A COMPARATIVE STUDY OF INTERNAL AND EXTERNAL AUDITORS' JUDGMENT OF INTERNAL AUDITOR INDEPENDENCE

Dissertation

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By

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The purpose of this study is to provide empirical evidence relevant to perceptions of internal auditor independence. Specifically, this study investigates how the auditor practitioners (both internal and external auditors) perceive the importance of five selected factors that characterize the organizational settings of an internal audit department.

Role theory is the frame of reference used to develop the conceptual model for this study in which the judgment of internal auditor independence is viewed as the role perception of internal auditors. A modified version of the Brunswik's lens model was developed to provide "paramorphic" representation of judgment of independence.

The research methodology of this study is based upon a laboratory experiment in which a replicated factorial design was used to elicit the subjects' judgments of independence. The data collected from this experiment were analyzed by three statistical methods: conjoint measurement, multiple regression, and cluster analysis.

The major findings follow. First, the five selected factors were not perceived as equally important by the subjects. In general, internal auditor's scope of audit, scope of service, and reporting level were perceived as more
important than adequacy of organizational support, and formalization of audit policies. Second, the two groups of auditors disagree, significantly, on the relative importance of scope of internal audit service. Third, while large individual differences existed on the relative importance of the five selected factors, the degree of judgment consensus, in general, is high within each auditor group. Fourth, the internal auditor's perceived role conflict and role ambiguity were inversely related to his perceived level of professional autonomy. Finally, the internal auditors' judgments were not notably affected by the perceptions of their own organizational environment. However, as evidenced by the different types of experienced role conflict and ambiguity, the nature of these auditors' environment varied considerably.

Given the above findings, the following implications are suggested: First, the organizational settings are critical to internal auditor independence. Improperly structured settings not only affect the perceived independence but also are detrimental to professional autonomy—de facto independence. Second, rule making bodies should provide more explicit guidelines concerning internal audit independence evaluation, particularly, in the area of scope of internal audit service. Third, while the auditor's reporting level is an important factor to independence, it should not be the only consideration. Other factors, such as the ones used in this study, should be also evaluated to avoid misleading results.
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CHAPTER I

INTRODUCTION

Role of the Internal Auditor: Historical Setting

For an adequate understanding of the contemporary role of the internal auditor, it is helpful to examine the historical development of internal auditing. Around the 1940s, the primary functions of internal auditing were to maintain an organization's internal accounting control and to serve as a psychological deterrent against wrongdoing (6, 17). However, over the next twenty years in line with the trend toward operational auditing activities, internal auditors began to downplay their role in internal accounting control. Instead, internal auditors began to emphasize their active contribution to operational effectiveness and efficiency in response to the increasing operational complexity of most organizations (6, 7).

The development of the internal auditor's role from the mid-1970s to the current time seems to be swinging back to that of the 1940s. This has been prompted by a number of reasons: (1) The incidence of major fraud and the resulting
loss of confidence in the integrity of business leaders, (2) increased interest on the part of regulatory and professional entities in corporate responsibility for internal control and accountability, and (3) legislative actions of Congress, such as the Foreign Corrupt Practice Act (FCPA) of 1977 (6, 7, 17, 20). All of these point to an increased demand for internal auditor involvement in improving corporate internal controls. Although the corporate board members and management, under the pressures of corporate accountability, are the major source of demand for internal audit services, the Stock Exchange Commission (SEC) and American Institute of Certified Public Accountants (AICPA) also emphasize the importance of the internal auditor in monitoring the effectiveness of corporate internal controls (2, p. 38; 29). To some writers, an effective internal audit function is considered as a "control of controls" or a "top management control", which is inseparable from the control environment for any given organization (6, 11, 12, 29).

Conceptualization of Internal Auditor Role

As shown in Figure 1, the internal auditor can be viewed as a monitoring agent who audits various levels of manager-agents (auditees) or the control mechanism (e.g., accounting and operational controls) over these agents on behalf of the principal(s). Acting as a monitoring agent,
Figure 1--Internal Auditor Role
the internal auditor is expected to perform two interrelated functions, auditing and consulting. These are performed to maintain reliability of financial statements, prevent occurrence of irregularities, and enhance effectiveness and efficiency of operations. Thus, the demand for internal auditing is presumed to arise due to an accountability relationship between two (or more) parties (e.g., top management vs. board member).

