

AUDITOR TACIT KNOWLEDGE AND AUDIT FIRM HUMAN CAPITAL DEVELOPMENT

JASMIJN C. BOL

Tulane University

jbol@tulane.edu

FRANK MOERS

Maastricht University

f.moers@maastrichtuniversity.nl

MARK E. PEECHER

University of Illinois at Urbana-Champaign

peecher@illinois.edu

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Abstract: Prior audit research has established that tacit knowledge plays a key role in relatively experienced auditors' performance evaluations (Tan and Libby [1997]), but also that tacit knowledge can improve relatively inexperienced auditors' ability to reach better-justified audit conclusions (Shankar and Tan [2006]). In addition, an easily overlooked finding in Tan and Libby [1997] is that even inexperienced auditors sometimes possess tacit knowledge levels rivaling that of top-rated experienced auditors. An important research question, therefore, is whether *valuable* tacit knowledge possessed by inexperienced auditors is consistently *valued* by audit firms. To address this question, we rely on real-world pairings of audit supervisors and subordinates (e.g., Kennedy and Peecher [1997]) to empirically test the following hypotheses: (1) Staff and senior audit subordinates with higher tacit knowledge levels are more likely to be identified as future leaders by their supervisors; (2) Staff and senior auditors' tacit knowledge is positively associated with their exposures to diverse professional experiences, opportunities to interact with clients, significance of their job responsibilities, and involvement with their firm's social and community activities; (3) Audit supervisors with higher tacit knowledge better cultivate their subordinates' tacit knowledge; and (4) Relative to those with lower tacit knowledge, audit supervisors with higher tacit knowledge place greater relative weight on subordinates' tacit knowledge than on their technical knowledge when evaluating annual performance. Our findings are consistent with all four of our hypotheses and contribute to the audit expertise, human capital development, and compensation contracting literatures in accounting.

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1. INTRODUCTION

This study presents four hypotheses and related empirical tests about the influence of auditor tacit knowledge in the identification, development, and evaluation of human capital in audit firms. Tacit knowledge has been defined as the relatively unarticulated and experiential know-how that people use to manage themselves, others, and their careers (Polanyi [1966]; Wagner and Sternberg [1985]; Horvath and Sternberg [1999]).¹ Tan and Libby [1997] is the first study to examine tacit knowledge in the financial-statement auditing context. As hypothesized, they find that tacit knowledge significantly differentiates between auditors who receive top versus mediocre performance evaluations when they are experienced (i.e., managers), but not when they are inexperienced (i.e., seniors and staff). A common interpretation of the Tan and Libby [1997] findings is that tacit knowledge generally plays a key role for experienced auditors but not for inexperienced auditors (e.g., Abdolmohammadi, Searfoss, and Shanteau [2004]), for whom technical knowledge plays a more pivotal role (Bhamornsiri and Guinn [1991]).

Nelson and Tan [2005], however, stress that auditors of all ranks perform a variety of tasks. Many, if not most, audit tasks entail social interactions with other auditors (e.g., subordinates, peers, and supervisors), client management and employees, and various third parties (e.g., Solomon [1987]; Gibbins and Trotman [2002]; Kadous, Leiby and Peecher [2012]). We posit that superior tacit knowledge facilitates these social

¹ Polanyi [1966] divided knowledge into explicit (e.g., declarative) and tacit (i.e., a particular kind of procedural knowledge). The former is about knowing *what* and can be summarized and stored in media and is easily transmitted. The latter is about knowing *how* within particular institutions and is sometimes thought of as unarticulated, intuitive knowledge. Tacit knowledge about *managing self* refers to knowledge about how to manage oneself on a daily basis so as to maximize one's productivity. Tacit knowledge about *managing others* refers to knowledge about managing subordinates and one's social relationships. Tacit knowledge about *managing career* refers to knowledge about such things as how a reputation in one's career is established, how reputations can be enhanced, and how to convince superiors of the worth of one's ideas or products (Wagner and Sternberg 1985).

interactions. Enhanced social interactions, in turn, likely improve even inexperienced auditors' ability to extract and filter information so they can appropriately apply their technical audit and accounting knowledge and better justify their professional judgments (Shankar and Tan [2006]). Tacit knowledge also likely would help mitigate the source of detection risk first empirically documented in Bennett and Hatfield [2012]) in which relatively green, inexperienced auditors are outmatched when socially interacting with older, more savvy members of client management. In short, because audit tasks often are social tasks, superior tacit knowledge likely enables auditors to perform more like experts earlier in their career than would be suggested by a common, but relatively narrow interpretation of Libby and Tan [1997].

Whether firms identify and reward superior tacit knowledge in audit staff and seniors, however, is an open question. Since direct supervisors frequently interact with specific audit subordinates and have considerable input in evaluating their performance, they potentially play a pivotal role in the identification, cultivation and rewarding of their tacit knowledge. Some experienced auditors, however, may have low tacit knowledge themselves. That is, some experienced auditors may attain supervisory positions only by earning satisfactory performance based largely on their relatively high technical knowledge/ problem solving ability. Such supervisors are relatively unlikely to try to identify, cultivate, and reward tacit knowledge when mentoring and evaluating their current subordinate auditors. Ignoring tacit knowledge in promising subordinates likely leads to their frustration and, potentially, their early exit from the firm and/or profession (Vera-Munoz, Ho and Chow [2006]). Other audit supervisors, though, likely excel in tacit knowledge and likely draw on it to coach subordinates and assign relatively more

weight on subordinates' tacit knowledge when formally evaluating their annual performance. Rewarding tacit knowledge in promising subordinates likely invigorates their implicit motivation to stay with the firm. The overall inflow, outflow, and stock of audit subordinates with relatively high and low levels of tacit knowledge, therefore, likely is a complex dynamic. Whether audit subordinates' *valuable* tacit knowledge is regularly *valued* by audit firms is an empirical question.

We begin addressing conditions under which audit firms nurture and value the valuable tacit knowledge possessed by its subordinate auditors by focusing on perceptions of real-world pairings of audit supervisors and subordinates (e.g., Kennedy and Peecher [1997]). In this context, we empirically test the following hypotheses: (1) Staff and senior audit subordinates with higher tacit knowledge levels are more likely to be identified as future leaders by their supervisors; (2) Staff and senior auditors' tacit knowledge is positively associated with their exposures to diverse professional experiences, opportunities to interact with clients, significance of their job responsibilities, and involvement with their firm's social and community activities; (3) Audit supervisors with higher tacit knowledge better cultivate their subordinates' tacit knowledge; and (4) Relative to those with lower tacit knowledge, audit supervisors with higher tacit knowledge place greater relative weight on subordinates' tacit knowledge than on their technical knowledge when evaluating annual performance. Our findings are largely consistent with all four of our hypotheses, thereby contributing to the audit expertise, human capital development and compensation contracting literatures in accounting.

Our findings shed some new light on two related and long-standing questions in audit expertise area of research (Davis and Solomon [1989]; Libby [1989]; Bonner and Lewis [1990]; Libby and Luft [1993]): Why is it that some new auditors develop more quickly and completely than others? And, are there characteristics of auditors and/or of their learning environments that can help shorten the path to expertise?

In particular, we provide evidence that tacit knowledge begins to differentiate more from less promising auditors considerably earlier in their careers than is suggested by relatively common interpretations of findings in Tan and Libby [1997]. While it may be years before tacit knowledge, on average, separates top performing from mediocre auditors in terms of annual performance evaluations, we show that staff and senior audit subordinates with higher tacit knowledge levels are more likely to be identified as future leaders by their supervisors.

Our findings also begin to reveal the phenomena that are associated with speedier development of tacit knowledge in relatively inexperienced auditors. We show that higher levels of tacit knowledge are associated with higher variety of experiences and more opportunities to interact with clients. Most importantly, our results show the pivotal role of supervisors' own tacit knowledge in the development of tacit knowledge. These findings suggest that the proactive management of tacit knowledge development by exposing the most talented employees to the right opportunities and supervisors with high levels of tacit knowledge will likely bear fruit.

Our results also contribute to the compensation contracting literature, particularly to our understanding of the roles of subjectivity. Research has shown that supervisors' use of subjectivity in incentive contracting is influenced by the structure of the incentive

contract (Bailey et al. [2011]), supervisors' personal incentives (Bol [2011]) and by their general attitudes toward compensation contracting (Bol, Hecht and Smith [2012]). Our study complements this literature stream by highlighting the importance of supervisors' skill sets and knowledge. Prior studies indicate that supervisors with more favorable performance evaluations themselves also have superior performance evaluation skills. For example, they find that higher rated supervisors evaluate with less partiality (Tan and Jamal [2001]) and provide better feedback (Dreher and Ash [1990]). Our results show that the skill sets and knowledge of supervisors not only influence *how* supervisors evaluate but also *what* they evaluate and reward. We provide empirical evidence indicating that supervisors have the tendency to focus on and reward those skills that were the basis for their own success within the organization. Thus, supervisors that were promoted because of their own superior technical and problem solving ability tend to recognize and reward those skills in their subordinates.² Consequently, in a system that allows supervisors to determine how heavily to value different skills in subordinates, supervisors who themselves were promoted with questionable tacit knowledge may unwittingly heighten the risk that their firm will forgo development of its most promising subordinates. Since subordinates have at least short-term incentives to develop those skills that supervisors evaluate and reward, these incentive systems might in some cases actually hurt instead of help the development of tacit knowledge. These results should be of interest to compensation system designers and firms as it suggest that they should consider the skill sets and knowledge of the supervisors executing the evaluation and

² This is not to say that these supervisors would not recognize that tacit knowledge skills are important at more senior levels than their own.

rewarding process when determining the degree, as well as, the type of discretion that should be endowed to supervisors.

