

**AUDITOR DETECTED MISSTATEMENTS
AND THE EFFECT OF INFORMATION TECHNOLOGY**

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ABSTRACT

This paper presents information on the causes and detection of misstatements by auditors and the relationship of those misstatements with information technology (IT). The last major study of misstatements and IT used data that was gathered in 1988. In the intervening period, there have been significant changes in IT, possibly altering the error generation and detection process. Two research questions related to detected misstatements and the effect of IT are examined. The six largest public accounting firms in Norway provided data from 58 engagements. We find that (1) the major causes of misstatements were missing, poorly designed, and improperly applied controls; inadequate methods used to select, train and supervise accounting personnel; and an excessive workload for accounting personnel, (2) missing and poorly designed controls, and excessive workload for accounting personnel were more likely to be causes of misstatements in computerized business processes than those that were not computerized, and (3) the increased use of tests of details over attention directing procedures on audits appears to result from auditors deciding that it is more effective or efficient to conduct such tests than rely upon IT controls. These findings have important implications for both audit practitioners and researchers.

Keywords: Audit misstatements, Misstatement causes, Audit procedures, and Information technology

Data Availability: Data is available from the authors upon request.

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INTRODUCTION

The objective of this paper is to examine two research questions about the effect of information technology (IT) on the procedures used by auditors to detect misstatements and the causes of misstatements detected on audits for computerized and non-computerized business processes. Our work is motivated by the fact that there has been no misstatement data gathered since the late 1980s.¹ For example, Wright & Ashton (1989) used audit data from 1984-85 and Bell et al. (1998) used 1988 data.² Bell et al. (1998) was the first study to examine the effect of computerization on misstatements. Since that time there has been significant changes in IT. For example, in the Bell et al. (1998) study only 56 percent of the audit engagements were from firms characterized as computerized. In contrast, 100 percent of the audit engagements in our sample have information systems that were classified as computerized and, of those, 62 percent were characterized as completely computerized.

Research on auditor-detected misstatements has made a significant contribution to our understanding of the accounts where misstatements occur, the causes of those misstatements, and the audit procedures that detected them. For example, the results of this body of research shows that the majority of the detected misstatements occur in a small number of financial statement accounts, personnel-related problems are a major cause of misstatements, and attention-directing procedures (e.g., inquiry and analytical procedures) are effective in detecting misstatements.³ In

¹ To our knowledge, only the Chan & Mo (1998) study reports on auditor-detected misstatements during the 1990s. However, their work focused on the distributional properties of the misstatements and did not discuss issues examined in this paper.

² Note that other published papers relied on these data sets; e.g., Maletta & Wright (1996), and the Wright & Wright (1996, 1997).

³ See Eilifsen & Messier (2000) for a detailed review of research on auditor-detected misstatements.

addition, these studies show that in terms of computerized versus non-computerized systems that the majority of misstatements occurred because of (1) incorrect manual computations, differences in management and auditor judgment; (2) faulty initial identification and processing of transactions, and overworked accounting personnel; and (3) incorrect manual computations, the recording of exchange documents, incorrect application of internal controls, and inadequate internal controls (Bell et al. 1998). Most of these causes of misstatements can be attributed to *manual* controls.

We examine the two research questions using data from a sample of 58 engagements with 1997 year-ends from 6 Norwegian audit firms. We have three overall results. First, there is an increased use of tests of details over attention directing procedures that appear to result from auditors deciding that it is more effective or efficient to conduct such tests than rely upon IT controls. Second, the major causes of misstatements were due to missing, poorly designed, and improperly applied controls; inadequate methods used to select, train and supervise accounting personnel; and an excessive workload for accounting personnel. Third, missing and poorly designed controls and excessive workload for accounting personnel were more likely to be causes of misstatements in computerized business processes than those that were not computerized. Therefore, we find that many of the causes of misstatements appear to relate to ineffective IT-types controls, and as a result, auditors are relying more on tests of details.

The remainder of the paper is as follows: In the next section, we provide background for the study and the research questions are presented. The third section presents the methodology used to gather the data. A fourth section presents the results. The last section provides some concluding comments.

