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Tacit Managerial versus Technical Knowledge as Determinants of Audit Expertise in the Field

HUN-TONG TAN* AND ROBERT LIBBY†

1. *Introduction*

In this paper, we test whether results of prior studies of the determinants of audit expertise generalize to measures of actual performance. In doing so, we expand the concept of expertise to include managerial dimensions in addition to those related to the technical requirements of audit tasks and we investigate how the managerial components of knowledge, together with technical knowledge and problem-solving abilities, distinguish auditors with superior performance at different levels of the organizational hierarchy. Past studies of the determinants of audit expertise have used auditors' experience or rank (e.g., Ashton and Brown [1980], Hamilton and Wright [1982], Bonner [1990], and Libby and Frederick [1990]) or their performance on experimental versions of technical auditing tasks (e.g., Bonner and Lewis [1990]) as proxies for actual performance. Establishing whether experience, knowledge, and ability measures are related to performance on the job is necessary to determine the economic significance of prior findings (Marchant [1990]).

We identify experts based on actual performance evaluations produced as part of a CPA firm's compensation and promotion system. The

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performance evaluations are composites of superiors' evaluations produced across several client assignments. These evaluations are based on a broad spectrum of technical and nontechnical tasks. Thus, the use of actual performance ratings calls for specification of the knowledge necessary to perform both technical and nontechnical tasks. In addition, performance evaluation guides indicate that the knowledge and abilities required for superior performance vary across organizational levels.

Surveys of auditors' perceptions of the determinants of superior performance (Bhamornsiri and Guinn [1991], Abdolmohammadi and Shanteau [1992], Abdolmohammadi, Searfoss, and Shanteau [1994], and Tan [1995]) suggest that nontechnical knowledge becomes more important with rank. The surveys suggest audit partners believe that "communications skills" and "interpersonal skills" become more important than "technical competence" at the managerial level. Consistent with these findings, prior research finds only small differences in general technical knowledge resulting from experience beyond the senior level (e.g., Bonner and Lewis [1990] and Libby and Frederick [1990]). We develop and test a measure of this softer managerial knowledge based on Wagner and Sternberg's [1985] work, and investigate how our measure, together with measures of technical knowledge and problem-solving ability (similar to those of Bonner and Lewis [1990]), distinguishes auditors with superior performance from those with below-average performance at different levels of the organization.

The major obstacle to conducting our tests is the sensitivity of performance evaluation data. Most of our attempts to gain access to such data encountered insurmountable concerns about employees' privacy rights and the litigious nature of employment relationships. One large office of one Big Six firm generously provided us with *limited* access to both their performance evaluation database and their auditors (for use as subjects).

Our results showed that at the staff (assistant) level, auditors with superior performance evaluations were distinguished by their technical knowledge; seniors with superior performance evaluations were distinguished by both technical knowledge and problem-solving abilities. These results are consistent with prior studies which used laboratory measures of performance. While tacit managerial knowledge was unrelated to performance at the staff and senior levels, experienced managers with superior performance evaluations were distinguished by their tacit managerial knowledge related to the relative importance of competing goals, efficiency in task performances (management of self), management of staff, and management of career. Our findings confirm the need to specify the organizational level in order to identify the determinants of performance.

We also use the performance evaluation data to approximate the portion of rank-related differences in knowledge resulting from training and experience versus selection. Our estimates indicate that significant learning of tacit managerial knowledge occurs between the experienced staff

The findings from these two groups of surveys were confirmed by our own examination of the performance evaluation forms used by our participating firm.¹ The forms used for managers emphasize criteria such as individual productivity, adaptation to unplanned or stressful situations, staff and engagement management, leadership, and business development.

Including these additional characteristics in a model similar to that of Bonner and Lewis [1990] requires the development and assessment of specific constructs which capture the characteristics. Three factors guided our development process. First, consistent with the knowledge-based approach to the study of expertise, we emphasized knowledge which could be acquired through training or experience, as opposed to abilities or personality attributes that are considered to be nearly immutable. Knowledge factors are particularly important because they present the possibility of improving effectiveness or efficiency through changes in training or staff assignment patterns. Second, we searched for constructs related to success in positions similar to audit management (as opposed to industrial worker and supervisory positions). Third, we recognized the need for efficient measurement given the high value of professional auditor subject time. We relied on Wagner and Sternberg's [1985] research² on determinants of management success to develop our measurement tools.

