

An Empirical Examination of a Model of the Turnover Intentions of Information Systems Auditors

Dr. Ross Quarles, Accounting, George Mason University

Abstract

This study addresses the applicability of existing models of auditor's and accountant's turnover to information systems (IS) auditors. Excessive, unprogrammed IS auditor turnover may decrease stability and expertise in an area critical to the development, audit, and control of computerized accounting information systems. Identification of the factors affecting IS auditor turnover will better equip management to deal with that turnover. The data indicate that several factors under the direct control of management affect the turnover intentions for the sample of IS auditors examined.

Introduction

This study proposes and tests a turnover model specifically for information systems (IS) auditors in order to identify the factors that may be related to turnover intentions among those professionals. Identifying these factors will enable management to take actions to reduce IS auditor turnover in cases where it is considered excessive. Because this segment of the audit and control community has been relatively ignored as a specifically examined group in prior research, the issue must be addressed concerning whether existing turnover models based on data from general auditors and accountants are applicable to IS auditors.

The increasingly important role of IS auditors in auditing and controlling the development and operations of computerized accounting information systems necessitates a high level of expertise in that area. However, Dunmore indicates that "most systems auditors spend less than four years in the profession, causing considerable personnel turnover" (1988, pp. 46). This represents a potential problem in that "given the high personnel turnover in the systems audit profession, most auditors are no sooner fully trained than they change careers" (Dunmore, 1988, pp. 51). If IS auditor turnover is planned and programmed by the organization (e. g., using the function to train personnel for other non-auditing positions), then high turnover is not an issue. However, if there is a high level of unplanned turnover (due possibly to adverse conditions), its associated disruption may be detrimental to the organization.

The conceptual motivation for developing and testing a model specifically of IS auditor turnover is that models based on input from general auditing and accounting personnel may not be valid for addressing IS auditor turnover. This potential inapplicability is suggested by the findings of a number of studies of management advisory services (MAS) personnel in public accounting firms (a field closely related to information systems auditing). Those studies report that work-related behavioral issues and outcomes such as turnover and job satisfaction for MAS personnel are of a different nature than are those for financial auditors, tax specialists and accountants (Benke and Rhode, 1980; Harrell and Stahl, 1984; Watson, 1975). As an exploratory effort to determine if these suggested differences hold for IS auditors, the specific factors that are included in the model proposed and tested in the current study are based on those factors suggested by existing research. This permits an initial comparison of the model derived from the data provided by IS auditors to the existing models of turnover for general auditors and accountants.

The applied motivation for developing and testing a model of IS auditor turnover is based on the need to identify those factors that may be under the control of management that may be used to beneficially affect (i.e., reduce) this turnover. Existing research has established the critical effects of organizational commitment and job satisfaction on turnover intentions. However, management is generally not able to directly affect those two

outcomes because each is the product of a complex interaction of a number of factors related to the individual, the organization and even the environment. This situation necessitates that the factors affecting commitment and satisfaction and which are subject to direct management control be identified before actions can be taken that might impact IS auditor turnover.

This study takes a model-development and testing strategy due to the suggestion that research on turnover be directed toward model development and testing rather than the correlation testing that occupies the attention of much of the existing literature (Cotton and Tuttle, 1986). This approach requires that even though the primary focus is to determine if there are factors under management control that are related to IS auditor turnover, other factors not under such control must be included in the proposed model. Failure to include potentially relevant factors would result in a misspecified model that may prompt erroneous conclusions. Path analysis is used to test the proposed model and to determine the presence of significant direct and indirect effects of a number of work-related, personal and external factors on the turnover intentions of practicing IS auditors.

Background and Prior Research

Existing research has established the individual's turnover intentions as the single best indicator of an individual's actual turnover behavior (Arnold and Feldman, 1982; Cotton and Tuttle, 1986; Rasch and Harrell, 1990). Prior research has also indicated that turnover intentions may be affected by a number of differing types of factors.

In a review of the general turnover research, Cotton and Tuttle (1986) identify three categories of variables that may affect turnover behavior: (1) external factors such as employment opportunities, the unemployment rate, union presence, etc., (2) work-related factors such as role clarity, job satisfaction, organizational commitment, etc. and (3) personal factors such as tenure, gender, education, etc. In a review of the turnover research involving auditors and accountants, Sorensen (1990) suggests that most examinations of turnover involve (1) correlates to which turnover is related such as tenure, educational level, and hierarchical level, (2) determinants such as pay or centralization of decision making that supposedly produce variations in turnover and (3) intervening variables such as job satisfaction or opportunity that moderate between the determinants and turnover. Although they are somewhat different, these two classification schemes are not mutually exclusive. For example, organizational commitment and job satisfaction are intervening work-related variables that affect turnover intentions.

Although there is little controversy concerning the fact that organizational commitment and job satisfaction are strongly related to turnover or turnover intentions (e.g. Cotton and Tuttle, 1986; Sorensen, 1990), the particular ordering of those two independent variables in a model of turnover is a debatable issue. Locke and Latham (1990, pp. 250) describe this controversy and identify studies that support commitment as a cause of satisfaction, studies that provide no support for a causal interpretation in either direction, and other studies in which job conditions cause satisfaction that in turn contributes to commitment. Williams and Hazer (1986) report that their data support the link from satisfaction to commitment. In an empirical test of the ordering of satisfaction and commitment in relation to turnover intentions for auditors and accountants, Gregson reports that the "model with satisfaction antecedent to commitment does a better job of predicting turnover than the model in which commitment is antecedent to satisfaction" (1992, pp. 92).