Figure 1 also depicts the principals of the internal auditor. From 1940 to 1960, the internal auditor often viewed his principal as being singular in nature—the controller. As the full impact of the Foreign Corrupt Practice Act became recognized, internal auditors found that they had multiple principals (e.g., top management, board members or the audit committee thereof), each with strong demands on the internal auditor to discharge his

* Owing to their inherent limitations, effective internal control systems may still fail to eliminate all possible types of irregularities. However, such systems do reduce their probability of occurrence (2, pp. 36-40). Furthermore, it has been argued that there is no clear-cut distinction between accounting and operational controls due to the complexity of business operation as well as its mode of data processing (18, 21). However, for the purpose of this paper, the distinction between the accounting and operational controls shall follow the definition made in the professional standards.

** Although it is interesting to develop a mathematic model for such a principal-agent relationship, it is beyond the scope of this paper. For those interested in agency theory research, particularly in auditing, see the following monographs: DeAngelo (10), Evans (14), and Ng and Stocekenius (22).
responsible to the organization and society at large. Perry (23), who is director of professional practice for the Institute of Internal Auditors (IIA), articulates the implication of this multiple-principal relationship faced by the internal auditor.

Internal auditing is no longer a service to management. It is a service to the organization. The primary concept in developing the Standards (for the Professional Practice of Internal Auditing) is that internal auditing is becoming and will become more and more accountable to others-audit committees, boards of directors and society-rather than accountable exclusively to management.

Internal Auditor Independence

Whether the internal auditor is able to fulfill the increasing demands from various parties mentioned earlier depends primarily upon his ability to function as an independent appraiser within the organization. If internal auditors are not independent or not perceived to be independent, they are of little value to those who demand their service (9, 12, 24, 27, 29). The Institute of Internal Auditors emphasizes independence, stating that "independence permits the internal auditor to render the impartial and unbiased judgements essential to the proper conduct of audits," and "without independence," the IIA continues, "the desired results of internal auditing cannot be realized."

To be independent, the internal auditor must maintain what may be described as "honest disinterestedness"
attitudes when conducting his audits. In their discussion of practitioner independence, Mautz and Sharaf point out the following attributes as the operational concepts for these "honest disinterestedness" attitudes:

1. **Programming Independence**: Freedom from control or undue influence in the selection of audit techniques and procedures and in the extent of their application.

2. **Investigative Independence**: Freedom from control or undue influence in the selection of areas, activities, personal relationships, and managerial policies to be examined.

3. **Reporting Independence**: Freedom from control or undue influence in the statement of facts revealed by the examination or in the expression of recommendations or opinions as a result of the examination. (19, pp. 204-208)

Although these attributes have been used to examine the independence of the external auditor, Rittenberg (25) and Clark, Gibbs and Schroeder (9) recommended the use of these attributes for the purpose of evaluating and understanding the issue of internal auditor independence.

This notion of internal auditor independence is also consistent with the concept of professional autonomy. Engel (13) asserted that one of the important dimensions of professional autonomy is work-related autonomy, which is defined as the professional freedom to provide professional services. Hall (16) viewed professional autonomy as "the most important attribute of a professional." This attribute contains an attitudinal dimension and a structural dimension. The former refers to "the belief of the
professional that he is free to exercise his judgment and
decision making" (p. 93). The latter refers to "the work
setting wherein the professional is expected to utilize his
judgment and will expect that only other professionals will
be competent to question this judgment" (p. 93). For the
purpose of this research, professional autonomy will be
treated synonymously with independence, since they both
refer to the ability of the internal auditor to act in
accordance with professional judgment.

Rittenberg developed the following comprehensive
definition of internal auditor independence:

Internal auditor independence is the ability of a
technically competent auditor to conduct and fully
report on the results of an audit without personal bias
or prejudice and with the ability to determine audit
areas, audit scope, and audit procedures without
adverse or controlling influence from the auditee or
other managerial segments of the organization. (25,
p. 20)

As can be seen from Rittenberg's definition, the notion
of internal auditor independence has two dimensions. The
first dimension is a personal attribute that deals with an
auditor's integrity and competency. The second dimension
deals with the organizational environment to which the
auditor belongs. This latter dimension affects the
auditor's ability to maintain independence, which is
contingent upon, or surrogated by, such factors as auditor's
organizational status, availability of adequate resources,
attitude of auditees, scope of audit, and other
organizational related factors. (Details of these factors will be discussed in Chapter II of this thesis.)

