styles and directives. In managing their responsibilities to diverse engagements and supervisors, auditors can experience role ambiguity from not having clear information concerning their duties, methods of fulfillment (e.g., how to obtain the information needed for making decisions), or consequences for their role performance (Kahn et al. 1964). In summary, higher role ambiguity is associated with lower quality exchanges between leaders and subordinates (Major et al. 1995), which in turn creates uncertainty about the degree of auditors' authority, duties, relations with others, sanctions, and rewards for their behaviors (Bamber et al. 1989).

In general, exposure to stress regarding their roles (e.g., conflict or ambiguity) causes individuals to exert greater effort to evaluate and activate the appropriate coping responses to minimize the adverse effects of the stress. As individuals devote more cognitive resources (e.g., span of attention and working memory capacity) to coping with the stress, they have fewer resources available for monitoring and enacting behaviors necessary for performing assigned job duties and responsibilities effectively and consistently (Viator 2001; Cohen 1980). This discussion suggests that role ambiguity and role conflict, either individually or combined (Fried et al. 1998), may impair knowledge sharing in public accounting firms because they tend to reduce auditors' capacity to control their work environment. The lack of control is expected to adversely affect their ability to share knowledge with other members of the audit team.

Supervision and Feedback

Mentoring theory suggests that to reduce role conflict and role ambiguity, supervisors need to manage their work groups and provide feedback during complex assignments (Dreher and Ash 1990). Supervision typically connotes downward communication in the form of advice about task-related matters, such as task instructions, objectives, constructive

assessments of preliminary plans and the results of past decisions (Hall 1996), and provision of feedback. Auditing standards have long required supervision of audit team members. These standards suggest that the need for supervision likely varies with “the complexity of the subject matter and the qualifications of persons performing the task” (AICPA 1996, AU Section 311). In practice, CPA firms rely on timely assignments of engagements (e.g., at least four weeks in advance) and pre-engagement team meetings to allow supervisors to explain the objectives and expectations of the engagement to the audit staff, and to respond to their questions. Supervisors direct the activities of the audit team that is charged with accomplishing the objectives of the audit. Supervisors also evaluate and communicate to the audit team whether those objectives have been accomplished.

Existing research on job satisfaction shows that a supervisor’s feedback is important to an auditor’s job satisfaction, career development, and turnover intentions (Patten 1995; Gregson 1990). Supervision helps increase supervisors’ understanding of the challenges being faced by subordinates, thus triggering more frequent and proactive sharing of knowledge. Working closely with supervisors also can increase subordinates’ upward knowledge sharing. This is because as subordinates develop interpersonal trust with their supervisors, they may be more willing to seek advice or to reveal unfavorable findings. A close working relationship also can facilitate transfer of tacit knowledge through an apprenticeship-like relationship between supervisor and subordinate.

Recent field-based studies on the workpaper review process support the importance of supervision and feedback for knowledge sharing (Fargher et al. 2005; Brazel et al. 2004; Gibbins and Trotman 2002). In the workpaper review process, preparers and reviewers may meet face-to-face to discuss the reviewer’s concerns in person. With recent technological advancements, reviewers can also review workpapers online and send review notes to the preparer via email.

In general, due to the personal nature of face-to-face reviews, they provide an opportunity not only for timely feedback, but also for a two-way knowledge-sharing process where supervisors and subordinates can pose questions to each other. This dialogue, in turn, allows supervisors and subordinates to discuss and understand complex issues related to the engagement, which likely will result in a higher quality of review. However, contextual factors may limit the frequency and/or effectiveness of face-to-face workpaper reviews. For instance, Fargher et al. (2005) find that the time preparers and reviewers spend on training when performing face-to-face reviews is significantly lower when time pressure is higher and when audit risk is high. Further, they find that seniors spend more of their review time on training subordinates than do managers.

