The Roles of Task and Technical Knowledge in Acceptance of Information Technology Among Preparers and Reviewers of Audit Workpapers

Jean C. Bedard [a]

Michael L. Ettredge [b]

Cynthia Jackson [a]

Karla M. Johnstone [c]

[a] Accounting Group
College of Business Administration
404 Hayden Hall
Northeastern University
Boston, MA 02115

[b] School of Business
University of Kansas
Lawrence, KS 66045-2003

[c] Department of Accounting and Information Systems
School of Business
University of Wisconsin - Madison
975 University Avenue
Madison, WI 53706-1323

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Please address correspondence to Jean Bedard

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ABSTRACT

This paper examines the effects of workpaper role (i.e., preparer or reviewer), task knowledge and technical knowledge on auditors' acceptance of a new computerized audit workpaper system introduced by an international public accounting firm. This research is important, as it represents an initial study of factors affecting the potential success of computerized audit workpaper implementation. We apply the Technology Acceptance Model (TAM) to study audit workpaper preparers' and reviewers' perceptions toward the new electronic workpaper system, and their intentions to use the system as planned by its developers. We find the TAM model to be appropriate in this setting, as auditors' perceptions of ease of use strongly influence their perceptions of system usefulness, and system usefulness perceptions in turn affect intentions to use the system. Further, we find that auditors' perceptions and intentions toward the system are affected by workpaper role, as well as by task and technical knowledge. These results contribute to research on systems acceptance in general, and are also important to auditing research and practice.

Key Words: Systems Implementation, Technology Acceptance

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INTRODUCTION

The purpose of this paper is to examine the effects of workpaper role (i.e., preparer or reviewer), task knowledge and technical knowledge on auditors' acceptance of a new computerized audit workpaper system. Understanding auditors' acceptance of computerized workpaper systems is important because auditing firms, like many businesses today, are investing considerable resources in computerizing their basic business processes. As a result, information technology is no longer perceived as a competitive advantage in the industry, but as a means of staying in the mainstream of competition (Practical Accountant 1997). Within the auditing industry, firms have developed information systems to collect and document evidence about audit clients and manage engagements (Bell et al. 2001; Bible et al. 2001; Vezina 1997; Rothman 1997). Firms implementing these systems expect several outcomes from the investment, including improvements in: audit quality, consistency with firm and regulatory standards, communication among team members, and the ability to collect and analyze data for management purposes (Bell et al. 2001; Abbe and King 1998). However, auditing firms will not achieve these goals efficiently unless their personnel accept the systems and use them to their maximum benefit. Despite the importance of systems acceptance in the auditing environment, we are aware of no research addressing the level of acceptance of audit process computerization among auditing professionals, or factors affecting their levels of acceptance.

We study this issue in the context of audit workpaper preparation and review. Audit workpapers are vital to effective and efficient functioning of the engagement team. Workpapers are the medium through which the team performs and tracks engagement activity, including gathering evidence

about client characteristics that may affect the nature and extent of tests applied during the audit, planning specific tests to be used in gathering evidence to support the audit opinion, documenting audit activity and results of testing, and budgetary control. Traditionally, workpapers have been maintained in voluminous paper files that are transported to and from the client's workplace in secure containers. Recently, however, several large audit firms have implemented systems to computerize workpapers. At the time of data collection, the Firm providing data for this study was involved in a gradual rollout of a computerized workpaper system to its U.S. offices.[1] This technological innovation in the construction of workpapers does not involve any changes in fundamental audit processes. Thus, it provides a unique opportunity to study factors affecting the intent of the Firm's personnel to use the system as planned by Firm management and the system's developers.[2]

The theoretical foundation for our study of systems acceptance in the audit workpaper context is the Technology Acceptance Model (TAM; e.g., Davis 1989; Hu et al. 1999). This model relates two basic perceptual constructs (perceived Ease of Use and System Usefulness) to an individual's Intention to Use an information system, which in turn affects actual use of the system.[3] TAM is the primary model used in the literature to study systems acceptance, and the number of studies relying on TAM is

[1] The Firm providing its expertise and personnel in support of this research is a large, worldwide professional services entity, which wishes to remain anonymous.

[2] While the Firm requires that the rollout offices use the system going forward, the relative acceptance of the system by its personnel remains an important issue. The Firm's intention in implementing the system was that records be stored electronically, and that the audit process be improved in terms of effectiveness and efficiency. By working outside the system (e.g., duplicating effort by performing some tasks on paper and on the computer), engagement personnel could reduce the potential benefits of the system. The researchers worked with the Firm's system development and implementation team to ensure that survey questions relate to specific behaviors that will influence audit effectiveness and efficiency when the system is in use.

[3] We study intention to use the automated workpaper system prior to its implementation. Based on Azjen and Fishbein's (1980) Theory of Reasoned Action, intention to use the system should directly affect actions when the system is implemented (Jackson et al. 1997, 2001). A further advantage of adopting TAM as the theoretical base for this study is that it facilitates the practical application of research results (Chau 1996).

accelerating. In addition to its contributions to the auditing literature, this study contributes to the literature on systems acceptance in two basic ways. One contribution is that we focus on highly trained knowledge workers using a complex workplace system integral to performing their professional role. There are relatively few such studies in the TAM literature (Hu et al. 1999; Lucas and Spitler 1999). Another contribution is that we study antecedents of user perceptions, to identify the personal and task characteristics associated with variation in system acceptance. Such research is important because it helps develop richness in the theory of technology acceptance. Further, it may help system developers anticipate difficulties in implementation, and target training toward individuals less likely to use the system fully (Igbaria and Iivari 1995; Karahanna and Straub 1999; Venkatesh and Davis 1996, 2000).[4]

In this study of an automated audit workpaper system, we examine whether system acceptance varies by workpaper role (preparer or reviewer). We expect user acceptance to differ between workpaper preparers (staff and seniors) and reviewers (managers and partners) due to differences in the nature of their respective tasks (i.e., preparers construct the workpaper files, while reviewers examine an already constructed file) and the longer experience of reviewers in their professional roles.[5] We also study whether systems acceptance varies with levels of self-perceived task and technical (i.e., computer) knowledge. Prior research shows that perceived knowledge plays an important role in influencing decision processes (e.g., Park et al. 1988) and decision behavior (Radecki and Jaccard

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[4] Taylor and Todd (1995) find that TAM can be used to predict subsequent system utilization, prior to users having actual experience with the system, as in the current context.

[5] These two differences in workpaper role have opposing implications for user acceptance. Because reviewing a constructed file may be less effortful than actually constructing the file using electronic workpaper technology, the difficulty implied by the technological shift toward computerized workpapers may be easier for reviewers to negotiate. On the other hand, reviewers have longer job tenure and may thus be less flexible toward changes in the ways they perform their jobs. Thus, we pose nondirectional hypotheses for the effect of workpaper role on systems acceptance.

1995). We hypothesize that audit professionals with higher perceived knowledge will be more likely to accept this technological innovation in performing their professional roles.

To perform the study, we adapted survey instruments used in prior TAM research to the audit workpaper environment, with the help of system developers. Two versions of the survey were prepared, one for workpaper preparers (senior and staff auditors) and another for workpaper reviewers (partners and managers). Survey items common to both preparer and reviewer surveys relate to Ease of Use and System Use perceptions, technical knowledge, and Intention to Use the workpaper files electronically as opposed to printing them out.[6] Survey items that differ by workpaper role relate to Intention to Use the system in performing specific tasks associated with preparer or reviewer roles, and knowledge related to performing those tasks. Survey instruments were administered to 235 professionals in the system rollout offices, after these professionals had completed a web-based training package introducing them to the system.

Our analysis proceeds in two stages. In the first stage, we test for expected TAM relationships between user perceptions and intentions among all participants, using OLS regression models with common survey items. In these models, we also test hypotheses regarding the effects of workpaper role and technical knowledge on system acceptance. In the second stage, we test TAM relationships and effects of technical *and* task knowledge using separate models for preparers and reviewers, including both common and role-specific survey items.

[6] One of the major goals of the firm in developing the system is to encourage engagement teams to maintain client workpaper files electronically. Thus, printing out workpapers bypasses one of the main functions of the system. The intent to use electronically versus print files is the only common survey item in the Intention to Use construct. Other items in that construct are specific to preparer or reviewer tasks.