Motivation of the Study

There are four motivating factors for this thesis. First, few guidelines are available to the audit practitioner on how to evaluate internal auditor independence. Without such guidelines, an objective evaluation of the internal audit function—the most integral part of corporate control environment—is very difficult to accomplish. Statements on Auditing Standards (SAS) No. 9, "The Effect of an Internal Audit Function on the Scope of the Independent Auditor’s Examination," provides only very general and ambiguous guidelines. The Commission on Auditors’ Responsibilities (2, p. 134) criticizes this general nature of SAS No. 9 and concludes that almost any practice is permissible. Ward and Robertson point out that even within the public accounting firm formal guidelines are not available to the auditor, and "to a great extent, reliance on internal auditors appears dependent on the interest and capability of [external] auditors in the field." (19, p. 70). Second, a set of agreed-upon operational criteria for internal auditor independence is not available in all circumstances. One of the reasons seems to be that audit practitioners do not have common opinions on the following issues: Should the internal auditor
be treated as a part of the management team? Should the internal auditor be primarily involved in financial instead of operating controls? To whom should the internal auditor have primary reporting responsibilities (3, 12)? Should the internal auditor participate in a company's EDP system design (28)? Third, few empirical works examine internal auditor independence. However, they vary both in terms of scope of inquiry and research findings (e.g., 1, 8, 9, 26). Strictly speaking, these studies do not devote their attention to examining internal auditor independence in that their research objective is to examine how the external auditor evaluates the internal audit function as a whole, of which internal auditor independence is only a part. Finally, no study has investigated how internal auditors perceive their own independence. What are the relevant factors that internal auditors perceive as important in maintaining their independence, and which of these factors is more important than the others?

This investigation may provide some insights into the understanding of internal auditor independence. There are two major reasons why such an investigation is important. First, since the major function internal auditors perform is to monitor various agents for the benefit of the principal, it is likely that these agents will exert pressures on the internal auditor because of conflict of interests between
the two parties. The major sources upon which the internal auditor can "balance" the pressures from auditees are the factors which characterize organizational settings. Thus, to know how the internal auditor perceives the (relative) importance of these factors should enhance the understanding of the effectiveness of these factors in maintaining internal auditor independence. Second, little is known about whether or not the external auditor and internal auditor have common opinions on how internal auditor independence should be evaluated. Braiotta (4) points out that the most important aspect of increased coordination between the internal auditor and external auditor lies in mutual understanding. However, some studies show that lack of mutual understanding does exist and that "state of the art" coordination between the internal auditor and external auditor is less than optimal (3, 27). Thus, with a comparative study of internal and external auditors' judgment of internal auditor independence, it is hoped that the mutual understanding between the two parties will be enhanced, and the coordination between them can be improved.

Research Objectives

The objective of this thesis is to provide empirical evidence relevant to perceptions of internal auditor independence. Specifically, the study investigates how the audit practitioners (both internal and external auditors)
perceive the importance of five selected factors when they exercise judgment on IA independence. These variables are (1) scope of internal auditing service, (2) internal auditor reporting responsibilities, (3) scope of internal auditor's audit, (4) adequacy of organizational support, and (5) formalization of internal auditing policies. The empirical evidence so provided from this investigation is tailored to answer the following four specific research questions.

1. How does the external auditor exercise judgment of internal auditor independence?

2. What is the degree of consensus among external auditors when exercising their audit judgment on internal auditor independence?

3. How does the internal auditor exercise judgment of internal auditor independence?

4. What is the degree of consensus among internal auditors when exercising their audit judgment on internal audit independence?

Chapter Description

Chapter I introduces the research study, in which the importance of the study is discussed. The chapter also points out the motivations of the study along with the objectives to be accomplished by this research effort.

Chapter II presents the conceptual model of this study. Role theory is the frame of reference used to develop
this conceptual model in which the judgment of internal auditor independence is viewed as the role perception of internal auditors. Also discussed in this chapter is the analytical model of this study. Based upon mathematical psychology theories, the analytical model used in this study is a modified version of the Brunswik's lens model. The purpose of this model is to provide a rigorous representation of judgment of independence.

Chapter III discusses the research methodology of this study. A laboratory experiment was used to collect data from the subjects. In the experiment, a replicated factorial design was used to elicit the subjects' judgment of independence. The statistical techniques used by this study are also discussed in this chapter. They are conjoint measurement, multiple regression, and cluster analysis.

Chapter IV discusses the data analysis procedures and presents the results of this study. Chapter V discusses the research results, and suggests the possible implications and future research avenues that could evolve from this study.