BACKGROUND AND RESEARCH QUESTIONS

Given the tremendous growth in the use of information technology by all types of organizations since the late 1980s, it is important for researchers and practitioners to examine more recent misstatement data.⁴ Companies have revised their information systems to implement new technologies that provide more control over the processing of economic transactions (Elliott 1994). Such systems have application controls intended to limit the occurrence of misstatements in the processing of routine transactions.⁵ Furthermore, controls have been implemented during this period based upon the recommendations of the Committee of Sponsoring Organizations (COSO) and Control Objectives for Information and Related Technology (COBIT). In their report, *Internal Control – An Integrated Framework*, COSO provided a detailed framework for controlling a company’s activities (COSO 1992). A number of components in the COSO framework also relate to IT-related issues.⁶ COBIT provides a comprehensive and usable control model over IT in support of business processes. We would expect, therefore, that fewer misstatements would be attributed to missing or poorly designed controls in an environment where IT is present. Kinney (2000) has noted that changes in technology are likely to alter the error generation process, and as a result, the risk of material misstatement may have changed in recent years. The result of these changes is that companies

⁴ Investment in computers by firms rose 28.3% per year on average between 1990 and 1996 (Jorgenson & Stiroh 1999).

⁵ Application controls include data capture controls, data validation controls, processing controls, output controls, and error controls. Such controls are intended to ensure the completeness and accuracy of transaction processing, authorization, and validity (Messier, 2003).

⁶ Norwegian, international, and U.S. auditing standards provide auditors with guidance on assessing control risk on an audit, including the effect of information technology. All of these standards rely heavily on the COSO framework (e.g., ISAs 400 and 401).

are likely to have improved control and monitoring activities; thus, providing better prevention and detection of misstatements (Elliott 1994).⁷

On the other hand, there are risks to the implementation of IT. IT consists of hardware, software, people, procedures, and data. Risks arise through inaccurate processing of data, processing inaccurate data, unauthorized access, loss of data, and inappropriate manual intervention. If IT personnel don't understand how the system processes transactions they may fail to include appropriate controls during system design. Inadequate training and insufficient knowledge of accounting personnel in the use of IT can contribute additional risk. Furthermore, management may fail to commit resources to address these risks.

Based on the preceding discussion, it is difficult to state formal hypotheses. Therefore, we investigate the following research questions related to the effect of IT on the detection and causes of misstatements:

RQ 1: Does IT affect the audit procedures used by auditors to detect misstatements?

RQ 2: Are the causes of misstatements detected on audits different for computerized business processes than those that are not computerized?

METHODOLOGY

Data Collection Questionnaire

A detailed questionnaire was developed based on the survey instruments used by Wright & Ashton (1989), Bell & Knechel (1994), and Bell et al. (1998).⁸ The questionnaire contained

⁷ Kinney has also suggested that the increased use of estimates in accounting may also change the error generating process. In this case, the use of estimates in the accounting process may lead to an increase in misstatements in the financial statements.

⁸ The survey instrument was first constructed in English. It was then translated into Norwegian by one of the authors. The questionnaire was reviewed in detail by 2 audit professionals to ensure proper wording and understandability. Members of the participating firms also provided an overall review of the questionnaire. A copy of the questionnaire is available from the authors.

three major parts: (1) general information about the client, (2) assessments of inherent risk factors, and (3) information on the accounts that contained the misstatements. The first part of the questionnaire requested information on the client's industry, selected financial statement information, the extent that the client's information system and accounting system areas were computerized, and whether or not the IT controls were relied upon in the audit. The second part of the questionnaire asked about the presence of 37 inherent risk factors on the selected audit. The last part of the questionnaire contained two sections. The first section requested information about the accounts affected by each of the five largest misstatements (if present) and a list of 28 questions related to each misstatement. The second section requested detailed information on the audit procedure or circumstance that signaled the discovery of the misstatement, its cause, and the team member who discovered the misstatement.

The first two parts of the instrument were to be completed by the engagement manager along with the selection of the five largest misstatements in the third part. The individuals who identified the misstatement, generally the in-charge auditor, completed the information in the third part of the instrument.⁹ The engagement manager and partner reviewed the completed instruments. This approach is consistent with prior studies.