Results of all models strongly confirm the expected TAM relationships: auditors' Ease of Use perceptions are highly related to their perceptions of System Usefulness, and System Usefulness strongly influences Intention to Use the system. In the combined models of all participants, we find differences between preparers and reviewers. Specifically, reviewers consider the system more easy to use, and report higher levels of intention to use the system electronically. Technical knowledge is strongly associated with Ease of Use and marginally associated with Intention to Use the system, but is unrelated to System Usefulness.

In the role-specific models of *preparers*, we find that technical knowledge is positively associated with Ease of Use perceptions, while neither type of knowledge is associated with System Usefulness perceptions. We also find that preparers' intention to use the system is positively associated with both task and technical knowledge. In the role-specific models of *reviewers*, we find that knowledge level does not affect System Usefulness perceptions, similar to findings in the preparer model. We find that for both groups, auditors with higher levels of task knowledge indicate greater intention to use the system. However, our findings in preparer and reviewer models differ on the role of technical knowledge on Intentions to Use the system: technical knowledge is positive and significant in the preparer model, but not in the reviewer model. Overall, these results suggest that auditors' acceptance of a new computerized audit workpaper system is driven by their workpaper role and by their relative knowledge perceptions. We discuss the specific implications of these results for research and practice in the concluding section of the paper.

BACKGROUND

Systems Implementation and User Acceptance

As a result of the exponential growth in the capabilities of information technology, society is undergoing an extraordinary informational transformation (Bandura 1977). One of the most pronounced of these transformations is the vital role that technology plays in most organizations' operations. These organizations are committing large amounts of resources to the development and implementation of information systems, with the expectation that they will improve operational effectiveness and efficiency. As a result of this expectation, an increased emphasis has been placed on system utilization. However, persuading employees to use the new systems "persists as an important problem confronting those responsible for the implementation decision" (Agarwal and Prasad 1999, 361). Users' resistance to new systems likely reduces the potential for anticipated organizational performance gains from the systems. To this end, understanding users' acceptance of IT systems (or lack thereof) is of considerable interest both to organizations implementing these systems and to researchers investigating related issues.

To address issues surrounding users' acceptance of information systems, a number of prior studies have relied on the Technology Acceptance Model (TAM) (e.g., Davis 1989). TAM theorizes that user acceptance of an information system is determined by two perceptual constructs: Ease of Use and System Usefulness. Perceived Ease of Use is defined as the degree to which an individual believes that using a particular system will be relatively free of effort, and perceived System Usefulness refers to the degree to which an individual believes that using a particular system will enhance his or her job performance (Davis 1989).

Although TAM is widely regarded as the dominant model in the systems acceptance literature, recent studies in this area have called for two extensions to this literature that are addressed by the

current study. One needed extension of the TAM literature is to explore its hypothesized relationships in professional contexts. Very few studies have done so (e.g., Venkatesh and Davis 2000, Agarwal and Prashad 1999, Hu et al. 1999; Lucas and Spitler 1999), and these studies have not produced consistent results. Thus, further research is needed on TAM relationships among knowledge professionals. In the next section, we briefly discuss the TAM literature, focusing primarily on studies in professional contexts, and pose hypotheses relating users' perceptions to their intentions to use the system. Following that discussion, we focus on the other needed extension of the TAM literature: identifying and testing possible antecedents of user perceptions. We review literature and present hypotheses relating to our study of workpaper role and perceived knowledge as possible influences on auditors' perceptions, which may ultimately affect the ways in which they use a computerized workpaper system.

TAM Relationships: User Beliefs and Intentions

TAM, developed by Davis (1989) and refined by Davis and other researchers, relates the beliefs of technology users regarding the Ease of Use and System Usefulness of an information system to their acceptance and ultimate use of the system. According to TAM, users who consider a system easier to use are also more likely to consider it useful (i.e., helpful in improving job performance). In turn, perceptions of Ease of Use and System Usefulness influence users' intentions to utilize the system. While there is a rapidly growing literature using TAM, we are most interested in studies of systems acceptance among professionals. There are relatively few such studies, and there is variance in their conclusions on the applicability of TAM to professional contexts. Venkatesh and Davis (2000) strongly support the expected relationships among Ease of Use, System Usefulness and Intention to Use, in four professional contexts ranging from manufacturing to banking. Similarly, Agarwal and Prasad (1999) support the TAM relationships in a study of a Fortune 100 high-tech company. In contrast, Hu et al.

(1999), studying physicians using a telemedicine system, find that System Usefulness perceptions affect actual use of the system, but Ease of Use does not. Based on their fairly weak results, Hu et al. (1999, 106) note that "TAM may not be appropriate for user populations with above-average general competence and intellectual capacity or have constant and reliable access to assistance in operating technology." Also, Lucas and Spitler (1999) find that neither Ease of Use nor System Usefulness perceptions significantly affects brokers' self-reported use of computerized workstations. They conclude that TAM may not apply to knowledge workers using complex, multifunctional systems.

In summary, prior research has demonstrated the validity of TAM across a variety of contexts, but there is some variance in findings in professional contexts. Recently, researchers have surmised that TAM research may be paying insufficient attention to the nature of tasks performed using information systems, which may be contributing to these mixed results (Dishaw and Strong 1999; Moon and Kim 2000). We address this issue by incorporating specific task-related items when measuring Intention to Use the system, as further described in the Methods section. To guide our analysis of auditors' perceptions and intentions, we propose directional hypotheses relying on the following basic TAM relationships:[7]

H1: Users' perceptions of Ease of Use will positively affect their perceptions of System Usefulness.

H2: Users' perceptions of System Usefulness will positively affect their Intentions to Use the system.

[7] Although the original TAM considers users' attitudes toward the system as a mediating variable between beliefs and intentions, recent papers (e.g., Agarwal and Prasad 1998; Lucas and Spitler 1999; Venkatesh and Davis 2000) simplify their models excluding the attitude construct in modeling. We follow that practice in this paper.

Factors Affecting User Perceptions and Intentions

Research using TAM provides much insight in the area of technology acceptance. A very important extension of this line of literature is represented by several recent studies that take a step back from testing relationships between user perceptions and intentions to use systems in various contexts. These studies focus on factors that affect user perceptions, asking why users come to a system with relatively positive or negative views about its potential role in their activities. For instance, researchers have studied the effects of social influence (Karanna and Straub 1999; Venkatesh and Davis 2000) and personal characteristics such as gender (Venkatesh and Morris 2000) and educational level (Agarwal and Prashad 1999). In this study, we consider two factors that are likely antecedents to auditors' use of a new automated workpaper system: engagement role (i.e., preparer versus reviewer) and the level of self-perceived knowledge regarding their professional audit tasks and computer technology. In the following sections, we discuss prior literature relevant to technology implementation in the audit workpaper environment, differentiation of tasks related to workpaper roles, and the potential linkage of task and technical knowledge to user perceptions and intentions related to workpaper system use.

Audit Workpapers and Audit Engagement Roles

There are relatively few TAM studies that address workplace experience as a precursor to systems acceptance, and most of these consider experience with the system itself rather than general workplace experience (e.g., Taylor and Todd 1995; Szajna 1996; Igbaria and Iivari 1995). System-specific experience is not a relevant factor in the current study, as all auditors are being introduced to the new system at the same time. In addition, prior TAM research generally assumes that all users will use the system for similar tasks (e.g., email, word processing, and telemedicine technology). However, in

the auditing context, junior members of the audit team (i.e., staff and seniors) are responsible for preparing the audit workpapers, which document client information and results of performing audit tests. In contrast, more experienced members of the engagement team (i.e., managers and partners) review the workpapers prepared by audit staff and seniors, to determine if the evidence gathered by the engagement team is sufficient to support the audit decision. Thus, preparers have a detail-oriented construction task, while reviewers have a more conceptually-oriented task (Rich et al. 1997). If the workpapers are properly constructed, the extent of reviewers' effort in interacting with the system may be less than that of preparers. Therefore, reviewers may have more positive perceptions about the system and greater intentions to use the system, relative to preparers. However, Wöber and Gretzel (2000), in a study of tourism managers, find that individuals with greater system-relevant task complexity and time pressure have higher perceptions of system usefulness. Because workpaper preparers have a more time-consuming and complex job with regard to workpaper construction, this result implies that *preparers* would have more positive perceptions about the system than reviewers.