Wagner and Sternberg applied the knowledge-based approach to modeling expertise to general determinants of managerial success. The work was motivated by observations similar to those already noted: neither IQ nor technical knowledge normally learned in business schools was a good predictor of managerial success (Wagner [1987]). According to Wagner and Sternberg [1985], managerial success also requires knowing how to manage oneself, knowing how to manage relationships with others, and knowing how to manage a career. These knowledge elements match the factors raised in the survey studies and the criteria included in the manager evaluation forms discussed above. Unlike much of technical knowledge, managerial knowledge is tacit; it is largely unarticulated, is not directly taught in school, and is presumably learned from experience (observations of others' behavior and others' reactions to one's own behavior).³

¹ This information is provided without reference and specific terminology to maintain our confidentiality agreement with the participating firm. These differences in criteria are similar to those noted in the evaluation forms of a second, nonparticipating Big Six firm.

² See Wagner and Sternberg [1985; 1987] and Wagner [1987].

³ This tacit knowledge is part of total job-relevant knowledge (Schmidt and Hunter [1993]). Schon [1983] discusses a similar concept and argues that professionals depend more on what they learn in practice than on technical knowledge acquired in school. Thus, although the professional should be "... technically competent, his claim to authority is substantially based on his ability to manifest his special knowledge in his interactions with his clients" (Schon [1983, p. 296]).

According to Wager and Sternberg [1985], *managing oneself* refers to knowledge of how to motivate and organize one's own activities to maximize productivity. *Managing others* involves knowledge of how to manage subordinates and interact with peers and superiors. *Managing career* involves understanding what is important to success and how to convince superiors one's contributions are of value. Unlike components of personality or skills such as leadership which are general characteristics of the individual, much of tacit managerial knowledge is specific to a particular job (i.e., the tacit managerial knowledge necessary for success as an audit partner will differ from that necessary for success as an accounting professor). Thus, the measurement of tacit knowledge is also specific to a particular employment category, here audit manager, and it should be assessed relative to the knowledge of experts in that category.

Wagner and Sternberg (Wagner and Sternberg [1985] and Wagner [1987]) developed and tested their measures of tacit managerial knowledge in two studies of experienced executives and students. They asked highly successful managers to describe typical work-related managerial *situations* and typical *responses* (both good and bad) to those situations. The situations and responses, which are described in more detail in section 3 of this paper, related to the three elements of tacit managerial knowledge noted above. An expert panel's rating of the importance of each of the responses forms the criterion for assessing a subject's tacit managerial knowledge. Subjects in their experiments read each situation and rated the importance of each response to the situation. Each subject's score was computed by taking the sum of all distances between his responses and the mean responses of the expert panel. Greater tacit managerial knowledge was indicated by greater similarity to the panel's opinions. Items which discriminated between individuals based on rank and occupational performance measures within rank were included in the test, yielding 12 management situations related to the three content areas described above, each with 9 to 20 associated response items.

Both of their studies report both reliable differences in tacit managerial knowledge between experience groups and between better and poorer performers within experience groups. Although tacit managerial knowledge was developed as having the three content elements described above, all tests of the structure of the construct indicate that it is unidimensional; that is, its components are highly correlated. We modified Wagner and Sternberg's instrument, based on the participating firm's stated evaluation criteria and the advice of experts from the firm.

Following prior research (Bonner and Lewis [1990] and Libby and Tan [1994]), we also examine the effects of problem-solving ability on performance. We expect this ability to be important at the fieldwork (nonmanagerial) level; at the managerial level, the performance evaluation process would have screened out those with limited problem-solving ability, so there may not be significant differences among managers in this ability.

We predict that technical knowledge, tacit managerial knowledge, and problem-solving ability differentiate superior auditors from others. Based on the survey studies and our analysis of firm evaluation criteria, we expect the relative importance of these attributes will differ as a function of the auditors' ranks.