The rest of this paper is organized as follows. Section II reviews prior research and develops the study's hypotheses. The research setting and empirical design are presented in Section III. Section IV presents the results. Finally, Section V concludes and discusses directions for future research.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

As Nelson and Tan [2005, 49] observe, "audit expertise research is important because we want to know why and how superior performance is attained, and the nature of the transition from a novice to an expert." The identification, development and retention of audit expertise are critical for audit firms' human capital development (Davis and Solomon [1989]; Libby and Luft [1989]), and human capital is again critical to the audit firm's success as human capital constitutes a substantial portion of professional service firm's competitive advantage (Grant [1996]; Nonaka [1994]; Conger and Fulmer [2003]; Hatch and Dyer [2004]). Although prior research indicates the importance of tacit knowledge in human capital development (Tan and Libby [1997]), to date, surprisingly few audit studies provide empirical evidence on how and how well tacit knowledge is cultivated within audit firms. Our study helps fill this void by positing and empirically testing hypotheses about the key role of tacit knowledge in the identification of potential future leaders and about factors associated with higher levels of tacit knowledge early in auditors' careers.

We begin by observing that although prior research has provided some evidence that tacit knowledge plays a more pivotal role, on average, in determining experienced

auditors' performance evaluations than in determining the evaluations of inexperienced auditors (Tan and Libby [1997]), tacit knowledge levels possessed by a nontrivial portion of relatively inexperienced auditors nevertheless is likely to be substantial. Exhibit 1 recasts basic findings in Tan and Libby [1997] so as to better emphasize both mean differences and likely variation in auditor tacit knowledge by rank. As shown, both bottom-ranked and top-ranked staff auditors fairly often possess tacit knowledge levels rivaling that of top-ranked managers. This provides additional motivation for examining whether audit firms cultivate and value tacit knowledge possessed by relatively inexperienced auditors in their firm.

We examine this overarching question within four hypotheses. Our first two hypotheses primarily pertain to subordinates and in particular to whether their tacit knowledge facilitates being identified as someone with promise as a leader and to the social interactions that help cultivate subordinates' tacit knowledge. Our last two hypotheses focus more on audit supervisors, by focusing on whether higher tacit knowledge supervisors tend to enhance their subordinates' tacit knowledge to a greater extent and to ascribe greater relative weight on subordinates' tacit knowledge than on technical knowledge when evaluating subordinates' overall performance. Taken together, our four hypotheses examine how tacit knowledge is cultivated, evaluated and rewarded within specific supervisor-subordinate pairings in audit firms.

2.1 Identification of Potential Future Leaders – H1

Identification and measurement of key performance capabilities early in an organization's professionals' careers is an important step in managing human capital. Failure to identify and measure these capabilities interferes with the efficient allocation of

top management's mentoring resources (Kram [1985]).³ If an organization does not proactively mentor its promising young professionals, it risks distancing and frustrating them, potentially to the point of losing them to competing firms or careers.

Conventional wisdom holds that different kinds of knowledge and skills drive success on the portfolios of tasks performed by inexperienced versus experienced auditors (Tan [1999]; Abdolmohammadi and Shanteau [1992]; Abdolmohammadi, Searfoss, and Shanteau [2004]). Related, extant analyses of different kinds of audit tasks proficiently outline the cognitive and technical knowledge requirements for successful performance (e.g., Bonner and Pennington 1991; Bonner and Walker 1994; Bonner 1999), but they do not identify the nature of social exchanges typically occurring before, during, or shortly after performance of such tasks, nor do they outline tacit knowledge requirements.⁴

Because social exchanges pervade in auditing contexts, however, we believe superior tacit knowledge improves task performance and makes favorable impressions for experienced and inexperienced auditors alike. To elaborate, even though it may take years before auditors' annual performance evaluations begin to qualitatively differ systematically across auditors who have relatively high or low tacit knowledge for their given rank (Tan and Libby [1997]), we predict that even lower-ranked auditors can still

³ Mentoring is a form of developmental support that senior colleagues provide to more junior colleagues oriented towards the junior colleagues' personal/psychological growth and career development (e.g., Kraimer, et al. [2011]). Specific behaviors that fall under the mentoring umbrella include sponsorship, coaching, managing introductions to key others in an organization, and steering challenging work towards promising junior colleagues (Dreher and Ash [1990]; Lankau and Scandura [2002]).

⁴ Some common contexts featuring rich social exchanges are informal and formal consultation (e.g., Kadous, Leibby and Peecher [2012]), the audit review process (e.g., Brazel, Agoglia, and Hatfield [2004]), and audit team brainstorming (or similar) sessions (e.g., Lynch, Murthy, and Engle [2009]). We leave the task of overlaying typical, particular social dynamics onto various audit tasks to future research. Here, we simply argue that rich social interactions occur within and across many audit tasks, and that this matters for auditors of all ranks, which suggests that tacit knowledge is an important determinant of auditor expertise even for staff and senior auditors.

distinguish themselves as potential leaders if they have relatively high tacit knowledge for their rank.

The theoretical appeal of this prediction is bolstered by focusing on the aforementioned, easily overlooked findings in Tan and Libby [1997]. Because meaningful differences in tacit knowledge likely exist not only across hierarchical ranks, but also within particular ranks, even relatively low ranks (see also e.g., Sternberg and Wagner [1985]; [1987]), with some auditors at low ranks nearing expert levels of tacit knowledge, it is likely that some auditors begin to emerge as potential leaders relatively early in their careers.

Focusing on variation in even inexperienced auditors' tacit knowledge also indicate that individual auditors likely acquire tacit knowledge with different speeds. And that, the early, proactive acquisition of tacit knowledge is likely a means to signal one's potential as a future leader of an organization. As such, we predict that supervisors use subordinates' tacit knowledge as a predictor of the subordinates' potential for being future leaders of their firms. This leads to the following hypothesis:

H1: Subordinates who have relatively high levels of tacit knowledge are more likely to be identified as future leaders of their organizations.

2.2 Environmental Correlates of Higher Tacit Knowledge – H2

As Bonner [2008, 70] observes, it is important to understand factors that affect auditors' development of different kinds of knowledge relevant to task performance (Davis and Solomon [1989]; Libby [1989]; Libby and Luft [1993]). Shankar and Tan [2006] show that higher tacit knowledge enables staff and senior auditors to develop stronger justifications for their conclusions on an ill-structured task, while related prior research shows that the conclusion justifiability is a key performance benchmark on ill-

structured tasks (e.g., Kennedy, Kleinmuntz, and Peecher 1997; Ricchuite [2004]). Thus, it is important to improve our understanding of staff and senior auditors' tacit knowledge development.

We argue that intra-rank differences in tacit knowledge are associated with both differences in the proactive acquisition of tacit knowledge and in learning opportunities suitable for acquiring new tacit knowledge. Either through serendipitous experiences or sought-out learning opportunities, subordinates further grow their tacit knowledge.⁵ Several scholars have examined tacit knowledge development in a variety of fields like medicine (Patel, Arocha, and Kaufman [1999]), management (Argyris [1999]) and teaching (Torff [1999]), and based on these prior studies we identify factors that are expected to be associated with higher levels of tacit knowledge in an audit context.

Exposures to new tasks and social learning situations are thought to enhance knowledge development (Nonaka [1994]). These exposures generate new patterns of interactions between the subordinates and their surroundings, prompting creative thinking as well as refinement of social norms learned in previously experienced settings (Nonaka [1994]). By contrast, subordinates' repetitive tasks and homogenous learning situations thwart the formation of new knowledge (Von Krogh, Ichijo and Nonaka [2000]). Consequently, we argue that subordinates' exposure to a higher variety of experiences positively affects the development of tacit knowledge.

⁵ Our theory does not specify a single direction of causality for the role of environmental markers. In some instances the subordinates will possess enough tacit knowledge to understand the importance of proactively seeking out learning opportunities and act accordingly or will be proactively sought out by the firm for these opportunities. In others, lower tacit knowledge subordinates happen to be at the right place at the right time and fortuitously grow their tacit knowledge to a point that they subsequently understand the importance of seeking out further learning opportunities.