CHAPTER II

MODEL DEVELOPMENT

Introduction

Three major areas are discussed in this chapter. First, the nature of audit judgment of internal auditor (IA) independence is considered; this judgment is viewed as the role perception of internal auditors. As a result, role theory and its applications are reviewed and synthesized. Second, the conceptual model of this thesis is explained. For this conceptual model, external auditor judgment of IA independence is first examined and the prior research is also reviewed. The next part of this conceptual model is concerned with the internal auditor judgment of IA independence; this discussion emphasizes the impact of organizational environment on internal auditor judgment of independence. Third, the analytical model of this thesis is explained. The purpose of this analytical model is to provide a rigorous representation of the auditors' judgment process when evaluating IA independence. Each of these three major areas are to be discussed in some detail in the following sections.
Role Theory: A Synthesis

Kahn and others (32) introduced role theory to the organizational behavior literature in order to assess the impact of organizational environment on an individual's behavior. Katz and Kahn [and others (36, 54)] consider role theory as "the major means for linking the individual and organizational levels of research and theory" (33, p. 197). The essence of role theory is that an individual's (i.e., focal person's) behavior on-the-job is determined jointly by the objective and subjective environments. The objective environment refers to the social and physical environment that the focal person populates. On the other hand, the subjective environment refers to a state of the person, or his perception of the characteristics of the objective environment and to his expectations of other people (32).

Role Perception and Formulation

In a complex organization, the variable that characterizes the focal person's objective environment can be categorized as either global or ecological. Global variables include such items as size of the company, number of rank or status levels, organizational structure (e.g., organic vs. mechanistic), leadership style, nature of operation, etc. Ecological variables are those that represent the relation of a certain position or person to the organization, for example, his rank, his
responsibilities in the organization, or the number and positions of others who are directly concerned with his performance (27, 32, 53). The subjective environment has two interrelated dimensions. The first dimension deals with the expectations held by others (i.e., role-senders), who are directly related to the focal person, or who simply have a notion about him. Examples of the focal person's role senders include his supervisors, subordinates, peers, or anyone whose job performance is functionally dependent upon that of the focal person. These expectations from the role senders often constitute the prescriptions and proscriptions to evaluate the appropriateness of a focal person's behavior and are formulated by the role-senders on the basis of their perceptions of the focal person's objective environment (32, p. 31). Rizzo, House, and Lirtzman point out that these expectations from the role-sender constitute the role of the focal person; in fact, these expectations of the role-senders are "conditioned by his general experience and knowledge, values, perceptions, and specific experience with the focal person(s)" (51, p. 155). The second dimension of the subjective environment has to do with the focal person's own perception with respect to the expectations of the role-senders, mediated by his own perception of the objective environment (32, 46, 47).

These three components (the objective environment, role-senders' expectations, and the focal person's
expectations) work in a dynamic manner to determine the focal person's role perception. Each role-sender behaves and exerts pressures toward the focal person in ways determined by his own expectations and observations of the focal person's responses. These expectations from various role-senders are, in turn, communicated to the focal person who then formulates his role perceptions. In this interplay, the objective environment serves as the foundation upon which the focal person's role perceptions are determined (32).

In role theory literature, the major research effort is to understand the "malfunctioning" occurring in the process previously described. This malfunctioning is deemed to occur when the role expectations between the focal person and his role senders are not in accord. The magnitude of this malfunctioning is usually represented by two indices—role conflict and role ambiguity.

Role Conflict and Ambiguity

Role conflict is typically defined as the incompatibility or incongruity of expectations associated with a role. Role ambiguity is defined (e.g., 32, 41, 51, 56) as the absence of adequate information which is required in order for the focal person to perform his role in a satisfactory manner. Since a focal person may experience different types of conflict from various sources, role
conflict can be further classified into four different types, as follows (32, 41, 51):

1. **Inter-sender role conflict**: Extent to which role expectations of different role-senders are incompatible;

2. **Intra-sender role conflict**: Extent to which role expectations from a single role-sender are mutually incompatible;

3. **Overload**: Extent to which role expectations communicated to a focal person exceed the amount of time and resources available for their accomplishment; and

4. **Person-role conflict**: Extent to which role expectations are incongruent with the orientations or values of the focal person.

Studies concerned with the impact of role phenomena in the work setting show that role conflict and role ambiguity are detrimental to both individual wellbeing and organizational effectiveness due to the following dysfunctional behaviors:

- Lower perception of organizational effectiveness,
- Unfavorable attitude toward role senders,
- Lower organizational commitment,
- Lower job satisfaction,
- Increased tension and increased turnover (27, 28, 30, 32, 41, 46, 47, 54, 59).