Gibbins and Trotman (2002) examine how the workpaper review process is conducted at three (then) Big 5 auditing firms in Australia. Their study finds that managers praise reviewers who use face-to-face discussion and provide feedback and training, and criticize those who review without discussion or who do not see the review as part of subordinates’ on-the-job training.¹² Brazel et al. (2004) find that face-to-face workpaper reviews elicit stronger feelings of accountability by the preparers than do electronic reviews.

Individual Characteristics

Examples of individual-level factors that affect knowledge sharing include, but are not limited to, locus of control (Hyatt and Prawitt 2001), knowledge, ability, and motivation

¹² Specific comments of praise included, for example, “Review acts as on-the-job training”; “Uses the review process as a learning tool”; “Tries to train as he/she reviews”; and “Coaches as part of the review.” Specific criticisms included, for example, “Poorly explained review points”; “Provides no training”; “No timely feedback”; and “Not involved in planning” (Gibbins and Trotman 2002).

(e.g., Solomon and Shields 1995; Libby 1995; Bonner and Walker 1994; Bonner and Pennington 1991; Davis and Solomon 1989), organizational commitment (Putti et al. 1990), methods of working paper review (Harding and Trotman 1999; Ramsay 1994; Bamber and Bylinski 1987), and persuasion knowledge and experience (Fargher et al. 2005). The extant literature does not explicitly link individual-level factors to knowledge sharing in public accounting firms. However, these factors likely affect knowledge sharing either individually or jointly. For instance, as noted above, research suggests that, when performing face-to-face workpaper reviews, seniors spend more of their review time on training subordinates than do managers (Fargher et al. 2005). This suggests that the review process varies with experience. Thus, to enhance knowledge sharing between preparers and reviewers in the workpaper review process, training should be tailored to the specific needs of different ranks of auditors.

Putti et al. (1990) identify organizational commitment as a factor that is potentially linked to effective communication within organizations. Organizational commitment refers to the degree to which an employee is involved with the organization's goals and values (Williams and Hazer 1986). This suggests that auditors who have high organizational commitment are also more likely to believe strongly in the firm's goals and values. In turn, they are expected to be more satisfied with their jobs (Taylor et al. 2001) and, thus, more likely to have a high level of loyalty to the firm, greater willingness to exert higher effort on the firm's behalf, and lower inclination to leave the firm (Morrow 1983; Porter et al. 1974).

Arguably, a lack of fit between a firm's culture and an auditor's individual-level characteristics may lead to lower organizational commitment, which in turn may affect his or her willingness to share knowledge. To foster knowledge sharing, recruitment and selection should favor people who are open to learning and trying new things (Lubit 2001). The above discussion suggests that CPA firms should include in their recruiting policies specific guidance to help recruiters pursue candidates who exhibit individual-level traits that are consistent with the firm's goals and values, and that are commonly associated with the ability to work well in teams and to share knowledge.

Reward Systems

Both the business press (e.g., Hickins 1999) and academic studies report that a firm's reward system can significantly affect the extent and truthfulness of subordinates' communications to superiors (e.g., Chow et al. 1991; Young 1985; for reviews, see Bonner et al. 2000; Young and Lewis 1995). Yet, a Harris Research Center survey of finance and marketing directors and chief executives of 423 leading U.S., U.K., and European companies reports that 69 percent of the respondents indicate that their organizations do not reward knowledge sharing (*Knowledge Management Research Report*, KPMG 2000).