The development of tacit knowledge occurs through an interactive socialization process of observation, imitation, and practice (Brown Collins and Duguid [1989]). We therefore argue that subordinates develop superior tacit knowledge if they are provided with the opportunity to be involved in and responsible for the interactions with the client. The subordinates will observe the manager/partner ‘manage’ the relationship with the client and following be able to imitate and practice relationship management skills when responsible for interacting with the client. Hence, we predict a positive association between the subordinates’ tacit knowledge and the subordinates’ opportunity for interactions with clients.

According to Nonaka’s work on knowledge development [1994], autonomy also positively influences knowledge creation by exposing subordinates to situations that force them to acquire, relate, and interpret new information. Audit tasks, however, usually are not autonomously completed; instead, they remain socially mediated and consultative (e.g., Gibbins 1984; Gibbins and Emby 1985; Gibbins and Trotman 2002; Gold et al. 2012; Kadous et al. 2012). Still, various auditors have lesser or greater primary responsibility for reaching conclusions on particular audit tasks, and this is similar to Nonaka’s autonomy construct. Specifically, individuals form deeper knowledge structures when they are experientially responsible for their own and others’ learning compared to when they simply observe others do so (e.g., Osland, et al. [2006]). Thus, increased responsibility likely heightens the degree to which subordinates feel the need to self-organize and consequently develop tacit knowledge.

Tacit knowledge development is also positively associated with subordinates’ willingness to learn. Subordinates who are motivated to get involved and are aware that

involvement in the organization's social activities is important will better use and recognize learning opportunities and consequently acquire tacit knowledge at an enhanced rate. Thus, we hypothesize that involvement in the organizational context will positively affect the development of tacit knowledge.

In sum, we hypothesize that, all else constant, subordinates who are exposed to a higher variety of experiences, have greater opportunities to interact with clients, are given more job responsibility, and who are more involved in the organization's activities will tend to have higher levels of tacit knowledge considering their rank within the organization.

H2: Subordinates who are exposed to a greater variety of experiences (H2a), have greater opportunities to interact with clients (H2b) given more job responsibility (H2c) and are more involved in the organization (H2d) have higher levels of tacit knowledge.

2.3 The Effect of Supervisors' Tacit Knowledge on Subordinates' Tacit Knowledge – H3

Since the development of tacit knowledge occurs through an interactive socialization process of observation, imitation, and practice, we argue that the levels of tacit knowledge of the 'experts' with whom subordinates regularly interact influence their development of tacit knowledge. Specifically, since supervisors interact with their subordinates on a daily basis and they are trusted, powerful, or otherwise valued individuals, subordinates are likely to mimic their behavior and model themselves after them (Brown Collins and Duguid [1989]; Swap et al. [2001]). Direct supervisors therefore play a key role in subordinates' tacit knowledge development.⁶ When the direct

⁶ Public accounting firms often have formal mentors assigned to inexperienced auditors. However, although active mentoring is an effective way to transfer tacit knowledge (e.g., Mullen [1994]; Wilson and Elman [1990]), having an official mentor frequently differs from having a day-to-day supervisor as these mentors often do not regularly interact with their mentee auditors. In addition, it is likely that greater variation in

supervisor has higher levels of tacit knowledge then the subordinate will likely develop higher levels of tacit knowledge by mimicking their behavior, while if the direct supervisor has lower levels of tacit knowledge the subordinate will likely acquirer lower levels of tacit knowledge by developing similar ‘bad habits’.⁷ Hence, the fact that individuals acquire tacit knowledge through social interactions with the people surrounding them rather than through classroom instruction and training is problematic for subordinates whose supervisors have relatively low tacit knowledge.

Moreover, since interactions with supervisors moderate the transmission of knowledge to and personal learning of subordinates (Lankau and Scandura [2002]; Vera-Munoz, et al. [2006]), supervisors who are better at managing others, i.e., those with higher tacit knowledge, likely better assess, coach and develop their subordinates. For example, they are likely to better provide both informal and formal feedback to subordinates regarding matters such as their preliminary plans and judgments (Dreher and Ash [1990]). Consequently, we argue that high tacit knowledge supervisors’ superior ability to manage others will not only improve their subordinates’ development of technical and problem solving skills but also their development of tacit knowledge as they will be more deliberate in their interactions, feedback and their coaching of subordinates.

tacit knowledge exists across day-to-day supervisors than across mentors, as mentors are specifically chosen to be a role model and often rank two or more hierarchical levels above the persons they mentor.

⁷ One might object by asking why would a subordinate model themselves after supervisors with relatively low tacit knowledge? The answer is because many subordinates will not be equipped to differentiate their supervisors’ tacit knowledge and even supervisors with relatively low tacit knowledge still have authority and power over their subordinates’ evaluations and compensation. Consequently, unless their own tacit knowledge is already quite high, subordinates will tend to model themselves after their superior, independent of whether the superior has relatively high or low levels of tacit knowledge. Moreover, the knowledge transfer through social interactions often happens even in the absence of any reinforcements and whether or not the individual intends to learn, subordinates might therefore not even be conscious of their mimicking behavior (Bandura [1977]; Anderson [1995]).

In sum, because acquiring tacit knowledge is an interactive socialization process, the level of tacit knowledge possessed by the subordinates' direct supervisor positively influences the subordinates' levels of tacit knowledge.

H3: The tacit knowledge level of a subordinate's direct supervisor positively affects the subordinate's tacit knowledge.

2.4 The Relative Weight placed on Technical versus Tacit knowledge – H4

Shankar and Tan [2006] examine the joint influence of tacit knowledge and technical knowledge on the task performance of staff and senior auditors and find that tacit knowledge improves staff and senior auditors' justifications of their conclusions.⁸ Thus, even though evidence in Tan and Libby [1997] provides no reason to conclude that tacit knowledge systematically affects how favorably their overall annual performance is evaluated, theory-consistent evidence in Shankar and Tan [2006] indicates the value of tacit knowledge for performance at more junior levels.⁹ The theory discussed and tested in this study helps reconcile this apparent disconnect. In particular, we propose that the absence of a significant association between staff and senior auditors' tacit knowledge and their annual performance evaluation is largely non-diagnostic as to whether or not tacit knowledge is of primary or only secondary importance for subordinate auditors.

⁸ In their experimental task subordinates first assess whether or not to require an additional allowance for doubtful accounts and then learn of their supervising managers' preliminary conclusion. Subordinates are held accountable by being told their managers will review their judgments and supporting justifications. The supervising manager's conclusion is manipulated between-subjects to either agree or disagree with their own. When supervisors agree, higher tacit knowledge subordinates more frequently emphasize consistent and downplay inconsistent evidence. When supervisors disagree, higher tacit knowledge subordinates more frequently list pros and cons of alternative conclusions and cover a greater breadth of issues, but only if they also possess relatively high levels of technical knowledge. These strategic modifications to their justifications improved how favorably *third party experts* evaluated high tacit knowledge subordinates' task performance.

⁹ Shankar and Tan [2006] is the only accounting study of which we are aware that examines the influence of tacit knowledge on relatively inexperienced professionals' task performance. Outside of accounting, greater tacit knowledge has been linked to more favorable trajectory of professionals in knowledge organizations (e.g., Nonaka [1994]), and has been shown to improve task performance in professional service firms (Horvath and Sternberg [1999]).

We argue that because of the importance of social interactions in the audit profession at all levels, tacit knowledge is expected to improve performance at all levels. However, since some supervising auditors have relatively low tacit knowledge (see exhibit one taken from Tan and Libby [1997]), these “middle managers” probably have little understanding of the importance of tacit knowledge at lower organizational ranks. They have been promoted into their current supervisory position based on their technical abilities and problem solving skills. Consequently, they are unconscious about their own incompetence when it comes to tacit knowledge (cf. Argyris 1990) and therefore also do not consider it of importance for their own subordinates’ current performance. By contrast, supervisor auditors who possess relatively higher levels of tacit knowledge will value tacit knowledge in their subordinates as they realize the importance of tacit knowledge in the audit profession at all organizational levels.

Supervisors’ own understanding of what are the relevant skills for subordinates to develop and demonstrate will influence performance evaluation ratings if supervisors are provided with subjectivity in the evaluation and rewarding process. Since auditors in general work collectively there often are no output measures that capture the junior auditor’s individual contribution to the audit, and audit firms are therefore very likely to use high levels of subjectivity in the performance evaluation of their junior employees.¹⁰ A consequence of these high levels of subjectivity in the compensation system is that supervisors will weight the importance of certain actions or behaviors according to their own understanding of what constitutes a contribution to firm value. For supervisors that have higher tacit knowledge this means that they will put relatively more weight on those

¹⁰ Prior literature, e.g. Woods [2009], confirms that subjectivity is very common in performance evaluation systems at audit firms.

actions and behaviors that provide information on the subordinates' tacit knowledge, while supervisors with lower tacit knowledge will likely put relatively more weight on those actions and behaviors that provide an indication of the subordinates' technical abilities.¹¹ It is because some supervisors do not value tacit knowledge in their subordinates, that empirical evidence does not necessarily show an association between subordinates' current performance evaluation rating and their tacit knowledge levels.¹²

In sum, we predict that supervisors with higher tacit knowledge understand the importance of tacit knowledge at all ranks and will therefore relatively heavily weight actions and behaviors that provide an indication of the subordinates' tacit knowledge versus actions and behaviors that indicate the subordinates' technical ability. Supervisors with lower tacit knowledge, on the other hand, will not understand the value of tacit knowledge for current performance at lower ranks and will consequently put relatively little weight on actions and behaviors that provide an indication of tacit knowledge while putting relatively a lot of weight on indicators of technical skills.