Organizational Commitment

Organizational commitment involves the relative strength of an individual's identification with and involvement in the employing organization (Mowday et al., 1982). An individual who is committed to the organization will, therefore, be less prone to express a desire to leave that organization. A number of studies confirm that organizational commitment has a significant inverse impact on the individual's turnover (actual or intended) for employees in differing types of organizations (e.g., Abelsen, 1987; Dailey and Kirk, 1992; Michaels and Spector, 1982; Williams and Hazer, 1986). Aranya et al. (1982) report an inverse relationship between organizational commitment and migration tendencies for accountants in both public practice and industry. These authors also report results indicating that organizational commitment is superior to job satisfaction as a predictor of migration tendencies. Arnold and Feldman (1982) indicate that organizational commitment is inversely related to the intention to search for alternative positions for accountants. Meixner and Blin (1989) report a significant inverse relationship between organizational commitment and the turnover intentions of a large sample of governmental accountants.

Job Satisfaction

Job satisfaction represents a pleasurable or positive emotional state based on the results of an appraisal of one's job or job experiences (Vandenberg and Lance, 1992; Locke, 1976). Michaels and Spector (1982) report that job satisfaction is inversely related to one's intention to quit a particular job. Sorensen suggests that the "inverse relationship between job satisfaction and turnover has been strongly supported by industrial

psychology research" (1990, pp. 335) and cites over a dozen behavioral research studies of auditors and accountants that indicate these same results. Specifically for professionals in public accounting an inverse relationship between turnover intentions and job satisfaction has been consistently reported in a number of studies (e.g., Arnold and Feldman, 1982; Bullen and Flamholtz, 1985; Gregson, 1990; Harrell and Stahl, 1984; Rasch and Harrell, 1990). Harrell et al. (1986) report a significant direct inverse relationship between job satisfaction and turnover intent for the internal auditors in their study.

Work-Related Factors

Two important work-related factors that are associated with turnover, commitment, and satisfaction are role conflict and role ambiguity. Role conflict is defined as "the simultaneous occurrences of two (or more) sets of pressures such that compliance with one would make difficult or impossible compliance with the other" (Wolfe and Snoek, 1962, p. 103). Role ambiguity is defined as "the absence of adequate information which is required in order for persons to accomplish their role in a satisfactory manner" (Senatra, 1980, pp. 595). Research results concerning the impact of these work-related factors are somewhat mixed. Jackson and Schuler indicate in their meta analysis of 96 studies that organizational commitment is inversely correlated with both role conflict and role ambiguity and that "job satisfaction is generally found to be negatively correlated with both role ambiguity and role conflict" (1985, pp. 38). Senatra (1980) reports that while role ambiguity (but not role conflict) is negatively associated with job satisfaction, there is an absence of a significant relationship between the propensity to leave the organization and either role conflict or role ambiguity.

Baird (1969) reports that role conflict is associated with lower commitment to the organization. For professional employees in an organization, Podsakoff et al. (1986) report an absence of a significant relationship between role conflict and organizational commitment. Van Sell et al. (1981) cite seven studies indicating job dissatisfaction as a result of role conflict. Hamner and Tosi (1974), however, report no relationship between role conflict and job satisfaction.

Johnson and Graen (1973) report a causal link between role ambiguity and turnover. Brief and Aldag (1976) and Lyons (1971) report positive correlations between turnover and role ambiguity. Ivancevich and Donnelly (1974) report an inverse relationship between role clarity (the antithesis of role ambiguity) and propensity to leave the organization. Cotton and Tuttle (1986) indicate that role clarity has a moderate negative correlation with turnover. Organ and Greene (1981) and Podsakoff et al. (1986) report a significant inverse relationship between role ambiguity and organizational

commitment. Senatra (1980) indicates that role ambiguity is negatively related to job satisfaction for auditors, and Van Sell et al. (1981) cite a number of studies that report an inverse relationship between role ambiguity and job satisfaction.

The degree to which individuals participate in decision making represents the degree of centralization in an organization with a high degree of participation indicating decentralization (Aiken and Hage, 1966). Morris and Steers (1980, pp. 55) report that the literature on participative decision making "consistently points to increased employee involvement and attachment resulting from decentralization" (i.e., increased participation in decision making). Sorensen (1990) indicates that centralization is a consistent determinant in the various robust models of turnover for auditors and accountants. Solomon (1981) reports that high centralization in a CPA firm (a low level of participation in decision making by the individual) is inversely related to job satisfaction.

Hierarchical position is a significant factor involved in the relationships between and among turnover, organizational commitment, and job satisfaction for auditors and accountants (e.g., Adler and Aranya 1984; Aranya and Ferris, 1981; Ferris, 1981). Schroeder and Imdieke (1977), Sorensen (1967), and Sorensen and Sorensen (1974) all report findings of increased organizational commitment at higher levels in the organization. Albrecht et al. (1981) and Benke and Rhode (1980) report that job satisfaction increases as accountants move higher in the organizational hierarchy of CPA firms. Harrell et al. (1986) report a positive relationship between supervisory status and organizational commitment for internal auditors.

Factors Related to the Individual

Pillsbury et al. (1989) and Rasch and Harrell (1990) both report that the individual's gender is related to turnover intent in public accounting settings (with females having higher turnover intentions). Cotton and Tuttle (1986) report that gender is strongly correlated with turnover (with females being more likely to leave than are males) and that gender in general is a strong predictor of turnover in professional jobs.

The individual's tenure (i.e., length of service) with the organization is identified as a significant pertinent factor in a number of studies involving turnover, commitment and job satisfaction (e. g. Brown, 1969; Farrell and Rusbult, 1985; Morris and Steers, 1980). Cotton and Tuttle (1986) report with "strong confidence" that the results of the studies which they analyzed indicate that tenure is negatively correlated with turnover. Harrell et al. (1986) report an inverse relationship between the length of time the individual has been a

member of the organization and turnover intent for internal auditors. Rasch and Harrell (1990) report that for males in a CPA firm, tenure with the firm is negatively correlated with turnover intentions, but for females there is no significant relationships between turnover and tenure.