Research in organizational theory suggests that intrinsic motivation can be crucial to people's propensity to share their knowledge (Deci 1975, 105). Employees are *intrinsically* motivated if they undertake an activity for their own inherent enjoyment, and the activity is "valued for its own sake."¹³ On the other hand, employees are *extrinsically* motivated if they are able to satisfy their needs indirectly, especially through monetary compensation (Calder and Staw 1975, 599). This distinction is important because prior studies suggest that extrinsic rewards (e.g., performance-based monetary awards) can undermine intrinsic

¹³ Intrinsic motivation is defined as a feeling of satisfaction, competency, control, or freedom that results from completing an interesting task (American Psychological Association 1997).

motivation for interesting tasks (i.e., tasks for which people show an intrinsic interest). This undermining—known as the crowding-out effect (Deci 1975)—is particularly true for monetary compensation that is perceived to be large or controlling.¹⁴

Personal relationships in teams raise self-determination and enable a “team spirit,” which in turn raise the intrinsic motivation to cooperate (Frey and Bohnet 1995; Dawes et al. 1988) and to share knowledge (Osterloh and Frey 2000, 543).¹⁵ Furthermore, the intrinsic motivation to cooperate with other members of a team is enhanced by team-based incentives and by nonfinancial social recognition. This suggests that to avoid discouraging knowledge sharing in team-based settings, CPA firms should avoid relying exclusively on individual-based, extrinsic rewards. Instead, CPA firms can combine particular forms of extrinsic motivation in a synergistic way with intrinsic motivation to enhance prospects for knowledge sharing.

For instance, in the case of formal interactions among audit team members, rewards such as merit pay could be made partly contingent on knowledge-sharing behaviors. Further, team-based rewards that are based on collective performance are also likely to be effective in creating a feeling of cooperation, ownership, and commitment among team members. In the case of knowledge sharing through informal interactions, intrinsic rewards, such as offering feedback about the auditor’s competence and the value of his or her outcomes, not only help build expertise, but also provide appropriate means of fostering feelings of competence. Finally, as discussed earlier, procedural and distributive fairness of organizational rewards are important factors in the development of trust. Trust between individual auditors and the CPA firm is a key factor for enabling knowledge sharing.

RECOMMENDATIONS AND DIRECTIONS FOR FUTURE RESEARCH

This paper systematically examines prior research in accounting, organizational learning, psychology, and knowledge management related to knowledge sharing in CPA firms. This examination provides the basis for the following observations and related recommendations:

- CPA firms are increasingly using information technology (IT)-based expert knowledge systems, an important enabler of knowledge sharing. However, IT does not automatically guarantee effective knowledge sharing. Existing challenges include:
 - (a) knowledge arising from professional interactions can be difficult to document;
 - (b) effectively using knowledge databases requires continuous education and training; and
 - (c) not everyone embraces knowledge sharing through IT-based tools.
 The value of IT is realized only when structures within organizations enhance and facilitate knowledge sharing. In other words, the success of knowledge sharing ultimately depends on an organizational—not just a technological—solution that includes the firm’s employees, their practices, and their know-how.
- An organizational culture that rewards knowledge hoarding as a source of power or job security creates an obstacle to knowledge sharing. Thus, CPA firms need to develop and maintain norms, practices, and fair processes that build trust, thereby leading employees to go beyond the call of duty by sharing knowledge. For instance,

¹⁴ For meta-analytical studies of crowding-out theory, see Deci et al. (1999a, 1999b), Tang and Hall (1995), Cameron and Pierce (1994), Wiersman (1992), and Rummel and Feinberg (1988).

¹⁵ According to cognitive evaluation theory, self-determination is the extent of control individuals feel over a task (Deci and Ryan 1985).

auditors in CPA firms may be more willing to share knowledge through informal interpersonal interactions, such as face-to-face discussions that provide opportunities for feedback and training, than via formal mechanisms.

- Team-based structures foster the development of personal relationships, which in turn may raise auditors' motivation to cooperate and share knowledge. To encourage knowledge sharing in team-based settings, CPA firms need to combine extrinsic motivation synergistically with intrinsic motivation. Such synergistic motivators should include feedback about the individual's competence and the outcomes of the individual's decisions. However, the reward system should not undermine feelings of self-determination or unduly constrain the way in which the work is to be done.