While many questions remain concerning the precise antecedents of role conflict and role ambiguity, some limited empirical work shows that "improper" organizational
arrangements of the role incumbent's work settings induce the occurrence and the magnitude of role conflict and role ambiguity. For example, a case study by House and Rizzo (27) found that improper organizational practices (such as lack of formalized rules and procedures, inadequate top management receptiveness, lack of authority), increased violations in the chain of command, and increased information distortion and suppression had a negative impact on role conflict and role ambiguity. Although this study was made in a manufacturing environment, a similar questionnaire study by Senatra (54) also found that these "improper" organizational practices were significantly related to the role conflict and role ambiguity experienced by audit seniors of a large accounting firm. Additional empirical studies found that role conflict and role ambiguity are also attributable to the following factors: improper job design (40, 45, 48), role incumbent's position level and relative authority to role senders (41, 53, 54), degrees of information feedback (46, 49, 54), and degrees of functional dependency between role incumbent and role sender (49). Finally, a study by Sorensen and Sorensen (58) found that in large accounting firms role conflict can also occur when the professional norms are incompatible with bureaucratic norms.
Conceptual Model of Auditor Judgment on Independence

In this thesis, role theory is used to conceptualize the auditors' (both EAs and IAs) judgment of IA independence. Viewed from this perspective, their judgment of IA independence can be interpreted as contingent upon their role expectations—perceptions of the IA. These expectations, in essence, represent the "standards" for evaluating IA behavior in which his independence is an integral part.

Although there are many factors that may affect IA independence, this thesis concentrates only on those factors related to IA work settings. The importance of the IA work setting to IA independence is supported for the following two reasons:

1. According to Hall's (21) distinction, the organizational base of the IA is a professional department that is part of a larger nonprofessional organization. While the general belief is that the professional in a

* According to Hall (21), the organizational base for professional occupations are of three types. The first type is the autonomous professional organization exemplified by the law firm and the public accounting firm. The second type is the heteronomous professional organization in which the professional employees are subordinated to an externally derived system. Examples of this type of organizational base include: public schools, libraries, and social work agencies. The third organizational base is the professional department (e.g., internal auditing department) which is part of a large organization. For the purpose of this thesis, the nonprofessional organization refers to the second or third type of organizational base as distinguished by Hall.
professional organization (e.g., CPA firm) tends to be more independent than one in a nonprofessional organization (43), it does not necessarily follow that the IA will lack independence due to his employment as a member of a nonprofessional organization. Hall found that lawyers in the legal departments of large organizations enjoyed even a higher degree of professional autonomy than those in law firms. Engle (17) found that bureaucratic organizations do not necessarily limit the professional autonomy of practitioner physicians. These studies suggest that the IA's ability to maintain his independence depends largely on the organizational setting of the internal auditing department.

2. Previous research findings (e.g., 11, 37, 39, 52) indicate that the credibility of the IA's work is determined by the organizational setting of the internal auditing department. As also suggested by role theory, this organizational setting is the major source upon which the perception of IA independence was formulated. Thus, although IA personal integrity and impartiality are admittedly important attributes of independence, it is the perceived independence that is important in determining IA independence.

For the purpose of this thesis, five variables related to the IA's work settings are used to examine both the IA's and the EA's judgment of, or perception of IA independence.
These variables were selected from a large set identified by a review of the internal auditing and the role theory literature. They are characterized by three selection criteria: First, they must be relevant to IA independence, that is, they are potentially likely to be used by the auditor when evaluating IA independence. Second, they must be representative of characterizing the organizational settings of an internal auditing department. Third, they are supported by previous research in both internal auditing and role theory literature.

These variables are as follows:

1. **Scope of internal auditing service**: Are internal auditors normally free from operational responsibilities and from performing other incompatible functions or conflict of interest assignments?

2. **Internal auditor reporting responsibilities**: Does the internal auditor report findings to the adequate organizational level and have frequent access to the board of directors (and its audit committee)?

3. **Scope of internal auditor's audit**: Do internal auditors have enough ability and authority to investigate significant areas of the company's operations and system of internal controls?

4. **Adequacy of organizational support**: Is the internal audit department adequately staffed and funded, and are its
recommendations frequently adopted by the organization?

5. **Formalization of internal auditing policies**: Does the company normally have explicit policies with respect to internal auditor performance standards, internal audit practices, and internal auditor position responsibilities?

Viewed from the role theory perspective, all of these selected variables are ecological in nature in that they indicate how the IA is related to the employing organization via his work setting (e.g., his responsibilities, nature of service, authority, relationship with others, etc.). Collectively, these five selected variables are also the common ones that depict the organizational environment of an internal auditing department.

Given the research findings from both role theory and internal auditing literature, the importance of these ecological variables to the investigation of IA independence is that (a) the EA, these ecological variables represent one of the major sources upon which the EA formulates his evaluation of IA independence, and (b) the IA, these ecological variables have two interrelated connotations: First, these variables are the potential sources of role conflict and ambiguity if they are not properly structured. Second, these variables also represent the major support to the IA in alleviating various pressures from auditees.