The technical nature of staff-level work suggests that staff auditors can be distinguished by their technical knowledge. While many tasks performed during the first three years of an auditor's career are simple and highly structured, Abdolmohammadi [1991] finds that other more analytical tasks such as ratio analyses and year-to-year comparisons are also performed by second- and third-year auditors. Since problem-solving ability has been found to aid the performance of more complex tasks (e.g., Raaheim [1988], Bonner and Lewis [1990], and Libby and Tan [1994]), to the degree that staff auditors perform these more complex tasks, superior staff are predicted to have better problem-solving ability. Survey studies indicate that staff perform few if any tasks requiring significant tacit managerial knowledge. Further, the tasks they perform provide little opportunity to acquire such knowledge. This suggests the following hypotheses:

- H1a.* Top audit staff will have higher problem-solving ability than mediocre audit staff.
- H1b.* Top audit staff will have higher technical (general accounting and auditing) knowledge than mediocre audit staff.
- H1c.* There will be no difference in the tacit managerial knowledge of the top and mediocre audit staff.

In contrast to staff auditors, audit seniors have some supervisory responsibilities and the technical tasks they perform are more complex and less structured (Abdolmohammadi [1991]). Demands on technical knowledge and problem-solving ability are thus expected to increase at this level. Consistent with this view, survey results by Bhamornsiri and Guinn [1991] indicated that technical competence was the major factor for promotion from staff to senior. Tasks requiring tacit managerial knowledge begin to enter the performance evaluation process for seniors, but still play a small role. The above discussion suggests the following hypotheses:

- H2a.* Top seniors will have higher problem-solving ability than mediocre seniors.
- H2b.* Top seniors will have higher technical (general accounting and auditing) knowledge than mediocre seniors.
- H2c.* There will be no difference in the tacit managerial knowledge of the top and mediocre seniors.

Given the preceding discussion, an efficient performance evaluation process should focus on consistent demonstrations of superior technical knowledge and problem-solving skills as criteria for promotion from staff to senior and from senior to manager (Bhamornsiri and Guinn [1991]). Further, managers' additional technical knowledge should relate pri-

marily to their chosen specialties (Bonner and Lewis [1990]), which we did not assess. Consequently, audit managers are not expected to differ in terms of their general accounting and auditing technical knowledge⁴ and problem-solving ability, and tacit managerial knowledge is expected to differentiate the top audit managers from the mediocre ones. This is because the ability to allocate personal and staff resources effectively is critical to the administrative and supervisory responsibilities which absorb a significant portion of a manager's time. Knowing how to enhance the visibility of these less easily measured activities also should increase in importance. The discussion above suggests the following hypotheses:

- H3a.* There will be no difference in the problem-solving ability of the top and mediocre managers.
- H3b.* There will be no difference in the technical (general accounting and auditing) knowledge of the top and mediocre managers.
- H3c.* Top managers will have higher tacit managerial knowledge than mediocre managers.

H1 to *H3* test for performance-related differences holding experience constant. We also attempt to capture the effects of experience on learning, holding performance level constant. To do so, we assume auditors promoted to the next rank are chosen randomly from those in the top-rated group for their current rank; that is, seniors are selected from the top staff and managers are selected from the top seniors. This assumption is supported by our finding (shown in table 1) that the problem-solving ability of top-rated staff is virtually identical to that of the average senior and the problem-solving ability of the top seniors is virtually identical to that of the average manager. Prior tests of differences in knowledge across ranks (e.g., Libby and Frederick [1990] and Bonner and Lewis [1990]) confound the effects of selection and experience, while, if our assumption is valid, our tests partition out the portion of the between-rank differences due to experience. However, since auditors from the average performance evaluation category are also often promoted, our tests probably overstate the ability and knowledge level of the average, about-to-be-promoted staff member or senior and are thus biased against finding significant results.

3. Research Method

One hundred auditors from the Singapore office of a Big Six firm participated in the study. The group was composed of 10 partners, 22 managers, 30 seniors, and 38 staff, with mean experience of 19.1 years, 9.9

⁴Managers may differ in specialized knowledge; however, our focus is on more general aspects of technical knowledge (such as internal control knowledge and analytical review knowledge described by Bonner and Lewis [1990] as general domain knowledge), which auditors are exposed to beginning at the assistant level. Auditors who make it to the managerial level should therefore be competent technically.