H4 – Supervisors with higher tacit knowledge put relatively more weight on behaviors and actions that indicate subordinates' tacit knowledge over behaviors and actions that indicate technical knowledge when evaluating subordinates' annual performance compared to supervisors with lower tacit knowledge.

¹¹ In our particular setting the compensation system uses subjective weights but our theory generalizes to all forms of subjectivity as they can all be used to highlight certain behaviors/actions that provide an indication of the subordinates' level of tacit versus technical knowledge.

¹² One might wonder why tacit knowledge at higher levels of the organization is positively associated with performance ratings if some supervisors put relatively little weight on it. First, at higher organizational levels there are more output measures and the organization is not as dependent on subjective assessment from supervisors. Moreover, at higher levels of the organization supervisors with lower tacit knowledge have likely been 'weeded out' and hence the subjective assessments will likely be more calibrated.

3. RESEARCH DESIGN

3.1 *The Company and Research Methods*

Our research setting is a mid-sized regional European audit firm with 4 offices and over 275 employees. The company is a strong player in their regional market and services small, mid-size and larger national and international organizations.

In order to get an in-depth understanding of the human capital development and evaluation processes at the firm, and allow for quantitative analysis we used a mix-method research approach. We gathered information for our research by: (1) conducting a qualitative field study, (2) collecting proprietary archival data and (3) conducting an extensive survey, details of which are provided below.

We gathered the qualitative field study data in two main ways. First, we carried out a series of in-depth semi-structured interviews with the different parties involved in the evaluation process. Specifically, we interviewed three partners, one manager, three subordinates at different job-levels, and the head of the HR department. The semi-structured interviews lasted about an hour and were aimed at getting a general idea of their human capital development and evaluation processes. Second, we studied internal documents, including the descriptions of the evaluation systems, which allowed us to better understand the structure of the company and the internal procedures. The qualitative field study was instrumental in the design of our questionnaire and the choice of our proxies as it allowed us to have a deep understanding of our setting. For example, we felt comfortable asking supervisors to assess the potential of their subordinates to become a manager and partner as we learned from the interviews that the company keeps track of their most talented employees.

To gather quantitative archival data, we hand-collected the personnel records of all accounting related subordinates in the firm.¹³ This process resulted in 92 performance documents. The performance documents provide information on the subordinate's position, department, and the subordinate's direct supervisor. The performance documents also indicate the performance measures, performance ratings, and the subordinate's yearly compensation. Based on these documents and other personnel records, we were able to establish 101 subordinate-supervisor/partner dyads.

The evaluation system consists of five different dimensions: goal achievement, technical performance, competencies, training, and leadership. Whether or not all these dimensions are used in the annual evaluation depends on the job-level of the subordinate. For example, until a subordinate reaches a supervisory level the leadership dimension is not part of the evaluation. However, the dimensions technical performance and competencies apply to all employees. Each dimension consists of several performance measures that are specifically chosen for each subordinate and that are agreed upon at the beginning of the contracting period. At the end of the contracting period, the supervisor evaluates the subordinate performance on each relevant dimension on a scale from 1 to 4 with the extreme anchors being unsatisfactory (1) and excellent (4). The system uses subjective weighting, that is, the supervisors are provided with the discretion to compose the final score based on the scores of the relevant dimensions, instead of the dimension scores being combined using a pre-specified formula.¹⁴ We collected information on the subordinate's rating on each individual performance measure, the different dimensions, and the final total score. Furthermore, the HR department provided us with demographic

¹³ Administrative personnel like secretaries and HR employees were not included. Moreover, the firm also has a significant tax and corporate finance department that was not included

¹⁴ This is common practice in performance evaluation and rewarding in audit firms.

information on the subordinates such as job tenure, firm tenure, age and contact information.

We also gathered quantitative survey data in order to capture the subordinates' tacit knowledge, as well as, get more detailed information on subordinates' tasks and development. We approached all accounting related employees of the firm with the request to participate in our survey. We conducted two separate surveys, one for the supervisors (managers and partners), in which we measured their tacit knowledge and asked them to assess their subordinates, and one for the subordinates, which also measured tacit knowledge and asked questions about their clients, responsibilities and involvement. We designed the surveys using the online tool Qualtrics, and sent all subordinates, supervisors, and partners an email with a link to the survey. In the introduction to the survey, as well as in the email, we informed participants that each participant that fills out the survey will receive a movie voucher for € 12,50 and that we will randomly select one participant to receive an Apple iPad. The HR manager of the firm also emailed all potential participants to indicate the company's support for the research study and to encourage participation. After two weeks we sent out a follow up email to thank those who had participated and to encourage those who had not. Out of the 101 subordinates that we contacted based on our subordinate-supervisor/partner dyads, 94 (93%) participated, 85 of which are usable, while 18 of the 20 (90%) contacted partners and supervisors filled out the survey, which allow a link to 99 subordinates. An overview of the observations in each separate dataset, as well as a description of the different samples used in this paper is provided in Table 1.

3.2 *Dependent, Independent and Control Variables*

In our test of H1, we examine whether tacit knowledge is a good indicator of future leadership potential. We capture the potential leaders of the organization by asking each supervisor and partner to indicate whether each of their subordinates a) has the potential to become a manager (*potential manager*) and b) has the potential to become a partner (*potential partner*).

The main independent variable in our first analysis is the subordinate's tacit knowledge. We capture subordinates' tacit knowledge by using Tan and Libby's (1997) modified tacit knowledge scale.¹⁵ This scale presents ten work-related scenarios and nine to eleven options associated with each scenario. The subordinates are asked to rate each option on a seven-point scale, with the extreme anchors being extremely unimportant and extremely important to success. We also asked the subordinate's direct supervisor to fill out the scale and consequently measure subordinates' tacit knowledge by calculating the absolute difference between a subordinate's importance ratings and the ratings of the subordinate's direct supervisor. Higher consistency in the importance ratings (smaller absolute difference) indicates higher levels of tacit knowledge, as perceived by the direct supervisor. Finally, we invert the measure so that higher values indicate more subordinate tacit knowledge (*Tacit knowledge subordinate – view of direct supervisor*).

¹⁵ This scale was originally developed by Wagner and Sternberg (1985) but modified by Tan and Libby (1994) to fit the instrument to the public accounting context. The ten work-related scenarios related to (1) activities which lead to promotion from manager to partner, (2) the importance of different tasks to audit firm management, (3) activities which lead to success in public accounting, (4) proper responses to a personnel problem, (5) motivations for pursuing a public accounting career, (6) personal characteristics of successful public accountants, (7) personal work strategies of successful managers, (8) components of a good reputation as a manager, (9) experiences relevant to becoming a good manager, and (10) the importance of candidate attributes in employment selection for entry-level positions in public accounting. For more information see Tan and Libby (1994).

Since we want to examine the effect of a subordinate's tacit knowledge considering their experience level, we need to control for experience. We do this by including the subordinate's firm tenure, job level and age (*Firm tenure, Job level, and Age*). Further, in order to examine whether tacit knowledge provides additional information on subordinates' potential to become a future leader beyond information already captured by the performance evaluation process, we also include the subordinate's total evaluation score (*Overall evaluation rating*).

In our test of H2, we examine environmental factors that are associated with subordinates' tacit knowledge development. Once again, our dependent variable is subordinate's tacit knowledge, but for this analysis we do not compare the subordinates' importance ratings to those of their direct supervisor. Instead, we use the importance ratings of their direct partner. This helps ensure that the tacit knowledge developed matches that of the current top leadership at the firm (*Tacit knowledge subordinate –view of direct partner*). In case of one supervisor, there is not a direct partner hierarchically above him, as he acted in the role as partner during the time of our study. We include the responses of this supervisor in our measure as if he is a partner and further show that our results are not sensitive to this inclusion.