Implications for CPA Firms and Their Clients

Deloitte & Touche reports that large business firms have spent, on average, nearly 70,000 additional man-hours to comply with the Sarbanes-Oxley Act of 2002 (Special Report 2005, 71). Further, a survey by Financial Executives International (FEI) reveals that 217 public companies paid, on average, initial-year compliance costs of \$4.36 million. The FEI survey shows that SOX attestation fees as a percentage of audit fees have increased substantially since January 2004. Across all respondents, increases in attestation fees were estimated to be 37.7 percent in January 2004, but actually reached 57.1 percent in March 2005 (*The Controller's Report* 2005). Against this background, the ability of CPA firms to effectively implement knowledge-sharing mechanisms can be vital to reducing attestation time and cost. For instance, PricewaterhouseCoopers is experimenting with a change in its assurance business model by assigning auditors at all levels to different client portfolios and evaluating them by collective, not individual, scorecards.

As noted earlier, recent comprehensive regulatory reforms have dramatically transformed the environment in which CPA firms and their clients conduct their business. For instance, in October 2002, the AICPA issued Statement on Auditing Standards No. 99, *Consideration of Fraud in a Financial Statement Audit*, to assist auditors in fulfilling their responsibility as it relates to fraud detection.¹⁶ The standard requires auditors to schedule an audit-planning meeting to discuss how and where a client's financial statements might be susceptible to fraud, and to consider possible management override of the internal controls. Other procedures include inquiries to management and other parties (e.g., the audit committee, internal audit staff) as to their views on the risk of fraud, their knowledge of any suspected or actual fraud, and their policies, procedures, and controls in place to address such risk. Other sources that may point to the possibility of fraud include whistleblower reports of company malfeasance.

Auditor rotation requirements and restrictions on nonaudit services may reduce auditors' exposure to information about a client's business, thus making it more difficult to learn about the possibility of fraud (Painter 2004). Further, the normal audit environment does not always provide auditors with the necessary practice and feedback to enable them to detect frauds. Importantly, recent research suggests that experienced auditors are less apt to detect fraud than novice auditors who have received simulated experience through specific training in asset theft detection (Carpenter et al. 2002). Thus, knowledge sharing is important for the effectiveness of the audit procedures outlined above, related to the evaluation and consideration of fraud. For instance, sharing knowledge among auditors who

¹⁶ For an in-depth commentary on fraud prevention and detection, see Wilks and Zimbelman (2004).

have witnessed or received practice and feedback on fraud and those who have not is very important for auditors when fulfilling their responsibility for fraud detection.

Furthermore, as noted earlier, the PCAOB's Auditing Standard No. 2 requires management to state for the record how well their companies' internal controls are functioning. It also requires the independent auditor to issue a separate report to attest to management's assertion on the effectiveness of internal controls and procedures for financial reporting (Orenstein 2004). Thus, now more than ever CPA firms must pay attention to their clients' control activities, as well as the corporate governance of their clients' boards of directors and their audit committees (Vera-Muñoz 2005). Accordingly, the scope of auditor-client communications must expand to include issues regarding implementation, documentation, evaluation, and remediation of internal controls. At the same time, knowledge-sharing systems may provide an excellent documentation roadmap to plaintiffs' counsels on legal actions. Thus, in designing and implementing knowledge-sharing mechanisms, CPA firms must balance their benefits against the potential costs in light of the recent regulatory reforms.

Directions for Future Research

In addition to implications for practice, our paper suggests several major directions for future research. First, some of the factors we examine likely affect knowledge sharing directly (e.g., information technology, supervision, and feedback), whereas others are more likely to play a mediating or moderating role (Baron and Kenny 1986) on knowledge sharing (e.g., trust, procedural justice). We encourage research that empirically examines direct effects and moderating or mediating effects on knowledge sharing. For instance, as discussed above, the success of IT-based knowledge-sharing tools (e.g., PowerPacks) depends largely on auditors' willingness to electronically contribute their ideas, information, and tips. Contributions to databases can be rewarded because of opportunities for the evaluator to measure discrete transactions of the contributions (Bartol and Srivastava 2002, 64), and a small group of experts could evaluate items for their relevance. However, as discussed earlier, evaluation apprehension may be a potential barrier to this type of knowledge sharing. Thus, future research could examine the effects on auditors' knowledge sharing of rewarding the quality and quantity of their contributions to electronic databases. More research is also needed to examine the effects of other factors, such as trust between the auditor and the firm, tenure with the firm, and team-based versus individual-based compensation, on auditors' tendencies to share knowledge through electronic databases.