In addition to their workpaper roles, reviewers differ from preparers on another dimension: their extent of job experience. As the audit team hierarchy is determined by rank, managers and partners will have successfully passed through the lower ranks. These individuals are also likely to be older, and more established in the ways they perform their jobs. There are few TAM studies addressing workforce tenure in other contexts, and these do not support variation in systems acceptance on that basis. Briggs et al. (1999) expect, but do not find, that higher-ranked naval officers would be more likely to object to a technological innovation. Similarly, Agarwal and Prasad (1999) do not find workforce experience to significantly affect systems acceptance in a study of information technology workers.

In summary, prior research does not clearly support a directional hypothesis relating to the probable effects of workpaper role on systems acceptance. Thus, we propose the following nondirectional hypotheses:

H3: Workpaper role (i.e., managers/partners who assume a reviewer role versus staff/seniors who assume a preparer role) will affect:

a. perceptions regarding Ease of Use;
b. perceptions regarding System Usefulness;
c. Intentions to Use the system.

User Perceptions of Task and Technical Knowledge

In professional domains, task-relevant knowledge is an important individual factor affecting task performance. The Theory of Reasoned Action (Fishbein and Azjen 1975), from which TAM was developed, notes that beliefs about a task are learned behavior, and should thus follow the accumulation of knowledge about that task through experience (Taylor and Todd 1995). Thus, exploration of the effects of knowledge on system-related beliefs and intentions is a natural extension of TAM research (e.g., Jiang et al. 2000). When considering performance of professionals in an information technology environment, two kinds of knowledge are essential: task knowledge and technical knowledge. In this paper's context, high-performing auditors should draw on an extensive knowledge base containing declarative knowledge of client conditions, and procedural knowledge relating to how an audit is conducted (e.g., Bèdard and Chi 1993; Libby and Luft 1993). In addition, auditors performing effectively and efficiently in an automated workpaper environment will need high levels of technological knowledge.

Some TAM studies use experience as a proxy for knowledge (e.g., Agarwal and Prasad 1999; Wöber and Gretzel 2000), while others have assessed user knowledge directly. The latter group of

studies primarily examines technical knowledge, by assessing users' estimates of their own relative proficiency with computers (e.g., Compeau and Higgins 1995; Igbaria and Iivari 1995; Venkatesh and Davis 1996). As noted in the previous section, several recent papers have called for greater consideration of task characteristics in future TAM research. Thus, we expand on prior literature by considering the effects of auditors' perceptions of their levels of task and technical knowledge on their beliefs about Ease of Use and System Usefulness of the automated workpaper system, and on their Intention to Use the system.[8]

H4: Technical (i.e., computer) knowledge will positively affect:
- a. perceptions regarding Ease of Use;
- b. perceptions regarding System Usefulness;
- c. Intentions to Use the system.

H5: Task knowledge will positively affect:
- a. perceptions regarding Ease of Use;
- b. perceptions regarding System Usefulness;
- c. Intentions to Use the system.

Figure 1 contains our proposed extensions to the TAM, and summarizes our research hypotheses.

Insert Figure 1 About Here

[8] The knowledge measures used in this study are self-assessments and may not well represent actual knowledge, to the extent that people do not have good insight into their own knowledge level (Kennedy and Peecher 1997). We study perceived knowledge because this perception has been found to be important in influencing cognition, decision making and behavior (Radecki and Jaccard 1995). While assessment of actual task and technical knowledge may have been a useful adjunct to this study, it was not possible to give participants a test to assess their actual knowledge levels.

METHODS

Procedures and Sample

Data on users' perceptions and intentions toward using a new computerized audit workpaper system are provided courtesy of a multinational auditing firm, which recently rolled out its new system to a subset of the Firm's U.S. offices. To become familiar with the new system, personnel in the rollout offices completed an on-line introductory tutorial, which included a description of the system's operations, functionality, and relation to the former paper-based workpaper system. Following this tutorial, the auditors completed a research instrument measuring their perceptions about the new system's Ease of Use and System Usefulness, their Intention to Use the system, and about their perceptions of their technical knowledge and task-related knowledge. Senior personnel at the participating Firm personally administered the research instrument to 235 professionals at the rollout offices who were potential users of the new system, including 153 workpaper preparers (staff and senior auditors), and 82 workpaper reviewers (managers and partners).[9]

Research Instrument

The research instrument contains a series of statements to which participants note their level of agreement/disagreement on a five-point scale ranging from "strongly agree" (score = 5) to "strongly disagree" (score = 1). We tailored the statements to relate specifically to the audit workpaper environment and to the nature of the professional tasks performed by workpaper preparers and workpaper reviewers. See the Appendix for a complete listing of statement items.

[9] The participating firm assigns staff/senior auditors to a "workpaper-preparer role" and managers/partners to a "workpaper-reviewer role" for purposes of using the system. Accordingly, we adopt this grouping for purposes of our analysis. Responses of a few participants are deleted due to incomplete data. The number of participants included in each model is disclosed along with model results in the tables.

Description of Ease of Use and System Usefulness Constructs

We measure participants' perceptions of Ease of Use (EU) using several statements such as: "Learning to use the electronic workpaper system will be easy for me" and "The electronic workpaper system will be flexible to interact with." We measure perceptions of System Usefulness (SU) with statements such as: "Using the electronic workpaper system will increase my productivity" and "Using the electronic workpaper system will improve my performance". The Ease of Use and System Usefulness statements are common across preparer and reviewer groups.

Description of Intention to Use Construct

We measure participants' Intention to Use (INT) the system with a series of statements. One statement in this construct is common to both workpaper role groups: "I plan to use the system in electronic mode, rarely printing out copies of workpapers as I proceed through my tasks." This statement reflects the Firm's emphasis on using the system in an electronic mode (i.e., not printing out the electronic workpapers and thus bypassing the system). Other statements measuring Intention to Use relate to certain activities performed by workpaper preparers and reviewers, and thus these statements differ by workpaper role. Specifically, audit staff and seniors are primarily responsible for preparing the workpapers, which document activities related to planning and executing the engagement. For example, one of the Intention to Use statements unique to the preparer role is: "I plan to use the electronic workpaper system in planning and tailoring audit programs."

The primary role of managers and partners is to supervise the engagement and review workpapers prepared by staff and seniors. Reflecting this role, one of the Intention to Use statements

unique to the reviewer role is: "I plan to use the electronic workpaper system to review decisions made by other members of the engagement team."

Description of Technical Knowledge and Task Knowledge Constructs

We measure Technical Knowledge and Task Knowledge using both common and role-specific statements. The Technical Knowledge statements are common across workpaper roles, reflecting participants' perceptions about their computer literacy, for example: "I am proficient at using computers." The Task Knowledge statements are specific to each workpaper role. For example, one of the statements for preparers is: "I am proficient at audit planning," while a reviewer statements is: "I am proficient at reviewing audit workpapers.[10]

Hypothesis Testing Strategy

As noted in the previous section, many individual statements are included in both preparer and reviewer instruments. However, some items relating to Task Knowledge and Intention to Use the system are role-specific, and are thus answered by only preparers or reviewers. Due to this feature of the study's design, we test the research hypotheses using three sets of OLS regression models: (1) Combined Models, using responses of both preparers and reviewers to the common statements; (2) Preparer Models, using responses of preparers to the common and preparer-specific statements; and (3) Reviewer Models, using responses of reviewers to the common and reviewer-specific statements. The following two sections describe the data reduction and modeling stages of hypothesis testing, respectively.

[10] Some knowledge survey statements are directed toward the individual participant, whereas others are directed toward the participant's view of his/her peers. This mix of perspectives is commonly used in surveys assessing sensitive constructs (e.g., ethical reasoning), in order to reduce social desirability bias (e.g., Cohen et al. 1996).

Data Reduction

Because each construct is measured using multiple indicators, the first step in testing the research hypotheses is to reduce the data to orthogonal factors. Within each sample, we form sample-specific factors for each construct. (See the Appendix for the factors and factor loadings.) For example, the first statement in the Ease of Use (EOU) construct is EOU-1. In the principal components analysis of all participants for the Combined Models, the loading on EOU-1 is 0.693 (Column A of the Appendix). In the principal components analysis for the Preparer Models, the loading on EOU1 for the preparer sample is 0.720 (Column B), and the loading on EOU-1 for the Reviewer Models (Column C) is 0.634.

The Appendix shows that Ease of Use and System Usefulness constructs each contain a single factor, whether estimated with combined, preparer or reviewer data. However, two factors emerged from data reduction of the knowledge measures in both the preparer and reviewer analyses. As the Appendix shows, these factors load cleanly on the Technical and Task Knowledge statements, respectively, for both workpaper roles.