The first environmental factor that is predicted to enhance tacit knowledge is variety of experiences. In our survey data, we asked subordinates to indicate how challenging and interesting their tasks are. Specifically, we ask them to indicate the percentage of assignments that are very challenging and interesting, challenging and interesting, somewhat challenging and interesting, routine and not challenging and interesting. We use the percentage of assignments that are (very) challenging and

interesting to proxy for the variety of experiences that the subordinate is faced with (*Challenging tasks*). We capture the second environmental factor predicted to enhance tacit knowledge development, the opportunity to interact with clients, by measuring the size of the subordinate's clients. From our field study it became apparent that the amount of social interaction that subordinates would have with clients (independent or together with the supervisor/partner) was not equal for each engagement. Specifically, the partner we spoke to stated that the extent to which subordinates are involved and responsible for interacting with the client is, in general, a lot higher for smaller clients. Because of the limited number of employees on these small engagements the subordinate would be present for all interactions with the client and would often be solely responsible for gathering information from the client. Hence, to capture the subordinate's 'client face time' we asked the subordinates to indicate in the survey how many of their clients are small, mid-size or large. We use the percentage of small clients as a proxy for the opportunity to interact with clients (*Small clients*). The third environmental factor is job responsibility. We capture the subordinate's perception of the responsibility they receive by asking the subordinate to indicate on a 7-point scale "the extent to which they are trusted by their supervisor with responsibilities that normally are only trusted to subordinates with more experience" and "whether they get trusted with more responsibilities than their direct colleagues." We take the average of these two survey questions as our measure for responsibility (*Perceived responsibility*). Our fourth independent variable is the subordinate's perceived involvement in the organization. We capture this by asking the subordinates to rate on a 7-point scale their agreement with the statement "I always attend social events organized by the company such as the Friday

afternoon receptions or drinks after trainings.” Higher agreement with this statement indicates higher social involvement with the company (*Social involvement*). In our tests of H2, we also include the control variables *Job level* and *Firm tenure* and *Age* as described above.

To test H3, we build on our analysis for testing H2 by adding a dummy variable that equals one if the subordinate’s direct supervisor has relatively high (i.e., above the median) tacit knowledge and zero otherwise. We also interact this dummy variable with *Small clients* and *Social involvement* to examine whether subordinates who are supervised by a low tacit knowledge supervisor rely more on these other forms of social interaction in developing their tacit knowledge. .

Last, to test H4, we analyze the weights that supervisors’ give to different behaviors and actions of their subordinates’ in developing their annual performance evaluation score for these subordinates. Recall that supervisors evaluate subordinates on at least two and at most five different dimensions, depending on their rank. For each dimension, supervisors must provide a score from 1 to 4, where 4 is the best. In addition, the supervisor subjectively combines these dimensions to reach an overall assessment of the subordinate (*Overall evaluation Rating*). We measure the actions and behaviors that provide an indication of the subordinate’s technical skills by using the subordinate’s score on the technical performance dimension (*Technical Performance Rating*). We capture the actions and behaviors that indicate the subordinate’s level of tacit knowledge by using the performance rating on the competencies dimensions (*Competencies Rating*). This dimension does not merely capture behaviors and actions that indicate tacit knowledge, nevertheless, we believe the performance rating is a good a priori proxy for

the subordinate's tacit knowledge as it includes sub-dimensions such as customer orientation, self-confidence, independence and willingness to learn from mistakes. These sub-dimensions seem to be related to the ability to manage oneself, others and one's career.

4. RESULTS

4.1 Descriptive Statistics

Tables 2 and 3 provide descriptive statistics and simple Pearson and Spearman correlations for our variables. Several results are notable. One is that while tacit knowledge of subordinates from the viewpoints of their direct supervisor and of the partners who in turn supervise these supervisors are significantly positively correlated ($r = +0.56$), immediate supervisors provide significantly more optimistic assessments of subordinates' tacit knowledge (i.e., 79.81 versus 73.04, $p_{\text{(two-tailed)}} = 0.001$). This finding resonates with similar findings in Kennedy and Peecher [1997] with respect to supervisors over optimism in their subordinate's technical knowledge.

Another noteworthy finding is that subordinates describe only about one-third of their assignments as being challenging and very interesting. One of the concerns about tasks assigned to promising subordinates early on in their careers is that they are boring and repetitive, which makes alternative career paths potentially more interesting. A final notable finding is that the overall performance evaluation ratings gravitate to 3 (1st quartile, median, and 3rd quartile all equal 3), consistent with prior research showing that performance evaluations tend to exhibit both a centrality bias and a leniency bias (Prendergrast [1999]; Moers [2007]; Bol [2011]).

4.2 Test of Hypothesis 1

To empirically test H1, which predicts that individual supervisors can identify subordinates who are potential future leaders based on their perceptions of the subordinates' tacit knowledge, we estimate the following logit model:

$$\begin{aligned} \text{Pr}(\text{Potential} = 1) = & \beta_0 + \beta_1 \text{Tacit Knowledge} + \beta_2 \text{Job Level} + \beta_3 \text{Firm Tenure} \\ & + \beta_4 \text{Age} + \beta_5 \text{Overall Evaluation Rating} + \varepsilon \end{aligned}$$

where "Potential" refers to either *Potential Manager* or *Potential Partner* and *Tacit Knowledge* is measured from the perspective of the subordinate's direct supervisor, as this supervisor is key in identifying subordinates most suited for promotion. We run this model both with and without *Overall Evaluation Rating* because of missing data for this variable.

The results, presented in Table 4, show a consistent pattern regarding the relationship between tacit knowledge of the subordinate and the probability of being identified as a potential manager/partner. More specifically, tacit knowledge is positively associated with the potential to become a manager in both regressions, although not statistically significant when *Overall Evaluation Rating* is included. The results for *Potential Partner* as dependent variable are stronger. That is, tacit knowledge is significantly positively associated with the potential to become a partner, irrespective of whether *Overall Evaluation Rating* is included in the analysis. Consistent with H1, these results imply that, as the tacit knowledge of the subordinate increases, from the viewpoint of the direct supervisor, the supervisor is more likely to identify the subordinate as a potential future leader.

Regarding the control variables, we find that both *Job Level* and *Overall Evaluation Rating* are significantly positively associated with both *Potential Manager*

and *Potential Partner*. This indicates that subordinates higher up the hierarchy and/or with a better performance evaluation are more likely to be identified as future potential leaders. Further, *Age* has a significant negative effect on the probability to become a manager, but not on the probability to become partner, while *Firm Tenure* is insignificant in all models.

Although we find results consistent with H1, it could be that tacit knowledge of a subordinate is positively associated with the potential to make any promotion, not only to manager and/or partner. We therefore run an additional analysis where we replace *Potential Manager / Potential Partner* by an indicator variable that indicates the potential of the subordinate to be promoted to the next hierarchical level (not manager or partner). Untabulated results show that tacit knowledge is not related to these types of potential promotions. Overall, the data therefore provide support for H1.

4.3 Tests of Hypotheses 2a-d

Given that tacit knowledge is systematically related to the probability of being identified as potential future leader, we address environmental correlates of this tacit knowledge. To test H2a-2d, which states that a subordinate's tacit knowledge is a function of the variety of experiences, opportunities to interact with clients, job responsibility, and organizational involvement, we estimate the following model:

$$\begin{aligned} \textit{Tacit Knowledge} = & \beta_0 + \beta_1 \textit{Challenging Tasks} + \beta_2 \textit{Small Clients} \\ & + \beta_3 \textit{Perceived Responsibility} + \beta_4 \textit{Social Involvement} \\ & + \beta_5 \textit{Job Level} + \beta_6 \textit{Firm Tenure} + \beta_7 \textit{Age} + \epsilon \end{aligned}$$

For this analysis, the dependent variable *Tacit Knowledge* is measured from the perspective of the subordinate's direct partner for reasons explained earlier.

The empirical results, presented in Table 5, show that *Challenging Tasks* is positively associated with *Tacit Knowledge*, consistent with H2a, which states that the variety of experiences of a subordinate benefit the development of tacit knowledge. Further, our measures capturing a subordinate's opportunity to interact with clients, i.e., *Small Clients*, is positively associated with *Tacit Knowledge*. This finding is in line with the prediction that subordinates who have greater opportunities to interact with clients have higher levels of tacit knowledge, which is consistent with H2b. Our measures capturing a subordinate's job responsibility, i.e., *Perceived Responsibility*, and organizational involvement, i.e., *Social Involvement*, are not significantly associated with *Tacit Knowledge*, so there is no discernible support for H2c and H2d. With respect to the control variables, we find that *Firm Tenure* is positively associated and *Age* negatively associated with *Tacit Knowledge*. Overall, the data provide support for H2a and H2b, but little to no support for H2c and H2d.

4.4 Tests of Hypotheses 3

Although the previous results show that job and subordinate related characteristics are associated with tacit knowledge, the hypothesized positive relation between the tacit knowledge of a subordinates' direct supervisor and a subordinate's tacit knowledge is not yet addressed. To examine this relation, we first correlate the level of tacit knowledge of these two groups, both measured from the perspective of the direct partner. To make this correlation useful, we first calculate the median level of tacit knowledge of all subordinates for each supervisor and then correlate this median with the tacit knowledge of the supervisor. We delete supervisors who have less than three subordinates with data and the one supervisor without a direct partner hierarchically above him during the time

of our study, which leaves us with 12 supervisors and thus 12 observations. The correlation coefficient is 0.47 and significant at $p=0.06$ (one-tailed). This result provides some preliminary evidence that the tacit knowledge of the subordinate is associated with the tacit knowledge of the subordinate's supervisor.