Sample Selection

Six public accounting firms in Norway (the Big 5 plus the largest national firm, Noraudit) agreed to provide data on misstatements from a sample of their clients.¹⁰ Each major public accounting firm uses a common audit approach for its international practice (usually based on

⁹ Audit team members were instructed to keep notes for each audit difference discovered during the engagement in order to be able to respond to the questions included in the questionnaire. They were also instructed to refer to those notes when completing the third part of the questionnaire.

¹⁰ Using multiple public accounting firms has advantages and disadvantages. While such an approach may potentially provide a more diverse cross-section of misstatements, differences in audit approaches used by the various firms may affect comparisons to earlier studies that typically only included one firm.

international auditing standards) and then modifies that approach for any national differences. Thus, the ability to detect misstatements for the set of auditors used in this study is likely to be comparable to prior studies using participants from major firms.

Each firm was requested to provide information on 10-15 audits from their client portfolio. The survey instruments were mailed to a contact partner in each firm who then distributed the instruments to the engagement partners of the sampled audits.¹¹ We asked the contact partner to select engagements that were representative of the firm's audit practice.¹² The survey requested information for the 1997 audit (year ending December 31 1997).¹³ Sixty-three questionnaires were completed and returned. The number (percentage) of engagements provided by each of the six firms was: Firm 1 = 8 (13.7), Firm 2 = 13 (22.4), Firm 3 = 15 (25.9), Firm 4 = 10 (17.2), Firm 5 = 9 (15.5), and Firm 6 = 3 (5.3). Five engagements reported no detected misstatements, so only 58 engagements are used in the data analysis.

Limitations

Prior to presenting the results, we acknowledge the limitations of the current study. First, the results are based on *detected* misstatements. The characteristics of such misstatements may be different from undiscovered misstatements (Caster et al. 2000). Second, while we requested that the firms select a representative sample of companies from their practice, we cannot be assured that this is the case. Lastly, much of our data was prepared by auditors from the working papers and their *ex post* judgments may be affected by inaccurate recollections of the events and facts.

RESULTS

¹¹ It is not possible to calculate an exact response rate since the client contact controlled the distribution of the survey instruments.

¹² Banking and insurance were excluded due to industry specific financial reporting requirements.

¹³ All but one company had a December 31 year-end.

Descriptive Engagement and Misstatement Data

Table 1 provides descriptive financial information on the sample engagement companies. For the overall sample, the mean data for revenues and assets are \$96 million and \$64 million, respectively. On average, the companies are profitable (\$3.45 million) and have significant equity (\$22.5 million). The auditor's average preliminary judgment about materiality was \$373,000.

[Insert Table 1 here]

The auditors reported a total of 717 misstatements (including 115 reclassification entries); of which 537 were auditor discovered and 180 were client requested. The data on the five largest misstatements showed 240 misstatements that affected 481 accounts (one entry affected 3 accounts) for the 58 audits. The auditors reported that 158 (65 percent) of these misstatements were booked while 83 (35 percent) were waived. The mean amount for the misstatements booked was \$280,500 while the mean adjustment for the waived misstatements was \$136,900. This difference was significant ($t = 1.5, p = .06$). The auditors reported five or more misstatements on a majority of the audits (67.2 percent). One to four detected misstatements were reported for 32.8 percent of the audits. Compared to prior studies, the distribution of number of misstatements per Norwegian audit shows more clients with five or more misstatements (see Eilifsen & Messier 2000).

Pervasiveness of Information Technology

The auditors reported the extent of computerization for each company by indicating whether the information (accounting) system was completely, partially, or not computerized. The auditors categorized all engagements as having partially or completely computerized accounting systems. In the Bell et al. (1998) study, approximately 45 percent of the

misstatements came from non-computerized systems although the extent of computerization varied by account/cycle.¹⁴

In addition, we asked the auditors how long the client's accounting system had been computerized. Sixty-seven percent had been computerized for more than 10 years, 21 percent for 5-10 years, 11 percent for 2-5 years, and 1 percent for less than 2 years. The auditors were asked to indicate which accounting system areas were computerized. As Table 2 shows, most of the major accounting areas (payroll, payables, receivables, inventories, and related income statement accounts) were computerized. In summary, we find that use of information technology has increased substantially since the Bell et al. (1998) study.