For individuals in public accounting, Harrell (1990) reports an inverse relationship between educational level and organizational commitment but no significant relationship between education level and either turnover or job satisfaction. However, Cotton and Tuttle (1986) report that education is positively correlated with turnover, and Benke and Rhode (1980) report that education level is inversely related to job satisfaction in their study of individuals in public accounting.

External Factor

A major external factor that may affect turnover intentions is the employment situation outside of the current organization. Aranya et al. (1982), Mobley (1977), Steers and Rhodes (1978), Michaels and Spector (1982) all suggest that the opportunity for alternative employment should be included as a variable in examinations of turnover and commitment. Cotton and Tuttle (1986) indicate that the individual's perception of outside employment opportunities is a highly stable

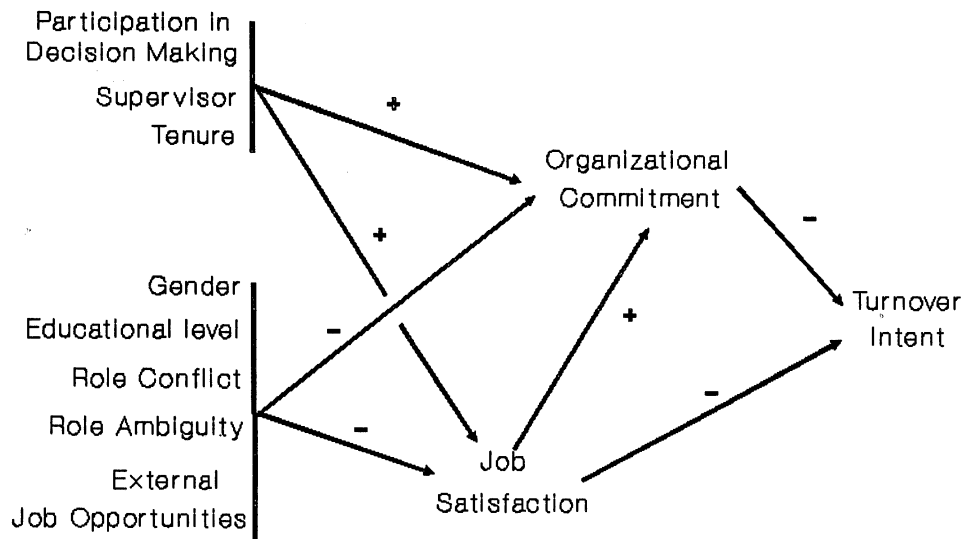
correlate of turnover. Bluedorn (1982) reports a positive relationship between perceived environmental employment opportunities and turnover.

Proposed Model and Hypotheses

A model of IS auditors' turnover intentions is presented in Figure 1. That model is based upon the results reported in previous research and includes the specific factors that are hypothesized to directly affect turnover intentions, organizational commitment and job satisfaction. Following the suggestions of Gregson (1992) regarding ordering of the intervening variables, the proposed model specifies job satisfaction as an antecedent variable affecting organizational commitment.

Table 1 identifies the hypothesized relationships based on the model in Figure 1 that are tested in this study. As indicated in Table 1, both organizational commitment and job satisfaction are hypothesized to have direct inverse effects on turnover intentions, and job satisfaction is hypothesized to have a direct positive effect on organizational commitment. The individual's tenure with the organization is anticipated to have a direct positive relationship with both organizational commitment and job satisfaction while gender (female) and education level are hypothesized to have direct inverse relationships with those two variables. The work-related

Figure 1
Hypothesized Model of
IS Auditor Turnover Intent



Signs indicate positive (+) or inverse (-) relationships between connected variables.

Table 1
Hypothesized Direct Relationships

Hypothesis Number	Independent Variable	Nature of Direct Effect on Dependent Variables of:		
		(a) Turnover Intent	(b) Organizational Commitment	(c) Job Satisfaction
H _{1a}	Organizational Commitment	Inverse	na	na
H _{2a 2b}	Job Satisfaction	Inverse	Positive	na
H _{3b 3c}	Role Ambiguity	na	Inverse	Inverse
H _{4b 4c}	Role Conflict	na	Inverse	Inverse
H _{5b 5c}	Participation in Decision Making	na	Positive	Positive
H _{6b 6c}	Supervisor Status	na	Positive	Positive
H _{7b 7c}	Gender (female)	na	Inverse	Inverse
H _{8b 8c}	Tenure	na	Positive	Positive
H _{9b 9c}	Educational Level	na	Inverse	Inverse
H _{10b 10c}	External Job Opportunities	na	Inverse	Inverse

variables of supervisory status (i.e., hierarchical position) and participation in decision making are anticipated to have direct positive relationships with both commitment and satisfaction. Role ambiguity and role conflict are each expected to have direct inverse relationships with commitment and with satisfaction. Finally, as indicated in the table, the individual's perception of external job opportunities is expected to have a direct inverse relationship with both organizational commitment and job satisfaction.

Method

Sample

The board of directors of a chapter of the EDP Auditors Association agreed to encourage chapter members to participate in this study. Questionnaires were mailed to 246 members of the chapter, and 116 usable responses from practicing IS auditors were returned (a 47% response rate). Table 2 provides the attributes of the respondents.

Variable Measures

Demographic data were obtained by asking respondents to provide their gender, length of time in their current organization (tenure), whether or not they were a supervisor and their educational level (number of degrees held). The other variables examined were measured by using multiple-item scales developed and used in previous research. Table 3 indicates the source of each of the scales, the number of items in each and the internal reliability [i.e., alpha value (Cronbach, 1951)] for each of the scales used in this study.