To provide further evidence, we adjust the model of the drivers of tacit knowledge that we used to test H2a-H2d. We add the tacit knowledge of the supervisor as an additional explanatory variable and allow the coefficients on *Small Clients* and *Social Involvement* to vary as a function of the supervisors' tacit knowledge, as these are potential alternative social interaction mechanisms to develop tacit knowledge in the absence of a supervisor with high tacit knowledge. To allow for a clear interpretation of the results, we use an indicator variable for the tacit knowledge of the supervisor (*HiTKMgr*), which equals 1 (0) if the supervisor has an above-the-median (below-the-median) level of tacit knowledge, and rescale *Small Clients* and *Social Involvement* such that zero represents the lowest observed value in the dataset. The following model thus applies:

$$\begin{aligned}
 \text{Tacit Knowledge} = & (\beta_0 + \gamma_0 \text{HiTKMgr}) + \beta_1 * \text{Challenging Tasks} \\
 & + (\beta_2 + \gamma_2 \text{HiTKMgr}) * \text{Small Clients} \\
 & + \beta_3 * \text{Perceived Responsibility} \\
 & + (\beta_4 + \gamma_4 \text{HiTKMgr}) * \text{Social Involvement} \\
 & + \beta_5 * \text{Job Level} \\
 & + \beta_6 * \text{Firm Tenure} \\
 & + \beta_7 * \text{Age} + \epsilon
 \end{aligned}$$

Given that we only have survey data regarding both direct supervisors and direct partners for 65 subordinates, we test H3 using the model above for these 65 subordinates. To ensure that the results presented in Table 5 also hold for this subset of observations,

we first report the above model without *HiTKMgr* and its interactions in Model (I) in Table 6. The results regarding H2a-H2d are in line with those presented in Table 5 and thus indicate that this subset of observations is not inherently different with respect to the drivers of tacit knowledge.

Model (II) in Table 6 shows the results of the model including *HiTKMgr* and its interactions. The main effect of *HiTKMgr*, which represents the impact of the tacit knowledge of the supervisor on the tacit knowledge of the subordinate, is positive and significant. This implies that subordinates who interact with a supervisor who has above-the-median tacit knowledge have increased levels of tacit knowledge themselves, which provides support for H3. The coefficient on *HiTKMgr* implies that a subordinate who has a supervisor with relatively high levels of tacit knowledge has a tacit knowledge score that is 31.23 higher than a subordinate who has a supervisor with relatively low levels of tacit knowledge. This indicates that a subordinate's tacit knowledge shifts by almost two times the standard deviation ($31.23 / 15.83$) by being supervised by a high tacit knowledge supervisor, which is an economically/practically significant effect.

The results regarding the interactions between *HiTKMgr* and *Small Clients* and *Social Involvement* show that the impact of the drivers of tacit knowledge identified in H2b and H2d is lower (higher) for subordinates who have high (low) tacit knowledge supervisors, although this result is significant at conventional levels for *Social Involvement* ($p=0.03$, two-tailed) but only at the margin for *Small Clients* ($p=0.18$, two-tailed). This suggests that interacting with other people inside or outside the organization to some extent acts as a substitute in the development of tacit knowledge for those subordinates who interact with supervisors who have below-the-median tacit knowledge.

Although our findings are consistent with H3, the presented results are unable to shed light on whether these associations are (partly) driven by self-selection or caused by employees mimicking and communicating with supervisors with higher tacit knowledge. However, from our field examinations it became apparent that because of the mid-sized nature of the organization, many subordinates had limited opportunities to switch supervisors if they wanted to stay in the same field of expertise and within the same geographic office location. Hence, changing to a group managed by a supervisor with higher tacit knowledge would result in significant transactions costs, which makes it less likely that our results are merely driven by self-section.

4.5 Tests of Hypotheses 4

To test our fourth hypothesis we examine the impact of direct supervisor's tacit knowledge on weighting different performance dimensions in subordinates' performance evaluations. Following Ittner, Larcker and Meyer (2003), we run a regression of the *Overall Evaluation Rating* on the ratings on the two dimensions of performance that are used for all subordinates and use the resulting regression coefficients as our estimates of the subjective weights.¹⁶

To examine the impact of supervisors' tacit knowledge on subjective weights, we allow the regression coefficients to vary between supervisors with below-the-median tacit knowledge and supervisors with above-the-median tacit knowledge. As a result, we run the following regression specification:

¹⁶ When we run a regression of the *Overall Evaluation Rating* on the ratings on all five dimensions and take the absence or presence of the other three dimensions into account by adding an indicator variable that equals 1 (0) if the dimension is present (absent) we find similar results (untabulated).

$$\begin{aligned}
\text{Overall Evaluation Rating} = & \beta_0 + \beta_1 \text{Technical Performance Rating} \\
& + \beta_2 \text{Competencies Rating} + \beta_3 \text{HiTKMgr} \\
& + \beta_4 \text{HiTKMgr} * \text{Technical Performance Rating} \\
& + \beta_5 \text{HiTKMgr} * \text{Competencies Rating} + \epsilon
\end{aligned}$$

Model (I) in Table 7 presents the results of the above specification. In particular, the main effect of *Technical Performance Rating* and *Competencies Rating*, which represents the subjective weight on these dimensions by below-the-median tacit knowledge supervisors, is positive and significant, indicating that these supervisors significantly weight these dimensions in their overall assessment. Our test of H4, however, requires examination of how the coefficients on these dimensions change with the supervisors' tacit knowledge. The coefficient on the *HiTKMgr*Technical Performance Rating* interaction is negative and significant, which indicates that supervisors with higher tacit knowledge put less weight on the subordinates' technical performance than supervisors with low tacit knowledge. The interaction term *HiTKMgr*Competencies Rating* is positive, as predicted but not significant.

Panel B of Table 7 is a more pointed test of H4. It examines whether higher tacit knowledge supervisors and lower tacit knowledge supervisors have significantly different relative weights for *Technical Performance* and *Competencies Rating*. As shown, higher tacit knowledge supervisors weigh their subordinates' *Competencies Rating* significantly more than their *Technical Performance* (+0.66_{tacit} versus -0.02_{technical}, $p < 0.01$). By contrast lower tacit knowledge supervisors weight their subordinates' *Technical Performance* as much or more than their *Competencies Rating* (+0.53_{technical} versus +0.33_{tacit}, n.s.).

To examine whether our results are driven by supervisors with higher tacit knowledge supervising subordinates who are at a higher job level, we rerun our model after including *Job Level* and its interaction with the two performance dimensions. The results, reported as Model (II) in Table 7, show that our results are not driven by job level. That is, the added variables are all not significant, while the results for the variables of interest to H4 are in line with Model (I).¹⁷

Overall the results clearly show a different pattern in performance evaluation behavior between supervisors with below-the-median versus above-the-median tacit knowledge. In particular, supervisors with below-the-median tacit knowledge put more emphasize on the dimension that provide an indication of technical knowledge (*Technical Performance*), and put less weight on the dimension that most likely is an indication of tacit knowledge (*Competencies*). Given that subordinates are expected to respond to and/or anticipate this behavior, subordinates who are supervised by supervisors with below-the-median tacit knowledge might misdirect their effort and underinvest in their tacit knowledge development.

5. CONCLUSION

In this study, we present empirical evidence that collectively supports the following four hypotheses: (1) Higher tacit knowledge increases the likelihood that staff and senior audit subordinates' will be identified as a future leader by their supervisors; (2) Staff and senior auditors' tacit knowledge is positively associated with their exposures to a rich variety of professional experiences and their opportunities to interact with clients, their degree of job responsibility, and their degree of involvement with their

¹⁷ We also run our model after replacing *HiTKMgr* by *Job Level*. The (untabulated) results show that *Job Level* and its interactions with the two performance dimensions are all not significant.

firm's social and community activities; (3) Audit supervisors with relatively high tacit knowledge better cultivate and grow their subordinates' tacit knowledge; and (4) Relative to those with lower tacit knowledge, audit supervisors with higher tacit knowledge place greater relative weight on subordinates' tacit knowledge than on their technical knowledge when evaluating annual performance. Our findings are largely consistent with all four of our hypotheses, thereby contributing to the audit expertise, human capital development and incentive contracting literatures in accounting.

In particular, we provide evidence that tacit knowledge begins to differentiate more from less promising auditors considerably earlier in their careers than is suggested by relatively common interpretations of findings in Tan and Libby [1997]. Our findings also begin to reveal the phenomena that are associated with speedier development of tacit knowledge in relatively inexperienced auditors. We show that higher levels of tacit knowledge are associated with higher variety of experiences and more opportunities to interact with clients. Most importantly, our results show the pivotal role of supervisors' own tacit knowledge in the development of tacit knowledge. These findings suggest that the proactive management of tacit knowledge development by exposing the most talented employees to the right opportunities and supervisors with high levels of tacit knowledge will likely bear fruit.