Regression Models

Next, we use the factors in three sets of regression models: Combined, Preparer and Reviewer. Within each set, we present the models in the order implied by the expanded TAM model in Figure 1. We first examine factors that we hypothesize will affect Ease of Use. Next, we examine factors that we hypothesize will affect System Usefulness. The final model in each set examines factors hypothesized to affect Intention to Use.

In the Combined Models, we test H1 (Ease of Use $\Rightarrow$ System Usefulness), H2 (System Usefulness $\Rightarrow$ Intention to Use), H3 (Workpaper Role $\Rightarrow$ Ease of Use, System Usefulness, Intention to

Use), and H4 (Technical Knowledge ⇒ Ease of Use, System Usefulness, Intention to Use). These models use responses of both preparers and reviewers to the common statements. As noted above, all Ease of Use and System Usefulness statements are common to both groups. The common Knowledge items relate to Technical Knowledge, and the common Intention to Use statement relates to the intention to use the system electronically versus printing out the workpapers. The Combined Models are:

Combined Model 1: $Ease\ of\ Use = a_0 + a_1\ Workpaper\ Role\ (H3a) + a_2\ Technical\ Knowledge\ (H4a) + u$

Combined Model 2: $System\ Usefulness = a_0 + a_1\ Ease\ of\ Use\ (H1) + a_2\ Workpaper\ Role\ (H3b) + a_3\ Technical\ Knowledge\ (H4b) + u'$

Combined Model 3: $Intention\ to\ Use = a_0 + a_1\ System\ Usefulness\ (H2) + a_2\ Workpaper\ Role\ (H3c) + a_3\ Technical\ Knowledge\ (H4c) + u?$

In the Preparer Models, we test hypotheses regarding the TAM relationships and the effects of Technical and Task Knowledge using only data from workpaper preparers (i.e., staff and senior auditors), including statements relating specifically to the preparer's role. These models test H1 (Ease of Use ⇒ System Usefulness), H2 (System Usefulness ⇒ Intention to Use), H4 (Technical Knowledge ⇒ Ease of Use, System Usefulness, Intention to Use), and H5 (Task Knowledge ⇒ Ease of Use, System Usefulness, and Intention to Use). The form of the Preparer Models is as follows:

Preparer Model 1: $Ease\ of\ Use = b_0 + b_1\ Technical\ Knowledge\ (H4a) + b_2\ Task\ Knowledge\ (H5a) + u$

Preparer Model 2: $System\ Usefulness = b_0 + b_1\ Ease\ of\ Use\ (H1) + b_2\ Technical\ Knowledge\ (H4b) + b_3\ Task\ Knowledge\ (H5b) + u'$

Preparer Model 3: $Intention\ to\ Use = b_0 + b_1\ System\ Usefulness\ (H2) + b_2\ Technical\ Knowledge\ (H4c) + b_3\ Task\ Knowledge\ (H5c) + u?$

Similarly, in the Reviewer Models we test hypotheses H1, H2, H4 and H5, regarding the TAM relationships and the effects of Technical and Task Knowledge, using data from workpaper reviewers

(i.e., managers and partners) on statements relating to the reviewer's role. The form of the Reviewer Models is:

Reviewer Model 1: $Ease\ of\ Use = b_0 + b_1\ Technical\ Knowledge\ (H4a) + b_2\ Task\ Knowledge\ (H5a) + u$

Reviewer Model 2: $System\ Usefulness = b_0 + b_1\ Ease\ of\ Use\ (H1) + b_2\ Technical\ Knowledge\ (H4b) + b_3\ Task\ Knowledge\ (H5b) + u'$

Reviewer Model 3: $Intention\ to\ Use = b_0 + b_1\ System\ Usefulness\ (H2) + b_2\ Technical\ Knowledge\ (H4c) + b_3\ Task\ Knowledge\ (H5c) + u?$

RESULTS

Descriptive Statistics

Table 1 presents means and standard deviations of responses to individual survey statements, along with results of t-tests of univariate differences between workpaper roles for statements common to both roles. The means of perception and intentions scores of these auditors range from about 3.7 to 4.6, indicating a relatively high level of systems acceptance overall. Responses of workpaper preparers and reviewers do not differ on any statements related to Ease of Use and System Usefulness.

Insert Table 1 About Here

Within Intention to Use, the only common statement relates to plans to use the system electronically, versus relying on printing out workpapers (INT-1). The mean response INT-1 is marginally higher for workpaper reviewers (4.68) than for preparers (4.53) ($t = 1.78$, $p = 0.077$). Within the knowledge construct, two of the common statements (TECH-1 and 2) show significant differences between roles, with preparers indicating a uniformly higher perception of their Technical Knowledge ($t = 2.47$ and $t = 2.02$, respectively; all $p = 0.05$).

Table 2 shows bivariate correlations among the factors used for hypothesis testing, with Panel A reporting correlations among factors for workpaper preparers, and Panel B reporting those for workpaper reviewers. For both preparers and reviewers, Ease of Use is positively related to System Usefulness, Intention to Use, and Technical Knowledge. For both preparers and reviewers, System Usefulness is positively related to Intention to Use and Technical Knowledge. While Task Knowledge is correlated with both Ease of Use and System Usefulness for reviewers, these relationships are not significant for preparers. . Further, Intention to Use the System is correlated with both Task and Technical Knowledge for both groups.. In the sections that follow, we present multivariate tests of these relationships.

Insert Table 2 About Here

Results of Combined Models, Using Preparer and Reviewer Common Statements

Table 3 shows results of estimating the Combined Models, which focus on how workpaper role (i.e., preparer or reviewer) and Technical Knowledge affect auditors' perceptions about and intentions to use the electronic workpaper system. Results of estimating Combined Model 1 show that workpaper reviewers perceive that the system will be more easy to use than preparers ($t = 2.202$, $p = 0.029$), which supports H3a. In addition, we find that auditors with higher Technical Knowledge are more likely to perceive the system as easy to use, supporting H4a ($t = 9.856$, $p = 0.000$).

Insert Table 3 About Here

Results of estimating Combined Model 2 show that System Usefulness is strongly affected by Ease of Use ($t = 12.691$, $p = 0.000$), supporting H1. System Usefulness perceptions do not vary by workpaper role ($t = -0.645$, $p = 0.520$); therefore, H3b is not supported in the combined model. There

is also no effect of Technical Knowledge on System Usefulness in Combined Model 2, and thus H4b is not supported in this model.

Combined Model 3 shows that System Usefulness strongly influences auditors' Intention to Use the system electronically ($t = 6.270$, $p = 0.000$), supporting H2. Workpaper role also has a significant effect on Intention to Use (supporting H3c), with reviewers showing higher intent to use the system ($t = 2.286$, $p = 0.023$). Further, there is a marginally positive effect of Technical Knowledge on Intention to Use ($t = 1.683$, $p = 0.094$), providing weak support for H4c.

Summary of Combined Models

In this section, we present results of models estimating TAM relationships and effects of Technical Knowledge and workpaper role, among auditors preparing to use a newly developed computerized workpaper system. We confirm the standard TAM relationships in this group of knowledge professionals: auditors' perceptions of how easy the system will be to use affect their perceptions of how useful the system will be in performing their professional roles. Further, we find that perceptions of system usefulness drive auditors' intentions toward working with workpapers electronically, rather than reverting to printing out workpapers in an effort to mimic the old paper-based system.

Regarding the role of knowledge, our results show that auditors with higher perceptions of their technical (computer) knowledge are more likely to consider the system easy to use and intend to use it electronically, but technical knowledge does not affect perceptions of system usefulness. Regarding workpaper role, we find that reviewers are *more* likely to consider the system easy to use and that they are more likely to intend to use it electronically. Our findings of significant differences between roles demonstrate that it is important to examine TAM relationships and knowledge effects within each

workpaper role. Results of separate models for preparers and reviewers are presented in the following sections.