Given the importance of these organizational variables to IA independence, the major concerns of this thesis are
how EAs perceive the (relative) importance of these variables in formulating their judgment of IA independence? and (2) how IAs perceive the (relative) importance of these variables in formulating their judgment of IA independence.

In the following discussions the issue of EA judgment will be examined first; prior research studies are reviewed, and two specific research questions are stated. The second discussion is devoted to an examination of the IA's judgment of independence. In this latter discussion, two additional research questions and the research hypothesis are stated.

**External Auditor Judgment**

In order to promote audit efficiency and effectiveness, external auditors usually will evaluate the effectiveness of the client's internal audit function as a part of their opinion formulation process. An integral part of this evaluation is to determine whether or not the internal auditing function is independent. Viewed from the role theory perspective, the EA's evaluation of IA independence can be interpreted as the EA's role expectation of the IA.

* Specifically, EAs' evaluation of the internal audit function can be made at the following stages: (1) orientation and preliminary evaluation of the client's internal control system, (2) audit planning, (3) system evaluation and testing, (4) substantive testing, and (5) aggregation of the result and formulation of opinion (18). For the purpose of this research, the external auditor's evaluation of internal auditor independence is restricted to the initial stage so that the model will not be overly complex.
If EAs have different expectations, then their subsequent judgments of independence will be different from each other. To date, only a limited number of empirical studies (e.g., 1, 9, 11, 52) have investigated how the EA evaluates internal auditor independence. However, these studies vary both in scope of inquiry and research findings.

Clark, Gibbs, and Schroeder (11) use a 2 ANOVA experiment followed by a panel study to examine how external auditors "use" the following five factors to determine IA objectivity:

* Rank: Indicates the relative importance of these factors as perceived by the external auditors as a group.

1. The independence of the IA department;
2. Adequate scope of IA department audit;
3. The ability of the IA department to investigate;
4. Top management support of IA department work;
5. The level at which the IA staff report.

Since only 55 percent of auditor judgment variations were explained by the above ranking, the researchers conclude that substantial judgment variability exists among external auditor evaluations of IA objectivity. However, the highest ranked factor, the independence of the IA department, should be interpreted with caution due to possible semantic similarity between independence and objectivity, which may have induced an experimental artifact.
Brown (9) used a similar ANOVA experiment to examine the EA judgment on the overall strength of the IA function. In his study, the following six factors were considered:

- The IA's audit work during the previous year;
- The IA's reporting level;
- The adequacy of supervision within the IA department;
- The satisfactory of the IA's follow-up procedure;
- The existence of ongoing training program;
- The IA's professional certification.

In his study, Brown found that factors 1, 3, and 4 were related to the IA's work quality, factor 2 was related to the IA's objectivity, and factors 5 and 6 were related to the IA's competency. Among these factors, factor 1 was the most important, with factor 2 second. They accounted for 25 percent and 19 percent of the judgment variations, respectively. The other factors were less important than the first two factors.

Similar in scope to Brown's study, Schneider's (52) study also attempted to model external auditors' evaluations of the internal auditing function as a whole. In phase one of the study, three factors relating to IA objectivity were identified via multidimensional scaling (MDS). These factors are presented on the next page.

*Rank: Indicates the relative importance of these factors as perceived by the external auditors as a group.
1. Top management support of the IA department;
2. Organizational level to which the IA department reports; and
3. Freedom from conflicting duties.

In the later phase of the study, only the last two of the above three factors were incorporated to develop an overall model of external auditor judgment of IA department strength. These two factors as a whole accounted for nearly 25 percent of auditor judgment variation as indicated by numerical conjoint measurement.

Similar to Brown's, Schneider's study also incorporates the IA's work quality and competency. The factors related to these two constructs were as follows:

**Work Quality**

1. Scope of internal audits;
2. Quality and quantity of IA documentation.

**Competency:**

1. Instruction and supervision by senior IA personnel;
2. Internal auditor's experience.

Unlike Brown, Schneider's study found competency was more important than objectivity, although both researchers reached the same conclusion that the quality of IA's work was the most important factor when the EA evaluated the strength of an IA function.
The study by Abdel-Khalik, Snowball, and Wragge (1) adopted a quite different approach to examine the issue of IA function when compared to the previously discussed three studies. Three EDP-audit techniques and two organizational variables were manipulated via a 25 ANOVA experiment to assess their effects on EA judgment in planning audit programs. The findings indicate that IA reporting level was the most dominant factor in determining EA judgment concerning reliance on the IA. Interestingly, the overall judgment variability among auditors in this study was much higher than in both Schneider's and Brown's studies, although all were involved with the examination of the IA function as a whole.