Our study also provides valuable insights for compensation system designers and firms as it suggest that they should consider the skill sets and knowledge of the supervisors executing the evaluation and rewarding process when determining the discretion that should be endowed to supervisors. Our results show that the skill sets and knowledge of supervisors not only influence *how* supervisors evaluate but also *what* they

evaluate and reward. We provide empirical evidence indicating that supervisors have the tendency to focus on and reward those skills that were the basis for their own success within the organization. Consequently, in a system that allows supervisors to determine the value of different skills, supervisors who were promoted without possessing high levels of tacit knowledge will also not highly reward tacit knowledge in their own subordinates. Since subordinates are motivated to develop those skills that get evaluated and rewarded, incentive systems that are executed by supervisors with lower tacit knowledge provided fewer incentives to develop tacit knowledge.

As with all studies, this one has limitations. One limitation is that the tacit knowledge scale used in this paper measures whether subordinates *recognize* actions that represent higher tacit knowledge, not whether they are able or inclined to actually perform them. Hence, consistent with earlier studies on tacit knowledge (e.g. Tan and Libby [1997]; Sternberg and Wagner [1985]; [1987], we assume that auditors who recognize actions of consistent with high tacit knowledge are more likely than other auditors to perform these actions. Another limitation is that our data, though rich and gathered from several research approaches, come from one mid-sized accounting firm in Europe. This is a similar limitation that applies to all of the extant tacit knowledge research in auditing that we are aware of: prior studies examine tacit knowledge for audit firms in Singapore.

Another limitation relates to one of our proxies, small clients. We predict and find that working with smaller clients enhances the development of tacit knowledge as it provides subordinates with more opportunities to interact with clients. Alternatively one could argue that working with bigger and more prominent clients would enhance tacit

knowledge development as subordinates get to work with carefully selected supervisors who likely have superior tacit knowledge. Because of the relatively small size of our organization this dynamic did not exist in our setting but we expect that as the size of an audit firm increases, the tacit knowledge development creation through the social interaction with superior supervisors and more prominent clients will likely outweigh the larger number of interaction that subordinates have with smaller clients. Hence, our proxy, small clients, makes sense for our setting but will likely not generalize to all accounting organizations.

Our study raises new questions for future research, such as do lower tacit knowledge supervisors pose incremental human capital risk to audit firms in the sense that their more promising subordinates go under- or unidentified, tend to leave earlier than is desirable and take their formative expertise with them to competing firms or alternative professions. This study also motivates additional work along the lines of Shankar and Tan [2006], which is the only study of which we are aware to show how greater tacit knowledge enables auditors to more skillfully deploy their technical knowledge to reach better-justified decisions. In particular, do lower tacit knowledge supervisors fail to pick up on these performance differences in justification quality or mis-attribute any differences they do discern to better technical knowledge alone (and discount the role played by tacit knowledge).

Related, our study motivates developing a refined measure of tacit knowledge that more convincingly applies to the financial-statement auditing context. Such a scale could, for example, present auditors with an apparent impasse between client management and an auditor and provide them with alternative negotiation strategies (e.g.,

Sanchez, Agoglia and Hatfield [2007]), or with a complex estimate that may benefit from informal and/or formal consultation with other auditors and provide them with alternative ways to sequence the consultation process (e.g., Kadous, Leiby, and Peecher [2012]). It may be that tacit knowledge would demonstrably play an even more pivotal role for audit expertise, regardless of auditor rank, if we were to refine our measure of the construct, as it pertains to the audit context.

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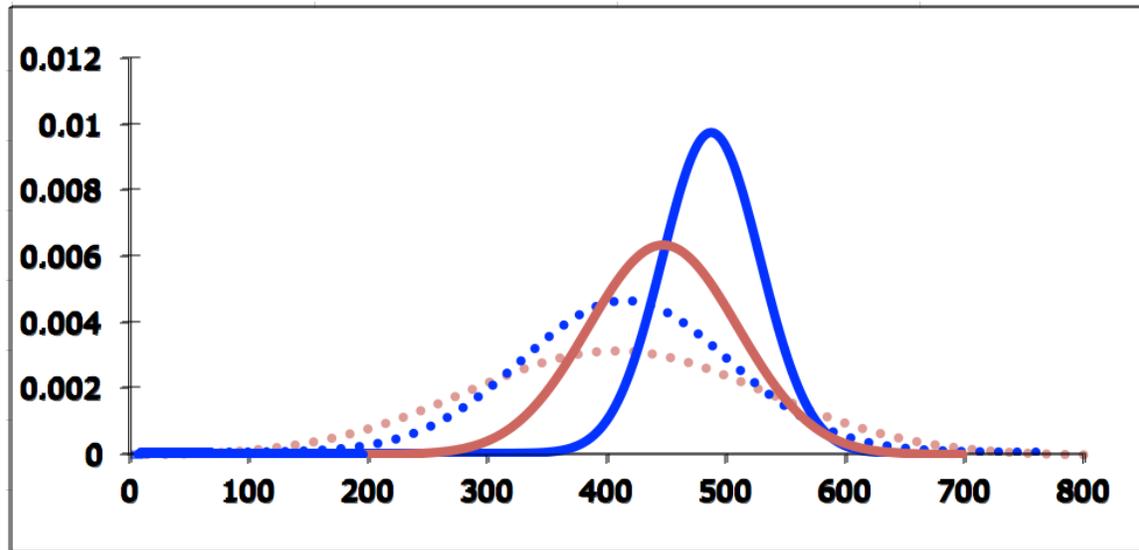
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Exhibit 1. Tacit Knowledge Distributions Implied by Results in Tan and Libby [1997]



We developed this exhibit by using sample means and standard deviations as reported in Table 1 of Tan and Libby [1997] and by making the simplifying assumption that tacit knowledge levels are normally distributed. The blue (red) lines are estimated normal distributions of tacit knowledge levels for audit managers (staff). The solid (broken) lines are estimated normal distributions of tacit knowledge levels for auditors with top (bottom) annual performance evaluations.

Two of the main takeaways emphasized in Tan and Libby [1997] and by papers citing this study are that tacit knowledge levels are significantly higher for managers who receive top versus bottom performance evaluations, but not significantly different for audit staff (or seniors) who receive top versus bottom performance evaluations.

We use this exhibit to accentuate another important, but easily overlooked, implication of their findings: The tacit knowledge levels of a considerable portion of both top- and bottom-rated staff auditors rival that of top-rated audit managers. In particular, the mean tacit knowledge level of top-rated managers, bottom-rated managers, top-rated staff, and bottom-rated staff are 486.3, 447.94, 414.3, and 406.4 (higher numbers are better). The related standard deviations 41.0, 62.8, 86.9 and 125.7. An implication is that staff auditors whose tacit knowledge is just one-standard deviation greater than the mean for their level would approximate the average tacit knowledge level of top-rated managers.

Table 1 Description of datasets and samples

Datasets / samples	#obs.	#obs.
(1) # of subordinate-supervisor/partner dyads based on personnel files	101	
(2) # of subordinates with non-missing direct supervisor survey data	99	
(3) # of subordinates with non-missing direct partner survey data	84	
(4) # of subordinates with non-missing subordinate survey data	85	
(5) # of subordinates with archival data on performance evaluation	92	
Merge (1), (2), and (4)		85
Merge (1), (2), (4), and (5)		79
Merge (1)-(4)		65
Merge (1)-(5)		61

Table 2 Descriptive statistics

Variable	n	Mean	Median	Std	Q1	Q3
<i>Tacit Knowledge Subordinate – view of direct supervisor</i>	85	79.81	80.0	21.94	66	98
<i>Tacit Knowledge Subordinate – view of direct partner</i>	85	73.04	76.0	15.83	62	83
<i>Challenging Tasks</i>	85	32.71	30.0	21.94	20	50
<i>Small Clients</i>	85	64.44	80.0	35.91	20	100
<i>Perceived Responsibility</i>	85	4.52	4.5	1.04	4	5
<i>Social Involvement</i>	85	4.60	5.0	1.26	4	5.5
<i>Firm Tenure</i>	85	82.13	47.0	83.73	27	111
<i>Age</i>	85	31.95	29.0	9.53	26	35
<i>Job Level</i>	85	2.32	2.0	1.36	1	3
<i>Overall Evaluation Rating</i>	79	2.99	3.0	0.20	3	3
<i>Technical Performance Rating</i>	79	2.98	2.97	0.29	2.9	3
<i>Competencies Rating</i>	79	2.94	2.94	0.18	2.9	3

Tacit Knowledge Subordinate – view of direct supervisor (partner): subordinate’s level of tacit knowledge from the perspective of the subordinate’s direct supervisor (partner), measured using the Tan and Libby (1994) modified tacit knowledge scale.

Challenging Tasks: percentage of tasks that are perceived to be very challenging and interesting by the subordinate.