[Insert Table 2 here]

Auditor Procedures Identifying Misstatements

To determine the procedures used to detect misstatements, nine categories of audit procedures were listed in the questionnaire consistent with Wright & Ashton (1989): (1) analytical procedures, (2) tests of details: analysis and review,¹⁵ (3) tests of details: checks on mathematical accuracy, (4) tests of details: documentation, (5) confirmations, (6) inventory observation, (7) client inquiry, (8) expectations from prior year, and (9) general audit procedures. Table 3 presents the results of the audit procedures that initially identified the misstatement. The results from Wright & Ashton (1989) are included in the table for comparative purposes.

[Insert Table 3 here]

¹⁴ We also collected a measure of complexity of the IT system. We defined complexity as "the IT environment is characterized by high user dependence on IT control procedures." Twenty engagements were assessed as having a complex IT environment while 38 were not complex.

¹⁵ "Tests of details: analysis and review" should not be confused with "analytical review." The former category refers to data appearing on various types of reconciliations, examination of transaction descriptions, "work-ups" to support accounts balances, and account balance details while the latter refers to comparisons of current unaudited balances with balances of prior years, prediction of current balances based on exogenous data, and analyses of interrelationship among account balances (Hylas & Ashton, 1982: p. 753; Wright & Ashton, 1989: p. 718).

The audit procedures used to detect the misstatements are significantly different between the studies ($\chi^2 = 16.8, p = .01$). The analysis of the audit procedures that detected misstatements (without considering the effect of IT) shows that the three attention-directing procedures (analytical procedures, discussions with personnel, and expectations from prior year) detected 29 percent of the misstatements (8, 14 and 7 percent, respectively) in our sample.¹⁶ This is considerably lower than the 50 percent reported by Wright & Ashton (1989). The three categories of tests of details (analysis and review, checks for mathematical accuracy, and documentation) detected 62 percent of the misstatements (41, 9, and 12 respectively). This is significantly greater ($p < .05$) than the 48 percent reported by Wright & Ashton (1989). Additionally, confirmations and inventory observation (other types of tests of details) detected 5 and 3 percent, respectively, of the misstatements. Results for these audit procedures were not presented in Wright & Ashton. Thus, when compared to prior studies, our results show that tests of details generally detected considerably more misstatements and attention-directing procedures detected fewer misstatements.¹⁷

RQ 1: The Effect of IT on Audit Procedures Identifying Misstatements

To gain some preliminary insight into how IT played a role in the choice of audit procedures used by the auditors to detect misstatements, we examined the auditors' decision to rely, or not rely, on controls.¹⁸ When a business process was identified as computerized, we asked the auditor's to indicate whether IT controls were relied upon.¹⁹ Table 2 shows the

¹⁶ Attention-directing procedures focus on the identification of amounts, relations, and events that are unusual or unexpected. Potential errors initially signaled by attention-directing procedures are then investigated by using other, often more detailed, audit procedures (Wright & Ashton, 1989: p. 710).

¹⁷ Houghton & Fogarty (1991) is the only broad-based misstatement study where tests of details detected as many misstatements as the current study.

¹⁸ The auditors reported that they spent 22.8 hours, on average, assessing the reliance of the accounting system.

¹⁹ Two of the authors independently classified each account (debit/credit) for a misstatement into one of the 14 business processes, resulting in a 92% agreement rate. Any differences were subsequently resolved.

reliance decisions made by the auditors. The auditors relied on IT controls for most significant accounting areas (e.g., payroll, payables, trade receivables, and property, plant, and equipment). We also asked the auditors to indicate the reason(s) for not relying on IT controls. Table 4 presents those results and shows that when the auditors did not rely on the IT controls, substantive testing was indicated to be either more effective (40 percent) or efficient (37 percent).

[Insert Table 4 here]

To examine RQ 1, the misstatements detected by the auditors were classified into business processes and further analyzed based on whether the misstatement originated in a business process that was computerized or not computerized. Each misstatement was reported as affecting at least two of the 30 account categories accounts included in the survey. Computerization of the affected business process was classified by the auditors into one of 14 accounting areas. A misstatement was deemed to have originated in a computerized business process if at least one of the affected accounts was in a business process that was computerized. Fourteen of the misstatements were indeterminable because both sides of the misstatement were classified as “other”. Eight misstatements were in areas for which the auditor did not provide a computerization assessment. This results in a sample of 218 misstatements.