TABLE 1
Performance Evaluation Effects
Mean Scores Across Performance Levels
(Standard deviations in parentheses)

	Staff			Seniors		Managers	
	Bottom ^a (<i>n</i> = 17)	Top ^b (<i>n</i> = 21)		Bottom (<i>n</i> = 15)	Top (<i>n</i> = 15)	Bottom (<i>n</i> = 10)	Top (<i>n</i> = 12)
Problem-Solving Ability	0.668 (0.223)	0.728 (0.184)	=	0.670 (0.211)	0.779 (0.199)	0.764 (0.123)	0.803 (0.122)
Technical (General Accounting and Auditing) Knowledge	0.605 (0.164)	0.734 (0.182)	<*	0.705 (0.191)	0.848 (0.205)	0.800 (0.204)	0.798 (0.166)
Tacit Managerial Knowledge	406.43 (125.71)	414.30 (86.87)	=	458.40 (39.18)	473.17 (57.78)	447.94 (62.84)	486.30 (41.03)
Experience		1.4 years		4.4 years			9.9 years

^aBottom auditors are those who received below-average performance evaluations.

^bTop auditors are those who received above-average performance evaluations and pay increments.

**p* < .1 (using one-tailed independent samples *t*-test).

**p* < .05 (using one-tailed independent samples *t*-test).

years, 4.4 years, and 1.4 years, respectively. The partners served as the criterion group for judging tacit managerial knowledge. The other three groups were our experimental subjects. Our groups are 1.2 to 2 years more experienced than the three groups of participants in Bonner and Lewis [1990].⁵

To aid comparisons to earlier research, our measures of tacit managerial knowledge, general accounting and auditing knowledge, and problem-solving ability approximate those used in prior research, in particular Bonner and Lewis [1990] and Wagner and Sternberg [1985]. Modifications were made where required to fit the tacit managerial knowledge instrument to the public accounting context and to accommodate our limits on subject time to participate. Following Wagner and Sternberg, we defined tacit managerial knowledge for audit managers as knowledge of traits and behaviors related to managing self, others, and career necessary for success in public accounting management, and developed our instrument starting with their work-related scenarios and responses. The instrument was then interactively pretested with two senior audit partners and two audit managers (who did not take part in other aspects of the study) to test for face and content validities, and revisions were made. This process resulted in ten work-related scenarios (compared to Wagner and Sternberg's 12) and nine to eleven options associated with each scenario.

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.⁶ Each of the options was to be rated on a seven-point scale, with the extreme anchors being extremely unimportant and extremely important to success. The scenarios and an example of a high- and low-rated response for each are presented in Appendix A.

The tacit managerial knowledge instrument was first completed by the ten audit partners. Since their responses were to serve as benchmarks, it was crucial that items included in the final measure of tacit managerial knowledge exhibit substantial agreement among the partners. This was

⁵ Whereas Bonner and Lewis's participants were recently promoted to their current position, ours had experience in rank. Our managers had 2 more years of experience than their senior managers, our seniors 1.2 more years experience than their seniors, and our staff 1.4 more years than their students.

⁶ The scenarios used here are meant to sample an auditor's tacit knowledge, not to cover all situations involving its use.

accomplished by selecting items with unimodal responses whose range was five or less.⁷ The 67 items that met these criteria had, on average, lower standard deviation (0.83) and skewness (-0.28) than other items (1.56 and -0.42, respectively).

The ten questions on the technical (general accounting and auditing) knowledge instrument were adapted from Bonner and Lewis [1990] (seven questions) and CPA examinations (three questions). We did not attempt to assess subspecialty knowledge since this knowledge would vary more with specialty than with rank. The 13 questions on the problem-solving ability test were from Bonner and Lewis [1990] (three questions), from the Thurstone test (Thurstone [1957]), and IQ questions.⁸

Using these instruments, we assessed three subject attributes: technical knowledge, problem-solving ability, and tacit managerial knowledge. The first two were measured by the proportion of questions answered correctly. Tacit knowledge was measured as the sum of the squared deviations of a subject's ratings from the mean ratings of the panel of partners (see Wagner [1987] for a similar approach). The squared deviation was then subtracted from the highest squared deviation score (worst score) produced by a subject (571.22), so that a higher knowledge score is associated with *better* tacit managerial knowledge.