Data Analysis and Hypothesis Testing

Given that the respondents in this study represented three differing types of employment areas for IS auditors (i.e., public accounting, industry and government), t-tests were used to determine if the expressed levels of turnover intentions differed by employment area. The results of these tests indicated that the mean level of turnover intentions did not significantly differ (<.05) by type of employer. Therefore, the data from the respondents from all three employer types were combined for

Table 2
Attributes of IS Auditor Participants

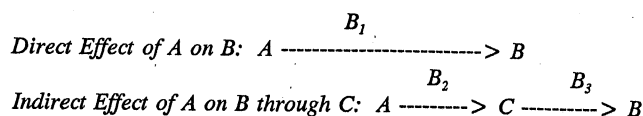
Attribute	Number of Respondents
Hierarchical position:	
Supervisors	70
Non-Supervisors	46
Gender:	
Females	37
Males	79
Educational level:	
One degree	70
Two or more degrees	46
Type of employer:	
Public Accounting	19
Government	45
Industry	52
Tenure with the firm:	
Low	4 months
High	20 years 7 months
Mean	6 years 6 months

the path analysis procedure.

Path analysis (Asher, 1983) was used to analyze the data in this study and to test the hypothesized relationships shown in Table 1. This analysis procedure not only permits testing of hypothesized relationships but also provides an indication of any unhypothesized direct relationships that are present in the data. The procedure utilizes a series of multiple regressions with the dependent variable and the set of independent variables being systematically changed. The initial regression involved turnover intentions as the dependent variable, with all other model variables used as independent variables -- even though only commitment and satisfaction were hypothesized to directly affect those intentions. In this manner, any variable that significantly affects the dependent variable -- turnover intentions in the case of the first equation -- will be identified, even though it was not hypothesized to do so. The next regression required the elimination of turnover intentions as a variable, the use of organizational commitment as the dependent variable, and the use of all remaining variables as independent variables. The final regression in the series involved the elimination of commitment as a variable, the use of job satisfaction as the dependent variable, and the use of all remaining variables as independent variables. Each of the resulting three regression equations was examined to determine the direct relationship, if any, between each independent variable in the equation and the equations's dependent variable by testing for a significant standardized beta.

As indicated by Snead and Harrell, the association of a statistically significant standardized beta weight (i.e., path coefficient) with an independent variable implies that "when the effects due to the other independent variables have been controlled for, that independent variable directly influences the dependent variable" in question (1991, pp. 89). Therefore, the hypothesized (and unhypothesized) direct relationships were tested by determining the presence of a statistically significant (.05 or less) standardized beta weight in the regression equations.

The path analysis process was also used to determine the presence of any significant indirect effect of a particular variable on a dependent variable. For example, if variable A has a direct effect on variable C that in turn directly affects B, then A has an indirect effect on B coming through C. This relationship is shown graphically as follows:



where B_1 is the value of the standardized beta (path coefficient). Therefore, the total effect of A on B would be the total of its direct effect on B and the indirect effect on B coming through C. This total effect would

Table 3
Variable Measures

Variable Measured	# of Items	Source of Scale	Cronbach's alpha
Role Conflict	8	Rizzo et al. [1970]	.74
Role Ambiguity	6	Rizzo et al. [1970]	.82
Turnover Intent	4	Aranya and Ferris [1988]	.69
Job Satisfaction	4	Hoppock [1935]	.85
Organizational Commitment	15	Mowday et al. [1982]	.91
External Job Opportunities	2	Michaels and Spector [1986]	.76
Participation in Decision Making	5	Rhu et al. [1975]	.88

be calculated by the expression:

$$Total\ Effect = B_1 + (B_2 \times B_3)$$

The potential existence of multicollinearity in data was examined based on the suggestions by Myers (1986) and Snead and Harrell (1991) that if any variance inflation factor (VIF) exceeds a value of ten there is some reason for concern in regard to multicollinearity. The VIF values for this study ranged from 1.0 to 2.0, indicating that multicollinearity was not a problem in this data set.

Results

Table 4 indicates the results of the path analysis process performed to test the various direct relationships hypothesized in this study. Only the data for statistically significant relationships are included in the table. In addition, Figure 2 provides a graphical representation of the results of the path analysis process and the model derived from that process. The data indicate that both organizational commitment and job satisfaction have the direct inverse effects on turnover intentions that were hypothesized (H_{1a} and H_{2a}) and together explain 53% of the variance in those intentions. Job satisfaction, as hypothesized in H_{2b} , has a direct positive relationship with organizational commitment. Also as hypothesized, role ambiguity (H_{3b}), role conflict (H_{4b}) and external job opportunities (H_{10b}) each has a direct inverse effect on commitment. Together these three variables explain 55% of the variance in the organizational commitment of the IS auditors in this study. The data also indicate

that role ambiguity has an inverse direct effect (H_{3c}) on job satisfaction and that both participation in decision making (H_{5c}) and supervisory status (H_{6c}) positively affect the level of job satisfaction. Together these variables explain 54% of the variance in job satisfaction. Neither gender, education level, nor tenure with the firm had a significant direct relationship with turnover intentions, organizational commitment, or job satisfaction.

Table 5 presents the direct, indirect, and total effects of each of the significant variables in the derived model. The indirect effect highlights the fact that a factor may affect an outcome such as turnover intent even though there is no direct relationship between that factor and the outcome. The total effect represents the combination of the direct effect of a given independent variable and its indirect effect working through other significant independent variables.