The audit procedures that identified misstatements were then analyzed by those that originated in computerized versus non-computerized business processes. Tests of details and attention directing procedures were just as likely to identify the misstatements in both computerized and non-computerized business processes ($\chi^2 = .005$, $p=.94$).

In summary, the answer to RQ 1 is that (1) compared to earlier studies, tests of details generally detected considerably more misstatements, (2) the primary reason auditors did not rely

on IT controls was their belief that substantive testing was more efficient or effective and (3) there were relatively few differences in the audit procedures that detected misstatements in computerized and non-computerized business processes.

RQ 2 - Causes of Misstatements

The auditors were asked to classify the causes of the misstatements into six categories consistent with Wright & Ashton (1989): (1) personnel problems, (2) insufficient accounting knowledge, (3) judgment errors, (4) cut-off or accrual errors, (5) mechanical errors, and (6) inadequate control, follow-up, or review procedures. Table 5 provides the frequency of the auditors' reported assessments of the causes of misstatements. The results from Wright & Ashton (1989) are included in Table 5 for comparative purposes.²⁰ The causes of misstatements are significantly different between the studies ($\chi^2 = 12.68, p = .05$). Personnel problems (turnover, new/inexperienced employees, carelessness, time pressures, incompetence, etc.) caused significantly more misstatements in our study than in the Wright and Ashton (1989) study ($\chi^2 = 5.4, p = .02$). Inadequate control, follow-up, or review procedures (noncompliance with internal controls, failure to follow-up reconciliation differences, failure to review account collectibility, etc.) caused significantly more misstatements on the audits in our study (23.0 percent) compared to Wright & Ashton (12.6 percent) ($\chi^2 = 3.7, p = .05$). The reported percentage of misstatements caused by mechanical errors is fairly consistent among the studies.

[Insert Table 5 here]

To provide further evidence on the causes of misstatements and IT we asked questions similar to those used by Bell et al. (1998). The results of those questions are presented in Tables

²⁰ It is more difficult to make direct comparisons to the other studies (e.g., Kreutzfeldt & Wallace 1986; Houghton & Fogarty 1991; Entwistle & Lindsay 1994) because they used different categories for misstatement causes (see Eilifsen & Messier 2000).

6 and 7.²¹ There is a significant difference in the causes of misstatements between the two studies ($\chi^2=57.9$, $p<.001$). Control failure factors such as missing, poorly designed, and improperly applied controls were a major cause of misstatements in our study followed by training and workload of personnel. In the Bell et al. study, a large number of misstatements were caused by incorrect manual computation of data (39.7 percent) and auditor disagreement with management's judgment (26.1 percent). Since the Bell et al. data were gathered in the late 1980's and there has been a significant increase in the extent of computerization, it is not surprising that incorrect manual computation is no longer a major cause of misstatements. It is a cause for some concern, however, that there has been an increase in the cause of misstatements resulting from missing and poorly designed controls.

[Insert Table 6 here]

Further analysis was undertaken to determine the cause of the misstatements that originated in computerized and non-computerized business processes (Table 7). There is a significant difference between audit misstatement rates in computerized vs. non-computerized business processes because appropriate controls were missing in the current study. Appropriate controls were judged to be missing more often in computerized rather than non-computerized business processes ($p<.05$). There was also a marginally significant greater number of misstatements within computerized business processes caused by the workload of personnel and poorly designed controls ($p<.07$).

[Insert Table 7 here]

²¹ While Bell et al. (1998) provided further analysis on the basis of company size; we were unable to make comparisons to their study on this dimension. Bell et al. (1998) partitioned their data on the basis of "gauge", a variable unique to the audit firm from which they gathered their data. Bell et al. (1998) also partitioned their data by accounting subsystem and each subsystem on the basis of computerization. We were unable to conduct statistical tests of this nature due to lack of sufficient data points in some of the cells.

We were able to compare these results to Bell et al. (1998).²² We note that while our study shows a significant difference between computerized and non-computerized misstatement rates when appropriate controls were missing, their study found no significant difference. Perhaps this is due to the increase in computerization that took place in the time period between the two studies. Since there was proliferation of computerization during this time period, it may be that the implementation of appropriate controls lagged the installation of the systems. Both studies showed a marginally significant difference between computerized and non-computerized systems when the cause of misstatements was poorly designed controls. With regard to personnel causes, Bell et al. (1998) did not find significant differences due to computerization. However, we found a marginally significant difference when the workload of accounting personnel does not permit satisfactory job performance.