As can be seen from the previous discussion, all of these studies dealt with the examination, or modeling, of the external auditor's judgment of IA function, of which IA independence is an integral part. While these studies certainly made significant contributions in confirming the relevancy of certain attributes related to IA independence, the most disturbing aspect of their findings is the lack of consistent results. For example, in the Clark, Gibbs, and

* These techniques were: integrated test facility, test data and general audit software.

** These two organizational variables were: the IA's reporting level and the IA's level of responsibility in reviewing changes in application programs.
Schroeder study (11), IA reporting level was found to be the least important factor to IA function; however, reporting level was found to be the most important factor in the study by Abdel-Khalik, Snowball, and Wragge (1). While these two studies found high judgment variability among external auditors, Brown (9) and Schneider (9) found relatively low variability. The lack of consistent findings among studies suggests that EAs seem to have no common opinions as to how IA independence should be evaluated. Lack of consensus is also consistent with the Cohen commission's observation which points out that the lack of guidance in SAS No. 9 may induce the variation in audit practice.

The other disturbing aspect of these prior studies is the scope of their inquiry. None of these studies devotes attention exclusively to the issue of internal auditor independence. In these studies, the concept of internal auditor independence was even treated synonymously as internal auditor objectivity by some researchers. For example, both studies by Abdel-Khalik, Snowball, and Wragge (1) and Brown (9) used the IA's reporting level as the only surrogate for independence. Schneider (52) derived a broader view for objectivity from his MDS experiment, yet arbitrarily dropped one factor in later conjoint analysis. However, viewed from Rittenberg's definition stated in Chapter I, objectivity is only a subset of independence.
Given the above discussions, it appears that these previous studies provide only limited evidence as to how the EA views the issue of internal auditor independence. Thus, in this thesis, part of the research effort is to provide further empirical evidence on external auditor judgment of internal auditor independence. Specifically, the empirical evidence provided herein is tailored to answer the following research questions:

Research question one. How does the external auditor perceive the relative importance of five selected factors when exercising judgment on internal auditor independence?

Research question two. What is the degree of consensus among external auditors when exercising judgment on internal auditor independence?

Internal Auditor Judgment

To date, no study has examined how internal auditors perceive their own independence, although such examination may provide important insights to enhance our understanding of the issue of internal auditor independence. In this thesis, role theory is used as a frame of reference to examine how internal auditors perceive their own independence. As suggested by role theory, an internal auditor's judgment of independence can be interpreted as his role perception as an auditor. This role perception is formulated on the basis of the expectations of his role
senders and intervened by his own perception as to what those expectation ought to be (see links 1 and 2 in Figure 2). In the above process, the organizational variables serve two interrelated functions. On the one hand, they represent the major source on which the expectations of the internal auditor and his role senders are formulated. On the other hand, organization variables also represent the conditions that may have a bearing on the internal auditor's ability to maintain independence. If the organizational settings of the internal auditing department, as characterized by these variables, are improperly arranged, two consequences will occur to the internal auditor. First, the internal auditor's ability to remain independent may be impaired. Second, the internal auditor will experience role conflict and role ambiguity. Since these two consequences result from the common source, it is possible that whenever an internal auditor experiences role conflict and ambiguity, his ability to remain independent may also be impaired (see link 4 of Figure 2).

Several observations can be used to illustrate these propositions. A number of writers (8, 16, 62) stress the importance of having the internal auditor report to someone in the organization (e.g., audit committees) who has sufficient authority to support the IA, as well as familiarity with the IA's work. Uecker, Brief, and Kenney
Figure 2--Auditor Judgment of Independence
suggest that the higher the level in the organization to which the IA reports, the more the IA will be perceived as effective in preventing corporate irregularities. All of these studies suggest the importance of the IA's position level and authority to maintain independence. However, these two factors were also found to be inversely related to role conflict and role ambiguity (53, 54, 56). The rationality for this relationship is that the higher the position or authority the IA is granted, the greater his ability to resist the pressures from auditees, thus he becomes less likely to experience role conflict and ambiguity. Furthermore, as a monitoring agent, the IA is faced with increasing demands from audit committees and top management to maintain the effectiveness of the company's internal control systems. However, if the internal auditing department is not equipped with adequate organizational support (e.g., the number of audit staff, the amount of funding), the IA will experience intra-sender role conflict or role overload. Similarly, this also will lead to role ambiguity since the IA will not know precisely what is expected, especially when the organization fails to adopt the audit findings and recommendations.