Results of Preparer Models

Table 4 presents results of hypothesis testing for workpaper preparers, using common and preparer-specific statements. Preparer Model 1 shows that Technical Knowledge positively affects Ease of Use perceptions ($t = 6.794$, $p = 0.000$), supporting H4a. This relationship does not exist for Task Knowledge ($t=1.267$, $p=0.207$), thus, H5a is not supported. Preparer Model 2 examines effects of Ease of Use, Technical Knowledge, and Task Knowledge on System Usefulness perceptions. We find that H1 is supported for workpaper preparers; Ease of Use strongly influences System Usefulness ($t = 10.103$, $p = 0.000$). However, neither H4b nor H5b is supported in Preparer Model 2, as neither Technical nor Task Knowledge significantly influences System Usefulness.

Insert Table 4 About Here

Preparer Model 3 tests hypotheses relating to factors that affect preparers' Intention to Use the system. Results show that System Usefulness affects preparers' Intentions regarding the system, as predicted in H2 ($t = 4.663$, $p = 0.000$). Further, Task Knowledge positively influences Intentions, supporting H5c ($t = 3.048$, $p = 0.003$), and Technical Knowledge marginally affects Intentions, providing weak support for H4c ($t = 1.718$, $p = 0.088$).

Summary of Preparer Models

In this section, we describe results of estimating TAM relationships and effects of Technical and Task Knowledge among workpaper preparers. We find that preparers who consider themselves more technically proficient with computers are more likely to consider the computerized workpaper system easier to use. Preparers' perceptions about system ease of use affect their perceptions about the relative

usefulness of the system, but neither Technical nor Task Knowledge affects this perception directly. We find that workpaper preparers who perceive their Technical Knowledge and Task Knowledge to be relatively high show greater intent to use the system as intended in performing their audit tasks.

Results of Reviewer Models

Table 5 presents results of hypothesis testing for workpaper reviewers. Reviewer Model 1 shows that both Technical Knowledge ($t = 6.920$, $p = 0.000$) and Task Knowledge ($t = 4.323$, $p = 0.000$) positively affect Ease of Use perceptions, supporting H4a and H5a for workpaper reviewers. Reviewer Model 2 shows that Ease of Use strongly influences System Usefulness ($t = 6.557$, $p = 0.000$), supporting H1 in this sample. Similar to our findings for workpaper preparers presented in the previous section, we find that neither Technical Knowledge nor Task Knowledge play a role in perceptions about System Usefulness. Thus, H4b and H5b are also not supported for workpaper reviewers.

Insert Table 5 About Here

Reviewer Model 3 demonstrates that System Usefulness significantly affects reviewers' Intention to Use the system ($t = 4.492$, $p = 0.000$), supporting H2. Technical Knowledge has no affect on reviewers' Intention to Use, and thus H4c is not supported for reviewers. Task Knowledge has a positive effect on Intention to Use ($t = 2.822$, $p = 0.006$), supporting H5c.

Summary of Reviewer Models

TAM relationships are strongly supported for workpaper reviewers, as they are for preparers (Ease of Use affects System Usefulness, and System Usefulness in turn affects Intention to Use). For reviewers, Technical Knowledge is found to influence only Ease of Use perceptions; beyond that influence, Technical Knowledge plays no role in reviewers' acceptance of the automated workpaper

system. Task Knowledge positively influences reviewers' Ease of Use perceptions and their Intention to Use the System..

DISCUSSION

The purpose of this paper is to study user acceptance of a new computerized audit workpaper system at a major international auditing firm. We examine relationships among TAM constructs of Ease of Use, System Usefulness and Intention to Use the computerized workpaper system. We also consider how workpaper role, technical knowledge, and task knowledge affect auditors' perceptions and intentions with regard to this system. This paper contributes to the auditing and accounting systems literatures as well as to research on technology acceptance in general. In this section, we outline this study's contributions and discuss its role in advancing knowledge in these areas. See Table 6 for a summary of results of hypothesis testing.

Insert Table 6 About Here

This study contributes to the auditing literature in several ways. First, we contribute to both auditing research and practice by providing the first empirical study relating to implementation of audit workpaper automation. The computerization of the workpaper process has been a very important aspect of professional practice in recent years. In spite of the cost of workpaper systems to auditing firms in capital outlay and personnel time in system development and training professionals, the impact of these systems has received virtually no research attention. The issue of whether the benefits derived from computerized workpaper systems are worth their cost is difficult to address.[11] This study

[11] The only empirical research on audit workpaper automation of which we are aware is a behavioral experiment by Bible et al. (2001). They find that auditors using computerized workpapers are less effective than those using paper workpapers, due to the difficulty in navigating through a computerized file. While further research is needed, this result implies that audit workpaper automation may not achieve the gains anticipated by firms.

contributes to understanding of that issue by examining factors associated with user acceptance of the system, assuming that greater benefit will accrue with increasing system utilization. Another issue related to workpaper automation is whether firms can identify specific individuals who have more difficulty with a new system. To the extent that reluctance to use a system is predictable, firms may reduce costs of their persuasive efforts and training by specifically targeting more reluctant individuals.

Our results show that in general, auditors in this Firm exhibited fairly high perceptions of system Ease of Use and System Usefulness, and generally indicated willingness to use it in the manner intended by its developers. Prior TAM research shows that intentions to use systems are highly related to actual use (e.g., Davis et al. 1989). If so, the generally high level of system acceptance found among auditors in this study should provide reassurance to firms that have not yet implemented computerized workpaper systems. While overall levels of acceptance were fairly high, we also found significant variation in perceptions and intentions toward the system. This variation is explained in part by the auditors' roles on the engagement team, and by their perceived technical and task knowledge.

These findings relate to the second issue noted above, i.e., whether firms can identify individuals who may be more or less accepting of new systems. Specifically, we find that auditors who consider themselves more knowledgeable about their professional roles (i.e., task knowledge) indicate intention to use the system more fully. This suggests that more capable auditors are more likely to respond well to technological innovations in the workplace. As a corollary, it implies that auditors who are less in command of their professional roles may feel threatened by major changes in the way they perform those roles. Interestingly, we find that the effect of technical knowledge varies by role. For seniors and staff, who prepare workpapers, perceived competency with computers positively influences intent to use the system as the firm intends. In contrast, managers' and partners' level of perceived technical

knowledge does not affect intention to use the system.[12] These findings imply that firms can improve the system implementation process by identifying these individuals and focusing training on developing technical and task knowledge as well as on the promoting the functionality of the system. Further, firms should consider users' levels of system acceptance when forming engagement teams, in order to ensure representation on teams of individuals favorable toward system use.

This paper also contributes to the literature on technology acceptance in general, through its focus on a workplace system to be used by professionals, and by explicit consideration of workplace roles in measuring users' intentions and knowledge. This extension of the TAM literature is important because information systems often have different types of users, with different backgrounds, levels of experience, and system-oriented purposes. Contrary to recent cautions that TAM may not apply well in complex professional environments (e.g., Hu et al. 1999; Wöber and Gretzel 2000), we find strong support for the effects of user perceptions on intentions. In contrast to prior research, we measure user's knowledge perceptions directly (i.e., do not use experience as a proxy), and we consider both types of knowledge relevant to good performance in an automated workpaper environment: task and technical knowledge. Similar to Igbaria and Iivari (1995) and Venkatesh and Davis (1996), we find that more positive assessments of one's own technical knowledge lead to higher perceptions of system ease of use, but only for preparers (whose job requires more detail orientation in file construction and hands-on interaction with the computer). Among reviewers (whose job in reviewing an already constructed file is more conceptually oriented), we find no effect of technical knowledge on intentions. These results imply that the role of technical knowledge varies depending on the nature of the task and/or the worker,

[12] System development personnel at the Firm indicate that these results may be explained by preparers' greater degree of interaction with the system as they construct the workpaper file.

an important result that should be further investigated. In contrast to Igbaria and Iivari (1995), we do not find an effect of perceived technical knowledge on System Usefulness for either preparers or reviewers. Our study differs from theirs in that we focus on a single system that has not yet been implemented, whereas they study a wide variety of systems already in operation. Future research could be directed toward studying whether the relationship between technical knowledge and system usefulness develops after a period of actual use of the system.

REFERENCES

----. 1997. Getting familiar with computerized workpapers. *Practical Accountant* (September): 4.

Abbe, S. C., and J. R. King, Jr. 1998. Aid for the audit. *Baylor Business Review* (Summer): 14-19.

Agarwal, R., and J. Prasad. 1999. Are individual differences germane to the acceptance of new information technologies? *Decision Sciences* 30(2): 361-392.

Azjen, I., and M. Fishbein. 1980. *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. 1977. *Social Learning Theory*. Prentice Hall, Inc., New Jersey, 1977.