We further analyzed the relationship between the cause of the misstatement, extent of computerization, and the two studies using a multivariate approach with a log linear model.

$$D = C + S + R + CS + CR + SR + \varepsilon$$

D= audit difference rate

C= computerized (yes, no)

S = study (current, Bell et al.)

R= cause of misstatement (controls were missing, controls were not properly applied, etc.)

There was a significant interaction between the cause of the misstatement and the study ($p < .0001$) and a main effect of misstatement cause ($p < .0001$). The results indicate that the audit difference rate is a function of the reason but differs between studies providing additional support to our observations stated above. There was no interaction between computerization and

²² Bell et al. (1998) did not provide specific information on this classification. We assume it was on the basis of the question asked in part I of their survey on the extent of computerization.

study which may indicate that the increase in computerization between the studies did not manifest itself in an overall difference in audit detection rates between computerized and non-computerized business processes. Apparently, there has been a significant shift in the cause of misstatements during that time. We suggest this may be due to increased computerization but acknowledge that other factors may have caused this shift.

The answer to RQ 2 is that although overall the percentage of personnel related causes has not changed significantly since the Bell et al. (1998) study, a greater percentage of misstatements were caused by personnel problems (turnover, inexperienced employees, employee workload, time pressures, incompetence, etc.) in our study. Moreover, more misstatements occurred as a result of controls that were poorly designed, inappropriate, or not properly applied. Not only, have control problems increased in general in the decade between our study and Bell et al. (1998), but they are more prevalent in computerized business processes.

CONCLUDING COMMENTS

The primary objective of this research was to provide descriptive evidence on the detection and causes of misstatements and the effects of information technology. We find there has been a significant change in the causes of misstatements and the procedures used to detect misstatements since such data was collected in the late 1980's.

Our results indicate that the major cause of misstatements detected by auditors in our study was due to missing, poorly designed, and improperly applied controls; inadequate methods used to select, train and supervise accounting personnel; and an excessive workload for accounting personnel. This is a shift from the causes determined in previous research that concluded that the majority of audit differences were due to incorrect manual computations, differences in management and auditor judgment, and faulty initial identification and processing

of transactions. Whereas personnel problems continue to be a major cause of misstatements, it is disturbing to see an increase in misstatement causes attributed to inadequate controls.

Our results also indicate that missing and poorly designed controls and excessive workload for accounting personnel was more likely to be causes of misstatements in computerized business processes than those that were not computerized. In light of the detailed framework for controlling a company's activities made by COSO and the comprehensive and usable control model over IT in support of business processes provided by COBIT we did not expect the cause of misstatements due to missing and poorly designed controls to be greater in computerized business processes. We are not surprised, however, to find that the excessive workload of accounting personnel was more likely to be a cause of misstatements in computerized business processes.

Finally, our results indicate the increased use of tests of details over attention directing procedures on audits appears to result from auditors deciding that it is more effective or efficient to conduct such tests than rely upon IT controls.

Taken together, it appears that despite (or perhaps due to) an increase in information technology, there has been some degradation in the control environment and increase in the workload of accounting personnel. One consequence appears to be a shift in the audit procedures used by auditors to detect misstatements.

Table 1
Descriptive Financial Information for the Sample Companies

Financial Data	Millions of NOK	Millions of \$
	Mean	Mean
Revenues	717.6	95.7
Net Income	25.8	3.5
Assets	476.9	63.6
Equity	168.6	22.5
Preliminary Judgment about Materiality	2.8	0.4

* NOK = Norwegian kroner.