Conclusions

Before discussing the findings and conclusions based on the analysis of the data in this study, there are a number of limitations that should be considered prior to making any broad generalizations of those conclusions. The sample selection and the analysis methods used do not permit causal inferences based on the data obtained. The sample was not randomly selected and is not necessarily representative of IS auditors, although it does represent a cross-section of the members of that profession. The lack of longitudinal data and the data analysis procedures used both eliminate any possibility

Table 4
Significant Direct Relationships

Dependent Variable	Model r ²	Hypothesis # and Independent Variable	Beta Value	t Value	t Sig.
Turnover Intent	.53	H _{1a} Organizational Commitment	-.580	-6.001	.00
		H _{2a} Job Satisfaction	-.194	-2.008	.02
Organizational Commitment	.55	H _{2b} Job Satisfaction	+.462	5.134	.00
		H _{3b} Role Ambiguity	-.256	-2.597	.01
		H _{10b} External Job Opportunities	-.135	-1.915	.03
		H _{4b} Role Conflict	-.142	-1.701	.05
Job Satisfaction	.54	H _{5c} Participation in Decision Making	+.376	4.183	.00
		H _{3c} Role Ambiguity	-.374	-4.334	.00
		H _{6c} Supervisor Status	+.177	2.362	.01

Independent Variables that were not significant (and their associated hypotheses):

- H_{7b 7c} Gender
- H_{8b 8c} Tenure
- H_{9b 9c} Educational Level

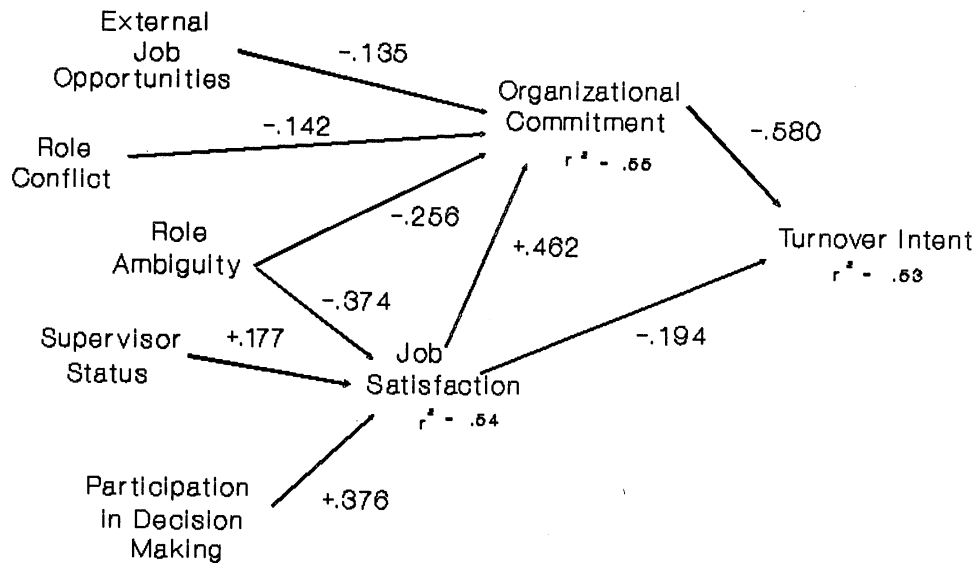
of causal inferences. The model that is derived from the data, however, is useful as an initial, exploratory indication of what relationships are pertinent for the further examination of IS auditor turnover. The model that is developed and the significant relationships that are indicated do suggest that IS auditor turnover can be influenced by management actions.

As indicated by Table 5 and in Figure 2, the data indicate that turnover intentions are directly affected inversely by organizational commitment and job satisfaction with those two variables explaining a considerable amount (54%) of the variance in those intentions. This suggests that IS auditors who are committed to their organizations and who are satisfied with their jobs will, given these results, be less prone to seek employment in other organizations. In addition, job satisfaction has a significant indirect effect on turnover intent coming through its effect on organizational commitment. The overall total effect of job satisfaction therefore appears to be quite critical in relation to turnover intentions for the IS auditors participating in this study.

The findings concerning organizational commitment and job satisfaction suggest that an organization faced with an unacceptable rate of IS auditor turnover may be able to favorably affect that rate by increasing the levels of commitment and satisfaction of its IS auditors. However, the problem is that organizational commitment and job satisfaction are difficult to affect directly by management actions because they are, like turnover intentions, outcomes of complex relationships involving individual, organizational and external environmental factors. Fortunately, however, the data indicate that there are factors largely under the direct control of the firm's management that significantly affect organizational commitment and job satisfaction. Table 5 identifies the factors that have significant direct effects on commitment and satisfaction and, in turn, indirect effects on turnover intentions acting through those two intervening variables. Figure 2 graphically demonstrates the effects of those factors.

As indicated by Table 5 and in Figure 2, the organizational factor of role ambiguity acts indirectly to affect

Figure 2
Derived Model
IS Auditor Turnover Intentions



Signed numbers are path coefficients

turnover intent through both organizational commitment and job satisfaction. According to the data, reduced role ambiguity is potentially a very critical factor in reducing IS auditor turnover due to its association with both increased job satisfaction and increased organizational commitment. If an organizational objective is to reduce the rate of IS auditor turnover, management should assess the degree of role ambiguity faced by those auditors. If role ambiguity is high, then it may be reduced through steps such as adequate and complete job descriptions and standard procedures, explicit specifications of job responsibilities and consistently specified goals and objectives for IS auditors. These steps may favorably affect both organizational commitment and job satisfaction and thereby reduce turnover intentions.

The data indicate that the degree of role conflict faced by the IS auditor is one organizational factor that directly and inversely affects organizational commitment and thereby indirectly increases turnover intent. Management may therefore favorably affect turnover for IS auditors by reducing role conflict through such steps as ensuring that those individuals are not faced with incompatible or conflicting role expectations (e.g., consultant there "to help" and investigator there "to indict"). Unanimity and consistency of expectations for the role of the IS auditor may have the effects of increasing organizational commitment and job satisfac-

tion and thereby reducing turnover for those individuals.