A partner of the participating Big Six firm selected auditors for participation in the study. Auditors in the "top" performance evaluation category were sampled from those who received above-average evaluations and pay increments for the year. Auditors in the "mediocre" or bottom category had received below-average evaluations. Subjects in the bottom and top groups within ranks did not differ significantly in years of audit experience. Subjects were unaware of the basis of selection.

The materials were administered to the subjects in their offices over the course of several days. Subjects were given a packet of materials containing the tacit managerial knowledge, technical knowledge, and problem-solving ability questions, together with a cover letter from the authors assuring them of complete confidentiality and anonymity. There was no time limit for the completion of the tacit managerial knowledge questions. Subjects were instructed to complete the technical knowledge and problem-solving ability tests within 20 minutes.

⁷ Multimodal distributions implied systematic splits in opinions, suggesting a lack of consensus. Certain items had responses ranging from one to six, implying wide variation in opinions about the appropriate response. The cutoff point of five was chosen as a compromise between achieving consensus and discarding too many items.

⁸ Constraints on subjects' time dictated the use of shorter questions from well-validated tests (Thurstone [1957] and other validated sources compiled in Sternberg [1988]), rather than the long and detailed questions in Bonner and Lewis [1990]. The similarity in the reliability of the problem-solving test used in this study (Cronbach alpha = .61) and that used in Bonner and Lewis (Cronbach alpha = .63, based on a subset of the questions, as computed in Bonner, Davis, and Jackson [1992]) suggests that the tests are compatible.

4. Results

4.1 RELIABILITY AND VALIDITY OF MEASURES

The tacit managerial knowledge construct had high reliability (Cronbach alpha = .90). The technical knowledge construct reliability coefficient of .39, while moderately low, is adequate for a multifaceted construct (Nunnally [1982]).⁹ The problem-solving construct had a reliability coefficient of .61. The tacit managerial knowledge construct was not highly correlated with the technical knowledge construct ($r = .22$) or problem-solving ability construct ($r = .08$); likewise, the problem-solving ability construct was not highly correlated with the technical knowledge construct ($r = .18$).¹⁰ Thus, these constructs had discriminant validity (see Bagozzi and Phillips [1982]).

4.2 ANALYSIS

Descriptive measures and results of one-tailed t -tests are shown in table 1. Hypotheses 1a and 1b predicted that top performance audit staff would have greater problem-solving ability and technical knowledge, respectively, compared to bottom performance staff. *H1a* was not supported ($t = 0.89$, $p = .19$).¹¹ There was support for *H1b* ($t = 2.28$, $p = .01$). *H1c* was also supported; there was no significant difference in tacit managerial knowledge between the top and bottom staff ($t = 0.23$, $p = .41$). *H2a* and *H2b* predicted that top performance audit seniors would have, respectively, greater problem-solving ability and technical knowledge than bottom performance audit seniors. These hypotheses were supported ($t = 1.47$, $p = .08$ and $t = 1.97$, $p = .03$, respectively). *H2c* was also supported; there was no significant difference in tacit managerial knowledge between the top and bottom seniors ($t = 0.82$, $p = .21$). There was support for *H3a* and *H3b* as there was no significant difference between the top and bottom managers on problem-solving ability ($t = 0.75$, $p = .23$) and technical knowledge ($t = 0.03$, $p = .49$). *H3c* predicted that

⁹ Based on an examination of the intercorrelations of the individual items with the total test scores, we eliminated three items from the technical knowledge and tacit knowledge constructs and two items from the problem-solving construct because of low intercorrelations. Despite the moderate reliability of the resulting technical knowledge construct, there is some assurance of construct validity since items in the technical knowledge construct covered multiple aspects (e.g., internal control, analytical review) of technical audit knowledge (Cronbach and Meehl [1955]).

¹⁰ For each rank, these correlations were: staff .03, -.15, -.02; seniors .29, .47, .29; and managers .39, .19, .22, respectively.

¹¹ Differences in observed problem-solving abilities among staff auditors may be small because they are generally assigned relatively structured and simple tasks. Bonner and Lewis [1990] found similar results when they analyzed their students separately. These arguments also suggest that observed differences in problem-solving abilities among seniors would be more significant, which they were, since audit seniors perform less structured and more complex assignments.

top managers would have a greater tacit managerial knowledge than bottom ones. This hypothesis was supported ($t = 1.72$, $p = .05$).