** At the time this data was gathered, the exchange rate was approximately NOK 7.5 = \$1.

Table 2
Descriptive Information on Accounting System Area Computerization
and Auditor Reliance Decisions

Accounting System Area (Business Process)	The client's accounting system is computerized			If the client's system is computerized were the IT controls relied upon?		
	n*	Yes %	No %	n	Yes %	No %
Payroll and Related Costs	57	94.7	5.3	54	83.3	16.7
Accounts Payable, Purchases, and Payments	58	94.8	5.2	55	80.0	20.0
Trade Receivables, Sales, Returns, and Collections	57	96.4	3.6	55	80.0	20.0
Inventories, Cost of Sales	54	88.9	11.1	47	68.1	31.9
Property, Plant, and Equipment	56	55.4	44.6	30	66.7	33.3
Nontrade Receivables	54	46.3	53.7	24	50.0	50.0
Cash Balances	58	41.4	58.6	24	62.5	37.5
Investments	56	39.3	60.7	21	52.4	47.6
Indebtedness	55	40.0	60.0	21	47.6	52.4
Ownership Equity	55	27.3	72.7	14	35.7	64.3
Taxes on Corporate Income	54	27.8	72.2	14	28.6	71.4
Prepaid Expenses, Deferred Charges, Intangibles, and Other Assets	48	25.0	75.0	11	45.5	54.5
Leases	41	22.0	78.0	8	25.0	75.0

* The number of engagements for which this question was answered varied since some participants did not provide the requested information.

Table 3
Audit Procedures that Identified the Misstatements:
Comparison to Wright & Ashton (1989)

Audit Procedures	Current Study	Wright & Ashton (1989)
Client inquiry	14.2	13.3
Analytical procedures	7.8	15.5
Expectations from prior year	6.9*	21.5
Totals: Attention-directing procedures	28.9*	50.3
Tests of details – analysis and review	40.8**	28.7
Tests of details – documentation	11.9	9.1
Tests of details – checks for mechanical accuracy	9.2	9.7
Totals: Tests of details	61.9*	47.5
Confirmations	5.0	nr
Inventory observation	3.2	nr
General audit procedures (other)	0.9	2.2

Audit procedures that detected errors significantly different between studies ($\chi^2=16.8$, $p=.01$).

nr = not reported by authors.

Difference between column significant at * $p<.05$ and ** $p<.10$.

Table 4
Reasons Given by Participants for not Relying on IT Controls

Accounting System Area (Business Process)	N*	Reasons for Not Relying on IT Controls									
		Missing or ineffective controls over manual follow-up procedures	Weak IT control environment	Weak access and systems development procedures	Weak physical/logical access controls	Weak system documentation	Substantive testing was more efficient	Substantive testing was more effective	Adequate user controls over entire processing stream-relied on user controls	Other	
Payroll and Related Costs	19	0.0	5.3	5.3	10.5	0.0	26.3	36.8	10.5	5.3	
Accounts Payable, Purchases, and Payments	24	0.0	4.2	0.0	4.2	0.0	33.3	41.6	12.5	4.2	
Trade Receivables, Sales, Returns, and Collections	25	12.0	8.0	0.0	4.0	0.0	24.0	40.0	8.0	4.0	
Inventories, Cost of Sales	25	20.0	12.0	4.0	4.0	0.0	28.0	20.0	4.0	8.0	
Property, Plant, and Equipment	18	5.6	0.0	0.0	0.0	0.0	44.3	38.9	5.6	5.6	
Nontrade Receivables	22	4.5	0.0	0.0	0.0	0.0	41.0	50.0	0.0	4.5	
Cash Balances	19	10.5	0.0	5.3	0.0	0.0	36.8	36.8	5.3	5.3	
Investments	18	5.6	0.0	0.0	0.0	0.0	44.3	38.9	5.6	5.6	
Indebtedness	22	4.5	0.0	0.0	0.0	0.0	45.5	45.5	0.0	4.5	
Ownership Equity	18	5.6	0.0	0.0	0.0	0.0	38.9	44.4	0.0	11.1	
Taxes on Corporate Income	18	5.6	0.0	0.0	0.0	0.0	38.9	44.4	0.0	11.1	
Prepaid Expenses, Deferred Charges, Intangibles, and Other Assets	14	7.1	0.0	0.0	0.0	0.0	42.9	42.9	0.0	7.1	
Leases	11	0.0	0.0	0.0	0.0	0.0	36.4	54.5	0.0	9.1	
Overall		6.7	2.8	1.2	2.0	0.0	36.9	39.7	4.4	6.3	

* More than one reason could be given for non-reliance

Table 5
Auditors' Assessments of Misstatement Causes:
Comparison to Wright & Ashton (1989)

Misstatement Causes	Current Study	Wright & Ashton (1989)
Personnel-Related Causes:		
Insufficient accounting knowledge	21.2	28.6
Personnel problems	16.8*	6.3
Judgment error	15.4	20.1
	52.4	55.0
Inadequate control, follow-up, or review	23.0*	12.6
Cut-off or accrual error	11.0	18.6
Mechanical error	10.0	12.9
Miscellaneous	2.6	.9

$\chi^2 = 12.68, p = .05$

* Difference between columns significant at $p < .05$.