Bèdard, J., and M. Chi. 1993. Expertise in auditing. *Auditing: A Journal of Practice and Theory* 12 (Supplement): 21-45.

Bell, T., J. C. Bedard, K. Johnstone, and E. Smith. 2001. KRisk[sm]: A computerized decision aid for client acceptance and continuance risk assessments. Working paper.

Bible, L., L. Graham, and A. Rosman. 2001. Comparing auditors' performance in paper and electronic work environments. Working Paper.

Briggs, R., M. Adkins, D. Mittleman, J. Kruse, S. Miller, J. Nunamaker, Jr. 1999. A technology transition model derived from field investigation of GSS use aboard the U.S.S. Coronado. *Journal of Management Information Systems* 15(3): 151-195.

Chau, P. 1996. An empirical assessment of a modified technology acceptance model. *Journal of Management Information Systems*, 13(2): 185-204.

Cohen, J., L. Pant, and D. Sharp. 1996. Measuring ethical awareness and ethical orientation of Canadian auditors. *Behavioral Research in Accounting* 8 (Supplement): 98-119.

Compeau, D. R. and C. A. Higgins. 1995. Application of social cognitive theory to training for computer skills. *Information Systems Research* 6 (2): 118-143.

Davis, F. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly* 13(3): 319-340.

Davis, F., R. Bagozzi, and P. Warshaw. 1989. User acceptance of computer technology: A comparison of two models. *Management Science* 35(8): 982-1003.

Dishaw, M., and D. Strong. 1999. Extending the technology acceptance model with task-technology fit constructs. *Information and Management* 36: 9-21.

Fishbein, M. and I. Ajzen. 1975. *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research.* Reading, MA: Addison-Wesley.

Hu, P., P.Y.K. Chan, O.R. Liu Sheng, K.Y. Tam. 1999. Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of Management Information Systems* 16(2): 91-112.

Igbaria, M.., and J. Iivari. 1995. The effects of self-efficacy on computer usage. *Omega, The International Journal of Management Science* 23(6): 587-605.

Jackson, C. M., S. Chow, and R. Leitch. 2001. The effects of structural antecedents on user involvement in the system development process. Working Paper.

Jackson, C. M., S. Chow, and R. Leitch. 1997. Toward an understanding of the behavioral intention to use an information system. *Decision Sciences* 28(2): 357-389.

Jiang, J. J., W. A. Muhanna, and G. Klein. 2000. User resistance and strategies for promoting acceptance across system types. *Information and Management* (January): 25-36.

Karahanna, E., and D. Straub. 1999. The psychological origins of perceived usefulness and ease of use. *Information and Management* 35: 237-250.

Kennedy, J., and M. Peecher. 1997. Judging auditors' technical knowledge. *Journal of Accounting Research* 35(2): 279-293.

Libby, R. and J. Luft. 1993. Determinants of judgment performance in accounting settings: ability, knowledge, motivation, and environment. *Accounting, Organizations and Society* 18(5): 425-450.

Lucas, H., and V. Spitler. 1999. Technology use and performance: a Field study of broker workstations. *Decision Sciences* 30 (2): 291-311.

Moon, J. and Y.G. Kim. 2001**.** Extending the TAM for a world-wide-web context. *Information & Management* 38 (4): 2217-230.

Park, C. W., M. Gardner, and V. Thukral. 1988. Self-perceived knowledge: Some effects on information processing for a choice task. *American Journal of Psychology* 101(3): 401-424.

Radecki, C., and J. Jaccard. 1995. Perceptions of knowledge, actual knowledge, and information search behavior. *Journal of Experimental Social Psychology* 31: 107-138.

Rich, J., I. Solomon, and K. Trotman. 1997. The audit review process: A characterization from the persuasion perspective. *Accounting, Organizations and Society* 22(5): 481-505.

Rothman, S. 1997. Expert: Paperless audit saves money. *The Credit Union Accountant*, (November 24): 1.

Szajna, B. 1996. Empirical evaluation of the revised Technology Acceptance Model. *Management Science* 42(1): 85-92.

Taylor, S. and P. A. Todd. 1995. Assessing IT usage: The role of prior experience. *MIS Quarterly*: 561-568.

Venkatesh, V., and F. Davis. 1996. A model of the antecedents of perceived Ease of Use: Development and test. *Decision Sciences* 27(3): 415-450.

Venkatesh, V., and F. Davis. 2000. A theoretical extension of the technology acceptance model: Four longitudinal studies. *Management Science* 46(2): 186-204.

Venkatesh, V. and M. G. Morris. 2000. Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly* 24 (1): 115-139.

Vezina, M. 1997. Tools of the trade--Part II. *CA Magazine* (October): 31-32.

Wöber, K., and U. Gretzel. 2000. Tourism managers' adoption of marketing decision support systems. *Journal of Travel Research* 39 (November): 172-181.

FIGURE 1
Empirical Model

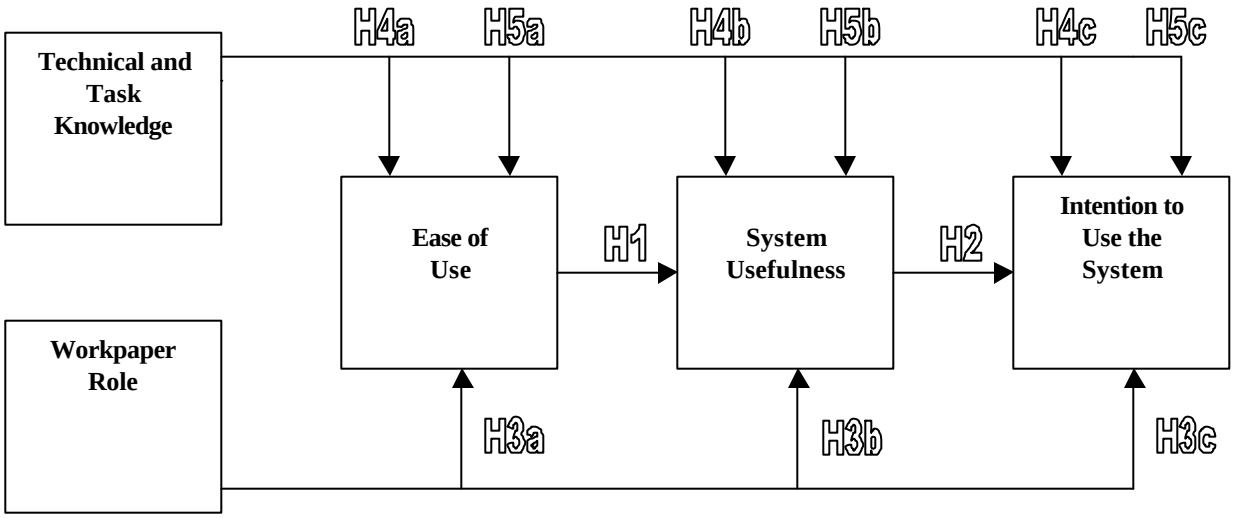

TABLE 1
Descriptive Statistics on Individual Variables Within Each Construct

Construct	*Variable Description*	*Workpaper Preparers*	*Workpaper Reviewers*	*t-statistics (2-tailed probabilities)*
EASE OF USE				
EOU-1	The electronic workpaper system will be flexible to interact with.	4.00 (0.76)	4.03 (0.73)	-0.25 (0.803)
EOU-2	It will be easy for me to become skillful in using the electronic workpaper system.	4.06 (0.80)	4.08 (0.85)	-0.15 (0.880)
EOU-3	Learning to use the electronic workpaper system will be easy for me.	3.88 (0.79)	3.97 (0.73)	-0.82 (0.415)
EOU-4	The electronic workpaper system will be easy to use.	3.90 (0.77)	3.95 (0.73)	-0.47 (0.642)
EOU-5	It will be easy to get the electronic workpaper system to do what I want it to do.	3.86 (0.79)	3.81 (0.71)	0.46 (0.649)
EOU-6	My interaction with the electronic workpaper system will be easy for me to understand.	3.96 (0.69)	4.05 (0.75)	-0.93 (0.353)
SYSTEM USEFULNESS				
SU-1	Using the electronic workpaper system will enable me to accomplish my tasks more quickly.	4.19 (0.82)	4.15 (0.73)	0.40 (0.690)
SU-2	Using the electronic workpaper system will make my job easier.	3.94 (0.86)	4.00 (0.70)	-0.57 (0.568)
SU-3	Using the electronic workpaper system will enhance my effectiveness.	4.23 (0.77)	4.20 (0.74)	0.24 (0.809)
SU-4	Using the electronic workpaper system will increase my productivity.	4.14 (0.80)	4.11 (0.73)	0.27 (0.784)
SU-5	Using the electronic workpaper system will improve my performance.	4.12 (0.81)	4.05 (0.75)	0.56 (0.575)
INTENTION TO USE THE SYSTEM				
INT-1	I plan to use the system in electronic mode, rarely printing out copies of workpapers as I proceed through my tasks.	4.53 (0.67)	4.68 (0.52)	**-1.78 (0.077)**
INT-2	I plan to use the electronic workpaper system to review decisions made by other members of the engagement team.	N/A	4.55 (0.58)	N/A