To test the overall explanatory power of the variables, separate linear discriminant analysis models were constructed for each experience level using the hypothesized variables (problem-solving ability and technical knowledge for staff and seniors and tacit managerial knowledge for managers). Using sample frequencies to form prior probabilities and a linear function, classification accuracy based on the original sample (jackknifed) was 65.8% (65.8%) for the staff, 76.7% (73.3%) for the seniors, and 63.6% (63.6%) for the managers.

We also compared knowledge levels of all seniors with the knowledge levels of the *top* staff from whom they are selected, and of all managers with the *top* seniors from whom they are selected. Since rank-related differences in auditor attributes may be due to learning and/or the performance evaluation/promotion selection process, we test for learning effects by controlling for performance at the lower rank. The only significant difference was between the tacit knowledge of the top staff and the seniors ($t = 2.46$, $p = .01$).¹² None of the differences between top seniors and the average of the managers was significant at conventional levels. This result suggests that tacit managerial knowledge is learned from experience, and that the portion of this knowledge that we assess is mostly learned by the time one is an experienced senior (4.4 years on average). It also suggests that whatever learning occurs between the senior and manager levels is not captured by our tests. Specifically, this later learning may involve specialized technical knowledge (Bonner and Lewis [1990]) and aspects of tacit knowledge, presumably related to client development, which we do not assess.

5. Discussion

Our study adds to the literature on auditor attributes associated with superior performance in the laboratory by testing the generalizability of prior results to actual performance evaluations and by expanding the knowledge construct to include elements of tacit managerial knowledge. At the staff and senior levels, our results using actual performance are similar to Bonner and Lewis's [1990] results using experimental measures of performance. We also found that nontechnical dimensions of knowledge play an important role in performance evaluations at the managerial but not the staff or senior levels. These results demonstrate the need to expand the construct knowledge into its various technical components (as in Bonner and Lewis [1990]) and tacit managerial components. The results from further analysis show that differences in tacit

¹² This t -statistic is adjusted for unequal variances. The unadjusted t -statistic is 2.70.

managerial knowledge between staff and seniors are due to learning from experience.

Several limitations of our analyses should be noted. First, our results on the importance of tacit knowledge are based on only 22 managers. In addition, the auditors participating in the study came from a single office of the same firm.

Readers may also be concerned about the generalizability of results, based on auditors in Singapore, to Big Six firms elsewhere, in particular to the United States, where most of the expertise literature has focused. The Big Six firms in Singapore perform similar services and are organized in a similar fashion to U.S. offices. Their auditors follow International Accounting Standards and International Auditing Guidelines, and some of the firms regularly send Singapore office personnel to the United States for training. Also, the performance of our auditors on the technical knowledge test was similar to Bonner and Lewis's [1990] results for comparable tests using U.S. auditors. Direct evidence on the comparability of promotion criteria is provided by comparing data gathered in Singapore by Tan [1995] with results reported in Bhamornsiri and Guinn's [1991] U.S. survey of criteria. On the five attributes used in Bhamornsiri and Guinn's survey, the correlation between the relative importance ratings in the two studies were .844 for promotion from staff to senior, .796 from senior to manager, and .711 from manager to partner. This suggests that auditors' perceptions of the relative importance of attributes are similar across the two countries.

Finally, we measured tacit managerial knowledge by determining whether auditors knew what they should do in various situations as opposed to observing their actions. Our approach is supported by the finding that seniors had greater tacit managerial knowledge than the top staff, which indicates learning from experience, and managers with superior tacit managerial knowledge also independently received top performance evaluations.

These results have implications for developing effective selection, promotion, and training. Concerning selection and promotion processes, our results underscore the importance of appropriately identifying promotion criteria at each rank. Auditors who are promoted based on technical performance at the staff and senior levels may not be those with the greatest potential to be top managers and partners if they do not have the abilities that allow one to best learn tacit managerial knowledge from experience. This possibility suggests the need to identify these abilities and include them as an additional promotion criterion at an early career stage. Wagner and Sternberg [1985] also raise this issue but provide little guidance. It is possible that some existing measures of personality, such as measures of field dependence, conformity, or need achievement, may be related to this type of learning from experience, but no tests have been conducted (see Gough [1983] for a review). Consideration of these

yet-to-be-documented abilities in the selection and promotion processes could increase firm effectiveness.