Second, Big 4 firms are expanding their practices to emerging markets such as China and India (Hansen 2005; Li 2004). While CPA firms extend their technology platforms to their joint ventures or affiliates (Feit 2004; Kapoor 2002), they also need to deploy country-specific initiatives to enable an informal knowledge-sharing culture. For instance, culture-related traits, such as Chinese nationals' concern for "face" (Harrison 1993; Triandis 1989; Hofstede 1980) may prevent subordinates from requesting help from their peers or superiors for fear that doing so may make them look less knowledgeable and more dependent on others to do their job. Research on the cultural barriers to knowledge sharing is emerging (e.g., see De Long and Fahey 2000) and extending the inquiry to knowledge sharing among auditors of different national cultures is important.

As corporate failures and incidents of fraud continue to unfold, questions about how much assurance auditors can provide when offering their opinion on the soundness of a client's financial statements and internal controls over financial reporting. Both the PCAOB and the SEC have issued guidance on how to audit internal controls over financial

reporting. As noted earlier, knowledge comes in two types—explicit and tacit. The former is amenable to codification, whereas the latter resides in individuals' personal beliefs, experiences, and values. The knowledge required during the audit of a client's financial statements and internal controls over financial reporting entails a wide variety of experiences, perspectives, and skills. The need of CPA firms to prepare for the regulatory oversight by the PCAOB and the SEC provides a fertile ground for examining tacit knowledge-sharing processes. For instance, future research could examine the mix of explicit and tacit knowledge that is shared among audit team members when making judgments regarding issues such as relying on the work of internal auditors.

The PCAOB guidance highlights the need for both clients and their auditors to avoid a "one-size-fits-all" mentality in favor of a risk-based approach to audits of internal controls that focuses on control effectiveness. However, the new guidance falls short on more complicated issues, such as derivative accounting, how to design audit processes for large, complex IT systems, and how best to communicate with the client without jeopardizing auditor independence. This suggests that audit team members will have to rely more on each other's "know-how" of the client to address these issues. Thus, two broad questions for future research are:

- What processes, channels, and incentive mechanisms are more effective for enhancing tacit knowledge sharing when audit teams are faced with difficult accounting rules and technology issues for which little guidance is available?
- What role does tacit knowledge sharing (or lack thereof) play on the outcome of PCAOB inspections of audits of registered public accounting firms?¹⁷

In addressing these research questions, accounting scholars stand to benefit from insights provided by the emerging body of field-based studies on tacit knowledge sharing in team-based settings (Jones 2005; MacNeil 2003), and by efforts to operationalize tacit knowledge (Ambrosini and Bowman 2001).

Finally, as discussed earlier, firms now use electronic reviews of staff work as an alternative to face-to-face reviews. Future research is needed to examine whether different review methods affect auditors' knowledge sharing. Thus, three broad questions for future research are:

- Which review method results in a higher quantity and quality of knowledge sharing when auditors face high versus low audit risk?
- How do the associated benefits (e.g., timesavings) versus the costs (e.g., lower accountability) of electronic reviews affect knowledge sharing?
- What are the effects of other formats of communication (e.g., bulletin board, chat tools) on auditors' knowledge sharing?

By publishing further research on these questions, academics can participate in the knowledge sharing within the profession.

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¹⁷ The PCAOB's website of limited inspection reports of registered public accounting firms, pursuant to Section 104 of SOX, is available at: <http://www.pcaobus.org/Inspections/index.aspx>.

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