As shown in Figure 2, participation in decision making and supervisor status each has a direct positive effect on job satisfaction which in turn has both direct and indirect inverse effects on turnover intent. This suggests that organizations may favorably affect an individual IS auditor's desire to leave by allowing that person greater participation in job-related decision making. Ensuring that individual IS auditors participate in audit planning and in the development of audit procedures, allowing the individual to have the maximum influence possible over how the job is accomplished and ensuring that superiors are receptive to ideas and suggestions from individual IS auditors may all indirectly contribute to reduced turnover. The organization must also be aware of the beneficial effect which promotion to supervisor status may have in relation to reducing turnover intent. Although not all IS auditors in a given department can be supervisors, the potential for promotion to that position may, in the short run, increase an individual's job satisfaction and favorably impact turnover.

Although they cannot be affected by management's direct actions, external job opportunities, as shown in Table 5 and Figure 2, apparently do have a significant indirect effect on turnover intentions. The individual IS auditor's perception of external job opportunities appears to act indirectly on turnover intentions through

Table 5
Direct, Indirect and Total Effects of Significant Independent Variables
on Dependent Variables

Dependent Variable	Independent Variable	Direct Effect	Indirect Effect	Total Effect
Turnover Intentions ($r^2 = .53$)	Organizational Commitment	-.580	na	-.580
	Job Satisfaction	-.194	-.267	-.461
	External Job Opportunities	na	+.078	+.078
	Role Conflict	na	+.082	+.082
	Role Ambiguity**	na	+.248	+.248
	Participation in Decision Making	na	-.174	-.174
	Supervisor Status	na	-.082	-.082
Organizational Commitment ($r^2 = .55$)	Job Satisfaction	+.462	na	+.462
	Role Conflict	-.142	na	-.142
	External Job Opportunities	-.135	na	-.135
	Role Ambiguity	-.256	-.173	-.429
	Participation in Decision Making	na	+.173	+.173
	Supervisor Status	na	+.082	+.082
Job Satisfaction ($r^2 = .54$)	Role Ambiguity	-.374	na	-.374
	Participation in Decision Making	+.376	na	+.376
	Supervisor Status	+.177	na	+.177

** Role Ambiguity has an indirect effect on Turnover Intentions coming through both Organizational Commitment and Job Satisfaction.

its direct effect on organizational commitment. A perception of a high level of external job opportunities is related to reduced organizational commitment that is in turn associated with an increased desire to leave. This logical situation indicates the sensitivity of turnover to influences external to the organization. Management must be aware that any actions taken with respect to organizational factors to increase commitment and reduce turnover may potentially be mitigated or en-

hanced by the individual's perception of external job opportunities.

The data examined in this study suggest a model indicating that organizational commitment, job satisfaction, external job opportunities, role conflict, role ambiguity, participation in decision making and supervisory status are elements that directly and/or indirectly influence IS auditor turnover intentions. Management

of organizations that are faced with an unacceptable rate of unprogrammed IS auditor turnover may be able to reduce that rate by addressing these elements in their organizations. Management generally has the power to directly affect the degrees of role conflict and role ambiguity in the firm, the level of participation in decision making and the provisions for promotion to supervisor. These factors are potential "tools" that may be effectively used to indirectly affect turnover.

As to the question of whether existing models of turnover based on data from general auditors and accountants are applicable to IS auditors, the data in this study indicate that a model of IS turnover intentions does not appear to drastically differ from those existing models. The inverse relationships between turnover intentions and both organizational commitment and job satisfaction are consistent with the existing models. The positive relationships between job satisfaction and both participation in decision making and supervisory status are consistent with the findings for auditors and accountants. Both role conflict and role ambiguity appear to affect IS auditors in the same manner as they affect other auditors and accountants. The role of the perception of external job opportunities is consistent with the suggestions made in studies describing existing turnover models. There is, however one noteworthy difference between existing models of auditor and accountant turnover (actual or intended) and the derived model for IS auditors. The IS auditor model does not contain any factors related to the individual as variables that are significantly related (directly or indirectly) to turnover intentions. The elements of the model are all work-related with the exception of the perception of outside job opportunities. While this is a potentially critical finding (given that the work-related factors are generally under the control of management), its application must be tempered given the limitations in the present study regarding sample size and selection method.

Suggestions for Future Research

This initial examination of turnover intentions for IS auditors has indicated that there are a number of significant relationships that should be addressed. However, the limitations concerning the nature of the sample examined and the analysis methods used do not allow generalization of these results to all IS auditors. Accordingly, future research using an experimentally appropriate sample with the necessary data and analysis procedures should be aimed at validating the results of this study and determining if the relationships suggested by its data can be generalized to all IS auditors. If those relationships and their suggested effects are validated by that research, then management has a number of factors under its direct or indirect influence with which to combat unacceptable turnover among the organization's IS auditors.

Future research should also use appropriately selected samples to more thoroughly examine the similarities of turnover-related factors between IS auditors and other members of the auditing and control community. That research would be part of a wider research issue regarding whether IS auditors, independent auditors, internal auditors and other control professionals represent, from a behavioral standpoint, similar or dissimilar occupational groups.