Table 6
Auditor's Assessments of Misstatement Causes:
Comparison to Bell et al. (1998)

Did the misstatement occur because...	Percent	
	Current Study	Bell et al. (1998) ^a
appropriate controls were missing?	47.3*	24.1
controls were not properly applied?	36.6	21.7
controls were poorly designed?	27.6**	13.0
the methods used to select, train, and supervise accounting personnel were inadequate?	28.0	21.0
the workload of accounting personnel does not permit satisfactory job performance?	22.9	11.0
the auditor disagreed with management's judgment?	16.5*	26.1
the methods used to select, train and supervise management personnel were inadequate?	8.6	6.5
incorrect data was manually determined or calculated?	7.8*	39.7
it took place at the boundary of an information stream?	6.6	nr
the segregation of duties among accounting personnel was inadequate?	5.3	1.6
it occurred in an information stream where we relied on the client's EDP controls?	4.5	nr
controls were performed on a test basis?	3.7	6.9
it was attributable in any way to the client's computer system?	2.1	nr
there was inadequate safeguard of assets?	1.2	0.4
there was management override of the control system?	0.8	3.5
there was erroneous data in an exchange document?	0.8	2.6
the information stream failed to capture an exchange document?	0.8	6.5
it occurred during input into the computer system?	0.8	nr

$\chi^2 = 57.9, p < .001$

nr = not reported by authors.

^a Although the Bell et al. study was published in 1998, the data are from 1988.

* Difference between columns significant at $p < .05$.

** Difference between columns significant at $p < .10$.

Table 7
Auditor's Assessments of Misstatement Causes and the Effect of IT:
Comparison to Bell et al. (1998)

	Current Study		Bell et al. (1998)	
	Computerized Business Process? ^a		Computerized System? ^b	
Did the misstatement occur because...	Yes %	No %	Yes %	No %
appropriate controls were missing?	53.2*	37.1	23.8	24.7
controls were not properly applied?	35.2	45.2	23.5	18.5
controls were poorly designed?	32.1**	19.4	15.1**	9.1
the methods used to select, train, and supervise accounting personnel were inadequate?	26.9	29.0	16.0 ^c	13.0
the workload of accounting personnel does not permit satisfactory job performance?	26.3**	14.5		
the auditor disagreed with management's judgment?	17.3	16.1	26.8	24.6
the methods used to select, train and supervise management personnel were inadequate?	7.7	8.1	7.1	5.5
incorrect data was manually determined or calculated?	10.3	4.8	41.4*	36.3
it took place at the boundary of an information stream?	7.1	6.5		
of inadequate segregation of duties?	7.1	3.2	2.1*	.7
it occurred in an information stream where we relied on the client's EDP controls?	6.4	0.0	nr	nr
controls were performed on a test basis?	1.9	1.6	8.2**	4.4
it was attributable in any way to the client's computer system?	3.2	0.0	8.4	nr
there was inadequate safeguard of assets	1.3	1.6	0.3	0.7
there was management override of the control system?	0.0	3.2	3.5	3.5
there was erroneous data in an exchange document?	0.0	0.0	2.3	3.1
the information stream failed to capture an exchange document?	1.3	0.0	7.7**	4.2
it occurred during input into the computer system?	1.3	0.0	nr	nr

* Difference between computerized and noncomputerized settings significant at $p < .05$.

** Difference between computerized and noncomputerized settings significant at $p < .07$.

nr = not reported by authors

^a Misstatements were classified into business processes and then classified as originating in a process that was computerized or noncomputerized.

^b Bell et al. (1998) do not provide specific information on this classification. We assume it was on the basis of the question asked in part I of their survey on the extent of computerization.

^c Bell et al. (1998) did not report these separately but report "Did the difference occur because of problems with accounting personnel?"

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