Although tacit managerial knowledge is by definition knowledge that is normally not directly taught in school, it could be improved by either formal classroom or on-the-job training. Although CPA firms routinely conduct courses on managerial skills, this training usually occurs only at the managerial level. Furthermore, the content of these courses varies over time and across firms and may not include all relevant elements of tacit managerial knowledge. Earlier training may have direct effects and also ease the process of learning additional tacit managerial knowledge from later experience (Bonner and Walker [1994]).

At present, the determinants of tacit managerial knowledge are largely unknown. Future research should investigate the mechanisms by which tacit managerial knowledge is acquired and factors which facilitate its acquisition.

APPENDIX A

Scenarios and Example of a High and Low Rated Response from Tacit Managerial Knowledge Instrument

1. It is your second year as an audit manager in a department of about 30 professional staff. The evaluation of your first year on the job has been generally favorable. Though your staff are generally motivated, there are some who seem to go through the motions but are of little real help. You believe that although you are well liked, there is little that would distinguish you in the eyes of your superiors from the nine other managers at comparable levels in your firm.

Your goal is rapid promotion. The following is a list of things you are considering doing in the next 12 months. You obviously cannot do them all. Rate the importance of each by its priority as a means of reaching your goal:

- ...
 — d. make an effort to better match the work that needs to be done with the strengths and weaknesses of individual employees
 — e. put pressure on staff to cut their time/cost budgets
 ...

2. Rate the following characteristics of a job by their importance in leading to a successful career in a given company:

- a. the job will bring your work to the attention of higher-level management personnel
 ...

- f. you can master the job with almost no effort
 ...

3. During one of your recruiting interviews at the university, a student asks you about things one can do to increase one's chances for success in public accounting. Rate each of the following things one can do by its importance to a successful career in a public accounting firm:

— *b.* avoid drawing attention to yourself at all costs

...

— *g.* take advantage of opportunities to take on responsibilities beyond the scope of your immediate assignment

4. You have just been transferred to another department in the firm. You were asked to take on this new job because of rather serious personnel-related problems in the new department. Morale in the new department is low. The department is divided into those who are sorry the former manager has left and those who are sorry the manager had not left earlier. Performance of the department has been below expectations. The problems have been around for some time, and you realize that solving them won't happen overnight. You also believe that this is a chance to show your superiors what you can do in a tough situation, and you hope that by doing well, you will improve your opportunities for advancement. Rate the following actions by their importance in helping you to succeed in your new position:

— *a.* always delegate to the most junior person who can be trusted with the task

...

— *j.* do not try to do too much too soon

5. Rate the following motivations in terms of their importance as incentives for pursuing a career in public accounting:

...

— *e.* I enjoy responsibility and the power that goes with it

...

— *h.* I like a job that I can "leave at the office" at the end of the day

6. In auditing as in other fields, there are often several people who are acknowledged to do extraordinary work. Rate the following characteristics by how important you believe they help in contributing to the success of these individuals:

...

— *i.* power hungry

...

— *k.* better able than most to grasp and operate in terms of the "big picture," i.e., the mission of the firm

7. Rate the following strategies of working according to how important you believe they are to the day-to-day work of an audit manager:

...

— *c.* be in charge of all phases of every task you are involved with

...

— *k.* carefully consider the optimal strategy before beginning a task

8. A number of factors enter into the establishment of a good reputation in a public accounting firm as a manager. Consider some of these factors and rate their importance:

— *a.* critical thinking ability

...

— *f.* extent of education and prestige of the school attended

9. Rate the following experiences by their importance in becoming a good audit manager:

...

- e. a strong background in accounting
- ...
- i. experience as editor of a professional magazine
- 10. Your company has sent you to a university to recruit and interview potential audit trainees. You have been considering characteristics of students that are important to later success in the public accounting firm. Rate the importance of the following student characteristics by the extent to which they lead to later success in public accounting:
 - a. motivation
 - ...
 - j. the need to win at everything no matter what the cost

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