(Continued on the following page)

TABLE 1 (continued)

Construct	*Variable Description*	*Workpaper Preparers*	*Workpaper Reviewers*	*t-statistics (2-tailed probabilities)*
INT-3	I plan to use the electronic workpaper system in planning and tailoring audit programs.	4.62 (0.61)	N/A	N/A
INT-4	I plan to use the electronic workpaper system in making risk management decisions.	4.27 (0.73)	N/A	N/A
INT-5	I plan to use the electronic workpaper system in performing analytical procedures.	4.15 (0.80)	N/A	N/A
INT-6	I plan to use the electronic workpaper system in assessing and documenting risks for my clients.	4.30 (0.74)	N/A	N/A
KNOWLEDGE				
TECH-1	Most of my peers (i.e., people at my rank in the firm) are proficient at using computers.	4.25 (0.71)	3.92 (1.02)	**2.47 (0.015)**
TECH-2	I am proficient at using computers.	4.25 (0.63)	4.01 (0.92)	**2.02 (0.045)**
TECH-3	Most of my peers would rate my computer skills as proficient.	4.19 (0.75)	4.01 (0.94)	1.50 (0.136)
TASK-1	Most of my peers (people at my rank in the firm) would rate my knowledge of audit planning as proficient.	N/A	4.47 (0.64)	N/A
TASK-2	I am proficient at audit planning.	N/A	4.32 (0.77)	N/A
TASK-3	Most of my peers (people at my rank in the firm) are proficient at audit planning.	N/A	4.36 (0.73)	N/A
TASK-4	I am proficient at reviewing audit workpapers.	3.74 (0.97)	N/A	N/A
TASK-5	Most of my peers (people at my rank in the firm) are proficient at reviewing audit workpapers.	3.70 (1.04)	N/A	N/A
TASK-6	Most of my peers (people at my rank in the firm) would rate my knowledge of reviewing audit workpapers as proficient.	3.86 (0.88)	N/A	N/A

The table provides means (standard deviations) of individual statement items statements included in each of the TAM constructs and the knowledge construct. We analyze univariate differences between workpaper roles using t-tests. The response scale is as follows: 1=strongly disagree, 2=somewhat disagree, 3=neutral, 4=somewhat agree, 5=strongly agree. Numbers in bold are significant at $p < 0.10$.

TABLE 2
Pearson Correlations by Workpaper Role

Panel A. Workpaper Preparers

	System Usefulness	*Intention to Use*	*Technical Knowledge*	*Task Knowledge*
Ease of Use	**0.712**	**0.337**	**0.497**	0.089
	(0.000)	**(0.000)**	**(0.000)**	(0.292)
System Usefulness		**0.438**	**0.367**	0.080
		(0.000)	**(0.000)**	(0.340)
Intention to Use			**0.271**	**0.256**
			(0.001)	**(0.002)**
Technical Knowledge				0.000
				1.000

Panel B. Workpaper Reviewers

	System Usefulness	*Intention to Use*	*Technical Knowledge*	*Task Knowledge*
Ease of Use	**0.766**	**0.591**	**0.588**	**0.367**
	(0.000)	**(0.000)**	**(0.000)**	**(0.001)**
System Usefulness		**0.597**	**0.476**	**0.355**
		(0.000)	**(0.000)**	**(0.002)**
Intention to Use			**0.231**	**0.456**
			(0.046)	**(0.000)**
Technical Knowledge				0.000
				(1.000)

The variables in this Table are constructed from principal components analysis of statements relating to Ease of Use, System Usefulness, Knowledge and Intention to Use the system. See Table 1 and the Appendix for descriptions of individual statements for each construct and factor loadings. Reported probability levels are 2-tailed. Numbers in bold are significant at $p < 0.10$. The lack of correlation between task and technical knowledge is by construction, as the variables in the table are principal components from a joint analysis of all knowledge variables. The correlation between the means of raw technical and task knowledge questions is 0.381 ($p = 0.000$) for preparers, and 0.441 ($p = 0.000$) for reviewers.

TABLE 3
Results of Estimating the Combined Models:
Effects of Workpaper Role and Technical Knowledge on Perceptions of Ease of Use, System Usefulness, and Intention to Use the Computerized Workpaper System (All Participants)

Combined Model 1: Ease of Use

Variables	*Expected Sign*	*B*	*Standard Error*	*t-statistic*	*Probability*
Intercept		-0.088	0.070	-1.257	0.210
Workpaper Role (H3a)	?	0.126	0.120	2.202	0.029
Technical Knowledge (H4a)	+	0.565	0.057	9.856	0.000

F = 48.775, p = 0.000; Adjusted R Square = 0.306, n = 218

Combined Model 2: System Usefulness

Variables	*Expected Sign*	*B*	*Standard Error*	*t-statistic*	*Probability*
Intercept		0.014	0.058	0.245	0.806
Ease of Use (H1)	+	0.717	0.057	12.691	0.000
Workpaper Role (H3b)	?	-0.031	0.101	-0.645	0.520
Technical Knowledge (H4b)	+	0.021	0.057	0.371	0.711

F = 80.568, p = 0.000; Adjusted R Square = 0.524, n = 218

Combined Model 3: Intention to Use the System (INT-1)

Variables	*Expected Sign*	*B*	*Standard Error*	*t-statistic*	*Probability*
Intercept		4.519	0.046	97.829	0.000
System Usefulness (H2)	+	0.413	0.041	6.270	0.000
Workpaper Role (H3c)	?	0.139	0.080	2.286	0.023
Technical Knowledge (H4c)	+	0.112	0.042	1.683	0.094

F = 21.971, p = 0.000; Adjusted R Square = 0.224, n = 219

These models explain TAM relationships using responses of both preparers and reviewers to common statements. The dependent variables are: for Combined Model 1, the scores from a principal components analysis of six statements relating to Ease of Use; for Combined Model 2, the scores from a principal components analysis of five statements relating to System Usefulness; and for Combined Model 3, z-scores of responses to Statement INT-1. The independent variable for Technical Knowledge is composed of scores from principal components analysis of the three common technical knowledge variables, all of which relate to computer proficiency. See Table 1 and the Appendix for descriptions of individual statements for each construct and factor loadings. Probabilities are given as one-tailed for directional hypotheses, and two-tailed otherwise.

TABLE 4
Results of Estimating Preparer Models:
Effects of Technical and Task Knowledge on Workpaper Preparers' Perceptions of Ease of Use and System Usefulness, and Intention to Use the Computerized Workpaper System

Preparer Model 1: Ease of Use

Variables	*Expected Sign*	*B*	*Standard Error*	*t-statistic*	*Probability*
Intercept		-0.001	0.073	-0.020	0.984
Technical Knowledge (H4a)	+	0.497	0.073	6.794	0.000
Task Knowledge (H5a)	+	0.093	0.073	1.267	0.207

F = 23.818, p = 0.000; Adjusted R Square = 0.245, n = 142

Preparer Model 2: System Usefulness

Variables	*Expected Sign*	*B*	*Standard Error*	*t-statistic*	*Probability*
Intercept		-0.016	0.060	-0.266	0.791
Ease of Use (H1)	+	0.701	0.070	10.103	0.000
Technical Knowledge (H4b)	+	0.016	0.070	0.230	0.819
Task Knowledge (H5b)	+	0.014	0.061	0.235	0.814

F = 46.917, p = 0.000; Adjusted R Square = 0.494, n = 142

Preparer Model 3: Intention to Use the System

Variables	*Expected Sign*	*B*	*Standard Error*	*t-statistic*	*Probability*
Intercept		0.007	0.073	0.098	0.922
System Usefulness (H2)	+	0.370	0.079	4.663	0.000
Technical Knowledge (H4c)	+	0.136	0.079	1.718	0.088
Task Knowledge (H5c)	+	0.225	0.074	3.048	0.003

F = 15.874, p = 0.000; Adjusted R Square = 0.240, n = 142

These models explain the TAM relationships using preparers' responses to common and preparer-specific statements. The dependent variables are: for Preparer Model 1, the scores from a principal components analysis of six statements relating to Ease of Use; for Preparer Model 2, the scores from a principal components analysis of five statements relating to System Usefulness; and for Preparer Model 3, principal components analysis of the five Intention to Use statements applicable to preparers. The independent variables for Technical and Task Knowledge are derived from scores from principal components analysis of the common and preparer-specific knowledge variables. See Table 1 and the Appendix for descriptions of individual statements for each construct and factor loadings. Probabilities are given as one-tailed for directional hypotheses, and two-tailed otherwise.