References

1. Abelsen, M. A., "Examination of Avoidable and Unavoidable Turnover," *Journal of Applied Psychology*, Vol. 71, No. 3, 1987, pp. 382-386.
2. Adler, S. and N. Aranya, "A Comparison of the Work Needs, Attitudes, and Preferences of Professional Accountants at Different Career Stages," *Journal of Vocational Behavior*, Vol. 25, 1984, pp. 45-57.
3. Aiken, M. and J. Hage, "Organizational Alienation: A Comparative Analysis," *American Sociological Review*, Vol. 31, 1966, pp. 497-507.
4. Albrecht, W. S., S. W. Brown and D. R. Field, "Toward Increased Job Satisfaction of Practicing CPAs" *Journal of Accountancy*, Vol 152, No. 2, 1981, pp. 61-66.
5. Aranya, N., R. Lachman, and J. Amernic, "Accountants' Job Satisfaction: A Path Analysis," *Accounting, Organizations and Society*, Vol. 7, No. 3, 1982, pp. 201-215.
6. _____ and K. R. Ferris, "A Reexamination of Accountants' Organizational-Professional Conflict," *The Accounting Review*, Vol. LIX, No. 1, January, 1984, pp. 1-15.
7. Arnold, H. J. and D. C. Feldman, "A Multivariate Analysis of the Determinants of Job Turnover," *Journal of Applied Psychology*, Vol. 67, No. 3, 1982, pp. 350-360.
8. Asher, B., *Causal Modeling*, Sage Publications, Beverly Hills, CA, 1983.
9. Baird, L. L., "A Study of the Role Relations of Graduate Students," *Journal of Educational Psychology*, Vol. 60, 1969, pp. 15-21.
10. Benke R. L and J. G. Rhode, "The Job Satisfaction of Higher Level Employees in Large Certified Public Accounting Firms," *Accounting, Organizations and Society*, Vol. 5, No.2, 1980, pp. 187-201.
11. Bluedorn, A. C., "A Unified Model of Turnover from Organizations," *Human Relations*, Vol. 35, No. 2, 1982, pp. 135-153.
12. Brown, M. E., "Identification and Some Conditions of Organizational Involvement," *Administrative Science Quarterly*, Vol. 14, 1969, pp. 346-355.
13. Brief, A. P. and R. J. Aldag, "Correlates of Role Indices," *Journal of Applied Psychology*, Vol. 61, 1976, pp. 468-472.
14. Bullen, M. L. and E. G. Flamholtz, "A Theoretical

- and Empirical Investigation of Job Satisfaction and Intended Turnover in the Large CPA Firm," *Accounting, Organizations and Society*, Vol. 10 No. 3, 1985, pp. 287-302.
15. Cotton, J. L. and J. M. Tuttle, "Employee Turnover: A Meta-Analysis and Review with Implications for Research," *Academy of Management Review*, Vol 11, 1985, pp. 55-70.
 16. Cronbach, L., "Coefficient Alpha and the Internal Structure of Tests," *Psychometrika*, Vol. 16, No. 3, 1951, pp. 297-334.
 17. Curry, J. P., D. S. Wakefield, J. L. Price and C. W. Mueller, "On the Causal Ordering of Job Satisfaction and Organizational Commitment," *Academy of Management Journal*, Vol. 29, No. 4, 1986, pp. 847-858.
 18. Dailey, R. C. and D. J. Kirk, "Distributive and Procedural Justice as Antecedents of Job Dissatisfaction and Intent to Turnover," *Human Relations*, Vol. 45, No. 3, 1991, pp. 305-317.
 19. Dunmore, D. B., *Systems Development Auditing*, Management Publications, Wellesley Hills, MA, 1988.
 20. Farrell, D. and C. Rusbult, "Understanding the Retention Function: A Model of the Causes of Exit, Voice, Loyalty and Neglect Behaviors," *Personnel Administrator*, April, 1985, pp. 129-140.
 21. Ferris, K. R., "Organizational Commitment and Performance in a Professional Accounting Firm," *Accounting, Organizations and Society*, Vol. 6, No. 4, 1981, pp. 317-325.
 22. Gregson, T., "An Investigation of the Causal Ordering of Job Satisfaction and Organizational Commitment in Turnover Models in Accounting," *Behavioral Research in Accounting*, Vol 4, 1992, pp. 80-95.
 23. Lyons, T. F., "Role Clarity, Need for Clarity, Satisfaction, Tension, and Withdrawal," *Organizational Behavior and Human Performance*, Vol. 6, 1971, pp. 99-110.
 24. Hamner, W. C. and H. W. Tosi, "Relationships of Role Conflict and Role Ambiguity to Job Involvement Measures," *Journal of Applied Psychology*, Vol. 59, 1974, pp. 497-499.
 25. Harrell, A. M. and M. J. Stahl, "Need for Achievement, Need for Affiliation and the Academic Performance and Career Intentions of Accounting Students," *Journal of Accounting Education*, Vol 1, No. 2, Fall, 1983, pp. 149-153.
 26. _____ and M. J. Stahl, "McClelland's Trichotomy of Needs Theory and the Job Satisfaction and Work Performance of CPA Firm Professionals," *Accounting, Organizations and Society*, Vol. 9, No. 3/4, 1984, pp. 241-252.
 27. _____, E. Chewning and M. Taylor, "Organizational-Professional Conflict and the Job Satisfaction and Turnover Intentions of Internal Auditors," *Auditing: A Journal of Practice and Theory*, Vol. 5, No. 2, Spring, 1986, pp. 109-121.
 28. _____ and R. Eichhoff, "Auditors' Influence-Orientations and Their Affective Responses to the "Big Eight" Work Environment," *Auditing: A Journal of Practice and Theory*, Vol. 7, No. 2, Spring, 1988, pp. 105-118.
 29. _____, "A Longitudinal Examination of Large CPA Firm Auditors' Personnel Turnover," *Advances in Accounting*, Vol. 8, 1990, pp. 233-246.
 30. Hoppock, R., *Job Satisfaction*, Harper and Row, New York, 1935.
 31. Ivancevich, J. M. and J. H. Donnelly, "A Study of Role Clarity and Need for Clarity for Three Occupational Groups," *Academy of Management Journal*, Vol. 17, No. 1, 1974, pp. 28-36.
 32. Jackson, S. E. and R. S. Schuler, "A Meta-analysis and Conceptual Critique of Research on Role Ambiguity and Role Conflict in Work Settings," *Organizational Behavior and Human Decision Processes*, Vol. 36, 1985, pp. 16-78.
 33. Johnson, T. W. and G. Graen, "Organizational Assimilation and Role Rejection," *Organizational Behavior and Human Performance*, Vol. 10, 1973, pp. 72-87.
 34. Locke, E. A. and G. P. Latham, *A Theory of Goal Setting & Task Performance*, Prentice Hall, Englewood Cliffs, NJ, 1990.
 35. _____, "Nature and Causes of Job Satisfaction," in *Handbook of Industrial and Organizational Psychology*, M. D. Dunnette (Ed.) Chicago: Rand McNally, 1976, pp. 1297-1349.
 36. Meixner, W. F. and D. M. Bline, "Professional and Job-related Attitudes and the Behaviours they Influence among Governmental Accountants," *Accounting, Auditing and Accountability Journal*, Vol. 2, No. 1, 1989, pp. 8-20.
 37. Michaels, C. and P. Spector, "Causes of Employee Turnover: A Test of the Mobley, Griffeth, Hand and Meglino Model," *Journal of Applied Psychology*, Vol. 67, 1982, pp. 53-59.
 38. Mobley, W. H., "Intermediate Linkages in the Relationship Between Job Satisfaction and Employee Turnover," *Journal of Applied Psychology*, Vol. 62, 1977, pp. 237-240.
 39. Morris, J. H. and R. M. Steers, "Structural Influences of Organizational Commitment," *Journal of Vocational Behavior*, Vol. 17, 1980, pp. 50-57.
 40. Mowday, R. T., L. W. Porter and R. M. Steers, *Employee-Organization Linkages*, Academic Press, New York, 1982.
 41. Myers, R., *Classical and Modern Regression with Applications*, Duxbury Press, Boston, 1986.
 42. Organ, D. W. and C. N. Green, "The Effects of Formalization on Professional Involvement: A Compensatory Process Approach," *Administrative Science Quarterly*, Vol. 26, 1981, pp. 237-252.
 43. Pillsbury, C., L. Capozzoli and A. Ciampa, "A Synthesis of Research Studies Regarding the Upward Mobility of Women in Public Accounting,"