Small Clients: percentage of small clients in the subordinate’s portfolio as a proxy for the subordinate’s opportunity to interact with clients.

Perceived Responsibility: two 7-point scale items capturing the extent to which the subordinate is trusted by the supervisor with more responsibilities than direct colleagues or than would be expected based on experience.

Social Involvement: 7-point scale item indicating agreement with the statement ‘I always attend social events organized by the company such as the Friday afternoon receptions or drinks after trainings.’

Firm Tenure: subordinate’s tenure with the firm in months.

Age: subordinate’s age in years.

Job Level: subordinate’s level in the corporate hierarchy, where higher values reflect a higher level.

Overall Evaluation Rating: performance rating received by the subordinate, ranging from 1 (poor) to 4 (excellent).

Technical Performance rating: performance sub-rating received by the subordinate on the dimension ‘Technical Performance’, ranging from 1 (poor) to 4 (excellent).

Competencies Rating: performance sub-rating received by the subordinate on the dimension ‘Competencies’, ranging from 1 (poor) to 4 (excellent).

Table 3 Correlations (Pearson below diagonal; Spearman above diagonal)

Variable	1	2	3	4	5	6	7	8	9	10	11	12
<i>1. Tacit Knowledge Subordinate – view of direct supervisor</i>	1	0.55	0.08	0.15	0.13	0.05	-0.04	-0.01	-0.11	0.14	0.29	0.36
<i>2. Tacit Knowledge Subordinate – view of direct partner</i>	0.56	1	0.22	0.26	0.10	0.18	-0.12	-0.02	-0.04	0.09	0.18	0.26
<i>3. Challenging Tasks</i>	0.07	0.25	1	-0.19	0.10	0.18	-0.19	-0.14	0.07	-0.00	-0.12	0.19
<i>4. Small Clients</i>	0.20	0.22	-0.19	1	0.15	0.04	-0.09	-0.01	-0.41	-0.06	0.09	-0.13
<i>5. Perceived Responsibility</i>	0.16	0.18	0.08	0.16	1	0.46	0.07	0.04	-0.06	0.27	0.32	0.33
<i>6. Social Involvement</i>	0.02	0.23	0.23	0.08	0.47	1	0.17	0.02	0.14	0.09	0.11	0.16
<i>7. Firm Tenure</i>	-0.08	-0.17	-0.24	0.01	-0.00	0.09	1	0.77	0.28	0.05	0.16	-0.09
<i>8. Age</i>	-0.06	-0.05	-0.30	0.05	0.04	0.01	0.85	1	0.39	-0.04	0.12	-0.19
<i>9. Job Level</i>	-0.11	0.01	0.09	-0.49	-0.07	0.12	0.21	0.19	1	0.05	0.16	-0.06
<i>10. Overall Evaluation Rating</i>	0.16	0.11	-0.03	-0.08	0.29	0.05	0.02	-0.01	0.09	1	0.44	0.48
<i>11. Technical Performance Rating</i>	0.19	-0.03	-0.05	-0.06	0.25	0.05	0.08	0.02	-0.07	0.27	1	0.58
<i>12. Competencies Rating</i>	0.34	0.27	0.18	-0.09	0.32	0.14	-0.22	-0.23	-0.08	0.55	0.32	1

All correlation coefficients that are significant at the 10% level (two-tailed) or better are in bold. Variable definitions are provided in the notes to Table 2.

Table 4 Impact of Tacit Knowledge of Subordinate on Manager/Partner Potential as Viewed by Subordinate’s Direct Supervisor

Independent variables	Predicted sign	Potential to be Manager		Potential to be Partner	
<i>Tacit Knowledge Subordinate – view of direct supervisor</i>	+	0.02* (0.01)	0.01 (0.02)	0.08** (0.04)	0.08* (0.05)
<i>Job Level</i>	+	0.90*** (0.29)	0.90*** (0.33)	1.33*** (0.49)	1.20** (0.52)
<i>Firm Tenure</i>	?	0.01 (0.01)	0.00 (0.01)	0.03 (0.03)	0.02 (0.03)
<i>Age</i>	+	-0.31*** (0.12)	-0.31** (0.14)	-0.53 (0.34)	-0.36 (0.35)
<i>Overall Evaluation Rating</i>	+		3.86* (2.22)		4.82* (2.66)
<i>Sample size</i>		85	79	85	79

***, **, * is significant at the 1%, 5%, and 10% level (two-tailed), respectively. Standard errors are in parentheses.

Potential to be Manager (Partner) is a dummy variable that equals 1 if the subordinate’s direct supervisor indicates that the subordinate has the potential to be a manager (partner), zero otherwise. All other variables are defined in the notes to Table 2.

Table 5 Drivers of Tacit Knowledge of Subordinates

Independent variables	Predicted Sign	Tacit Knowledge Subordinate (view of direct partner)
<i>Challenging Tasks</i>	+	0.19** (0.08)
<i>Small Clients</i>	+	0.14*** (0.05)
<i>Perceived Responsibility</i>	+	0.41 (1.77)
<i>Social Involvement</i>	+	1.87 (1.52)
<i>Job Level</i>	+	1.75 (1.40)
<i>Firm Tenure</i>	+	-0.09** (0.04)
<i>Age</i>	?	0.62* (0.33)
Adjusted R-square		16.52%
Sample size		85

***,**, * is significant at the 1%, 5%, and 10% level (two-tailed), respectively. Standard errors are in parentheses.
Variable definitions are provided in the notes to Table 2.

Table 6 Impact of Direct Supervisor’s Tacit Knowledge on Subordinate’s Tacit Knowledge

Independent variables	Predicted Sign	Tacit Knowledge Subordinate (view of direct partner)	
		(I)	(II)
<i>Challenging Tasks</i>	+	0.18** (0.09)	0.18** (0.08)
<i>Small Clients</i>	+	0.19*** (0.06)	0.27*** (0.07)
<i>Perceived Responsibility</i>	+	-1.05 (2.07)	-2.30 (2.08)
<i>Social Involvement</i>	+	0.85 (1.67)	4.30* (2.17)
<i>Job Level</i>	?	2.45 (1.52)	3.03* (1.54)
<i>Firm Tenure</i>	?	-0.10** (0.04)	-0.09** (0.04)
<i>Age</i>	?	0.54 (0.38)	0.55 (0.38)
<i>HiTKMgr</i>	+		31.23*** (11.59)
<i>HiTKMgr * Small Clients</i>	?		-0.13 (0.10)
<i>HiTKMgr * Social Involvement</i>	?		-6.03** (2.75)
Adjusted R-square		20.07%	25.77%
Sample size		65	65

***, **, *, # is significant at the 1%, 5%, 10%, and 15% level (two-tailed), respectively. Standard errors are in parentheses.

HiTKMgr is a dummy variable that equals 1 if the subordinate’s direct supervisor has a level of tacit knowledge that is above the median, zero otherwise. All other variables are defined in the notes to Table 2. *Small Clients* and *Social Involvement* are rescaled such that zero represents the lowest observed value in the dataset.

Table 7 Impact of Direct Supervisor’s Tacit Knowledge on Weighting Different Performance Dimensions in Subordinates’ Performance Evaluations

Panel A: Relationship between sub-ratings and overall evaluation rating by supervisor type

Independent variables	Predicted Sign	Overall Evaluation Rating	
		(I)	(II)
<i>Technical Performance Rating</i>	+	0.58*** (0.19)	0.54** (0.21)
<i>Competencies Rating</i>	+	0.33* (0.17)	0.35* (0.18)
<i>HiTKMgr</i>	?	0.78 (0.77)	1.02 (0.88)
<i>HiTKMgr * Technical Performance Rating</i>	-	-0.60*** (0.21)	-0.78** (0.32)
<i>HiTKMgr * Competencies Rating</i>	+	0.33 (0.26)	0.44 (0.30)
<i>Job Level</i>	?		0.13 (0.31)
<i>Job Level * Technical Performance Rating</i>	?		-0.10 (0.12)
<i>Job Level * Competencies Rating</i>	?		0.06 (0.11)
Adjusted R-square		36.07%	33.28%
Sample size		61	61

Panel B: Weights on Different Performance Dimensions by Supervisor Type based on Model (I)

	<i>LoTKMgr</i>	<i>HiTKMgr</i>	<i>Hi vs. Lo TKMgr</i>
<i>Weight on Technical Performance</i>	0.58***	-0.02	-0.60***
<i>Weight on Competencies</i>	0.33**	0.66***	0.33
<i>Weight on Competencies vs. Technical Performance</i>	-0.25	0.68***	0.93**

***,**, * is significant at the 1%, 5%, and 10% level (two-tailed), respectively. Standard errors are in parentheses.

HiTKMgr is a dummy variable that equals 1 if the subordinate’s direct supervisor has a level of tacit knowledge that is above the median, zero otherwise. All other variable are defined in the notes to Table 2. *Job Level* is centered at the mean.