TABLE 5
Results of Estimating Reviewer Models:
Effects of Technical and Task Knowledge on Workpaper Reviewers' Perceptions of Ease of Use and System Usefulness, and Intention to Use the Computerized Workpaper System

Reviewer Model 1: Ease of Use

Variables	*Expected Sign*	*B*	*Standard Error*	*t-statistic*	*Probability*
Intercept		0.000	0.084	0.000	1.000
Technical Knowledge (H4a)	+	0.588	0.085	6.920	0.000
Task Knowledge (H5a)	+	0.367	0.085	4.323	0.000

F = 33.287, p = 0.000; Adjusted R Square = 0.466, n = 75

Reviewer Model 2: System Usefulness

Variables	*Expected Sign*	*B*	*Standard Error*	*t-statistic*	*Probability*
Intercept		-0.000	0.075	0.000	1.000
Ease of Use (H1)	+	0.685	0.105	6.557	0.000
Technical Knowledge (H4b)	+	0.073	0.097	0.754	0.453
Task Knowledge (H5b)	+	0.103	0.085	1.221	0.226

F = 35.044, p = 0.000; Adjusted R Square = 0.580, n = 75

Reviewer Model 3: Intention to Use the System

Variables	*Expected Sign*	*B*	*Standard Error*	*t-statistic*	*Probability*
Intercept		0.000	0.089	0.000	1.000
System Usefulness (H2)	+	0.503	0.112	4.492	0.000
Technical Knowledge (H4c)	+	-0.008	0.105	-0.075	0.940
Task Knowledge (H5c)	+	0.278	0.098	2.822	0.006

F = 17.489, p = 0.000; Adjusted R Square = 0.401, n = 75

These models explain the TAM relationships using reviewers' responses to common and reviewer-specific statements. The dependent variables are: for Reviewer Model 1, the scores from a principal components analysis of six statements relating to Ease of Use; for Reviewer Model 2, the scores from a principal components analysis of five statements relating to System Usefulness; and for Reviewer Model 3, principal components analysis of the two Intention to Use statements applicable to reviewers. The independent variables for Technical and Task Knowledge are derived from scores from principal components analysis of the common and preparer-specific knowledge variables. See Table 1 and the Appendix for descriptions of individual statements for each construct and factor loadings. Probabilities are given as one-tailed for directional hypotheses, and two-tailed otherwise.

TABLE 6
Summary of Results of Hypothesis Testing

	Hypotheses (Independent, Dependent Variables)	*Expected Sign*	*Combined Models (All participants, common statements)*	*Role-Specific Models*	
				Preparers	*Reviewers*
H1	Ease of Use, System Usefulness	+	Supported	Supported	Supported
H2	System Usefulness, Intention to Use	+	Supported	Supported	Supported
H3a	Workpaper Role, Ease of Use	?	Supported	N/A	N/A
H3b	Workpaper Role, System Usefulness	?	Not Supported	N/A	N/A
H3c	Workpaper Role, Intention to Use	?	Supported	N/A	N/A
H4a	Technical Knowledge, Ease of Use	+	Supported	Supported	Supported
H5a	Task Knowledge, Ease of Use	+	N/A	Not Supported	Supported
H4b	Technical Knowledge, System Usefulness	+	Not supported	Not supported	Not supported
H5b	Task Knowledge, System Usefulness	+	N/A	Not supported	Not supported
H4c	Technical Knowledge, Intention to Use	+	Marginal	Supported	Not supported
H5c	Task Knowledge, Intention to Use	+	N/A	Supported	Supported

This table summarizes results of hypothesis testing, in models using common statements across all participants, and in separate models using statements unique to each workpaper role.

APPENDIX

Factor Loadings

Construct	*Variable Description*	*Column A: Combined*	*Column B: Preparers*	*Column C: Reviewers*
EASE OF USE				
EOU-1	The electronic workpaper system will be flexible to interact with.	0.693	0.720	0.634
EOU-2	It will be easy for me to become skillful in using the electronic workpaper system.	0.861	0.866	0.856
EOU-3	Learning to use the electronic workpaper system will be easy for me.	0.889	0.883	0.904
EOU-4	The electronic workpaper system will be easy to use.	0.881	0.884	0.875
EOU-5	It will be easy to get the electronic workpaper system to do what I want it to do.	0.791	0.797	0.787
EOU-6	My interaction with the electronic workpaper system will be easy for me to understand.	0.895	0.876	0.931
SYSTEM USEFULNESS				
SU-1	Using the electronic workpaper system will enable me to accomplish my tasks more quickly.	0.845	0.841	0.856
SU-2	Using the electronic workpaper system will make my job easier.	0.876	0.895	0.833
SU-3	Using the electronic workpaper system will enhance my effectiveness.	0.881	0.878	0.891
SU-4	Using the electronic workpaper system will increase my productivity.	0.940	0.944	0.929
SU-5	Using the electronic workpaper system will improve my performance.	0.911	0.919	0.892
INTENTION TO USE THE SYSTEM				
INT-1	I plan to use the system in electronic mode, rarely printing out copies of workpapers as I proceed through my tasks.	N/A	0.470	0.852

The table shows scores obtained from principal components analysis of the individual statement items included within each of the TAM constructs and the knowledge construct. The response scale was as follows: 1=strongly disagree, 2=somewhat disagree, 3=neutral, 4=somewhat agree, 5=strongly agree.

APPENDIX (continued)

Construct	*Variable Description*	*Column A: Combined*	*Column B: Preparers*		*Column C: Reviewers*	
INT-2	I plan to use the electronic workpaper system to review decisions made by other members of the engagement team.	N/A	N/A		0.852	
INT-3	I plan to use the electronic workpaper system in planning and tailoring audit programs.	N/A	0.725		N/A	
INT-4	I plan to use the electronic workpaper system in making risk management decisions.	N/A	0.814		N/A	
INT-5	I plan to use the electronic workpaper system in performing analytical procedures.	N/A	0.796		N/A	
INT-6	I plan to use the electronic workpaper system in assessing and documenting risks for my clients.	N/A	0.830		N/A	
KNOWLEDGE See **Note A**			*TASK*	*TECH*	*TASK*	*TECH*
TECH-1	Most of my peers (i.e., people at my rank in the firm) are proficient at using computers.	0.696	0.165	0.620	0.146	0.723
TECH-2	I am proficient at using computers.	0.937	0.105	0.912	0.233	0.917
TECH-3	Most of my peers would rate my computer skills as proficient.	0.919	0.202	0.877	0.213	0.912
TASK-1	Most of my peers (people at my rank in the firm) would rate my knowledge of audit planning as proficient.		N/A	N/A	0.917	0.043
TASK-2	I am proficient at audit planning.		N/A	N/A	0.507	0.195
TASK-3	Most of my peers (people at my rank in the firm) are proficient at audit planning.	N/A	N/A	N/A	0.852	0.314
TASK-4	I am proficient at reviewing audit workpapers.	N/A	0.937	0.170	N/A	N/A
TASK-5	Most of my peers (people at my rank in the firm) are proficient at reviewing audit workpapers.	N/A	0.919	0.088	N/A	N/A
TASK-6	Most of my peers (people at my rank in the firm) would rate my knowledge of reviewing audit workpapers as proficient.	N/A	0.719	0.282	N/A	N/A

Note A: Principal Components analysis of preparers' and reviewers' responses to the knowledge statements yielded two factors, labeled Task Knowledge and Technical Knowledge. See the text for discussion.