- Accounting Horizons*, Vol. 3, No. 1, March, 1989, pp. 63-70.
44. Podsakoff, P. M., L. J. Williams and W. D. Todor, "Effects of Organizational Formalization on Alienation Among Professionals and Non-Professionals," *Academy of Management Journal*, Vol. 29, No. 4, 1986, pp. 820-831.
 45. Rasch, R. H. and A. M. Harrell, "The Impact of Personal Characteristics on the Turnover Behavior of Accounting Professionals," *Auditing: A Journal of Practice and Theory*, Vol. 9, No. 2, Spring, 1990, pp. 201-215.
 46. Rhu, R. A., J. K. White and R. R. Wood, "Job Involvement, Values, Personal Background, Participation in Decision Making, and Job Attitudes," *Academy of Management Journal*, Vol. 18, No. 2, June, 1975, pp. 300-312.
 47. Rizzo, J. R., R. J. House and S. I. Lirtzman, "Role Conflict and Ambiguity in Complex Organizations," *Administrative Science Quarterly*, Vol. 15, June, 1970, pp. 150-163.
 48. Schroeder, R. G. and L. F. Imdieke, "Local-Cosmopolitan and Bureaucratic Perceptions in Public Accounting Firms," *Accounting, Organizations and Society*, Vol. 1, 1977, pp. 39-45.
 49. Senatra, P. T., "Role Conflict, Role Ambiguity, and Organizational Climate in a Public Accounting Firm," *The Accounting Review*, Vol. LV, No. 4, October, 1980, pp. 594-603.
 50. Snead, K. and A. M. Harrell, "The Impact of Psychological Factors on the Job Satisfaction of Senior Auditors," *Behavioral Research in Accounting*, Vol. 3, 1991, pp. 85-96.
 51. Solomon P. E., *The Development and Testing of a Model of Staff Turnover in Public Accounting*, PhD dissertation, University of Minnesota, Minneapolis, 1981.
 52. Sorensen, J. E., "The Behavioral Study of Accountants: a New School of Behavioral Research in Accounting," *Managerial and Decision Economics*, Vol. 11, 1990, pp. 327-441.
 53. _____, "Professional and Bureaucratic Organization in the Public Accounting Firm," *The Accounting Review*, Vol. XLII, No. 3, 1967, pp. 553-565.
 54. _____ and T. C. Sorensen, "The Conflict of Professionals in Bureaucratic Organizations," *Administrative Science Quarterly*, Vol. 19, No. 1, 1974, pp. 98-106.
 55. Stahl, M. J. and A. M. Harrell, "Evolution and Validation of a Behavioral Decision Theory Measurement Approach to Achievement, Power, and Affiliation," *Journal of Applied Psychology*, Vol. 67, No. 6, 1982, pp. 744-751.
 56. Steers, R. M. and S. R. Rhodes, "Major Influences on Employee Attendance: A Process Model," *Journal of Applied Psychology*, Vol. 63, 1978, pp. 391-407.
 57. Vandenberg, R. J. and C. E. Lance, "Examining the Causal Order of Job Satisfaction and Organizational Commitment," *Journal of Management*, Vol. 18, No. 1, 1992, pp. 153-167.
 58. Van Sell, M., A. P. Brief and R. S. Schuler, "Role Conflict and Role Ambiguity: Integration of the Literature and Directions for Future Research," *Human Relations*, Vol. 34, No. 1, 1981, pp. 43-71.
 59. Watson, D. J. H., "The Structure of Project Teams Facing Differentiated Environments: An Exploratory Study in Public Accounting Firms," *The Accounting Review*, Vol. L, No. 2, April, 1975, pp. 259-273.
 60. Williams, L. J. and J. T. Hazer, "Antecedents and Consequences of Satisfaction and Commitment in Turnover Models: A Reanalysis Using Latent Variable Structural Equation Methods," *Journal of Applied Psychology*, Vol. 71, No. 2, 1986, pp. 219-231.
 61. Wolfe, D. M. and J. D. Snoek, "A Study of Tensions and Adjustments Under Role Conflict," *Journal of Social Issues*, Vol. 17, 1962, pp. 102-121.