Finally, an aggressive audit by the IA may threaten the auditee to the point where he may attempt to thwart the audit (42, 38). As any auditor knows, a cooperative auditee makes the task much smoother and can result in a better
audit. Thus, if the company does not explicitly spell out the rules and procedures concerning its internal auditing policies, the IA will experience inter-sender role conflict. This lack of formalization also will induce role ambiguity in that the IA may be faced with either task ambiguity or feedback ambiguity concerning his performance.

Given the above observations, the following research hypothesis is proposed:

**Research hypothesis.** There will be an inverse relationship between role conflict (and role ambiguity) and the degree of professional autonomy perceived by the internal auditor.

The rationale for the above hypothesis can be further supported by the following research findings. A number of studies indicate that improper organizational arrangements tend to impact negatively on the professionals in large organizations due to the potential incompatibility between bureaucratic norms and professional norms. Montagna (43) found that the professionals in nonprofessional firms tend to have less opportunity to exercise their professional autonomy vis-a-vis those in professional firms. Engel (17) and Hall (21) found organizations vary in degrees to which they allow professionals to act in accordance with their professional autonomy; their conclusion was that it is the degrees of bureaucracy that limit professional autonomy.
regardless of the type of organization (i.e., professional vs. nonprofessional). Lengermann's (35) findings are also consistent with those of Engel and Hall. Lengermann found that even within the CPA firm environment, there is a positive relationship between CPA position level and the perceived levels of professional autonomy regardless of firm size. Thus, when the IA's work settings are not properly structured, he becomes vulnerable to bureaucratic influences, which in turn impair or limit professional autonomy and result in role conflict and role ambiguity.

In addition to testing the above hypothesis, this thesis is also interested in exploring the impact of organizational arrangement on internal auditor judgment of independence. Specifically, will the internal auditors' judgment of independence vary because of the differences in the types of role conflict and role ambiguity they experienced? (See link 5 or the joint-effect of links 3 and 4 in Figure 2.)

Given the research findings from role theory, it is not clear how the focal person, such as the internal auditor, perceives the organizational environment when he experienced role conflict and role ambiguity. However, this knowledge is critical for those who wish to take corrective action to alleviate role conflict and ambiguity and to promote independence. The rationale for this argument is based upon the following. First, given the research findings reviewed
earlier, the improper organizational environment not only tends to induce the occurrence of the IA's role conflict and role ambiguity but also limits the IA's professional autonomy. **Second,** according to Kahn and others (32) theoretical framework, role conflict and role ambiguity are multidimensional attributes. Miles and Perreault (41) found individuals, such as IAs, may have different role conflict orientations in that the sources and types of conflict they experience may be quite different from those of others. Their further analysis indicates that individuals with different conflict orientations tend to develop different perceptions with respect to attitude toward role senders, organizational effectiveness, job satisfaction, and job tension.

Taking the above reasonings, it is argued that improper arrangements of each, or a combination of those ecological variables related to the internal auditing department, can be viewed as the source of a specific type of role conflict and ambiguity the IA may have experienced. Consequently, the most effective corrective actions are the ones that are tailored to the specific source of improper arrangement given the types of conflict and ambiguity the IAs experienced.

Given its empirical nature, both the impact of role conflict and the ambiguity on the IA's judgment of
independence need to be investigated from two phases. First, there is a need to examine how IAs exercise judgment on IA independence. Second, there is a need to assess how the IAs' judgment of independence becomes different from that of others given the types of role conflict and ambiguity they experienced.

In this thesis, the above mentioned phases of investigation are translated into the following research questions:

**Research question three.** How does the internal auditor perceive the relative importance of five selected factors when exercising judgment on internal auditor independence?

**Research question four.** What is the degree of consensus reached among internal auditors when exercising judgment on internal auditor independence?

With the evidence provided from investigating research question three, an internal auditor's perception of his organizational environment can also be discovered because an IA's judgment of independence is contingent primarily upon his perception of organizational environment. With the evidence provided from investigating research question four, the impact of role conflict and role ambiguity on the IA's judgment can also be assessed because one can compare whether IAs with different role conflict and ambiguity are also different in the subsequent judgment of independence.
An Analytical Model of Audit Judgement

This thesis uses the Brunswik's Lens Model (BLM) framework to build an analytical model of audit judgement. The purpose of this analytical model is to provide a rigorous conceptualization and representation of the auditors' judgement, or perceptual process when evaluating IA independence. For this purpose, the following discussion examines (1) the nature of BLM studies in audit judgement, (2) their relevancy to this thesis, and (3) their research findings and underlying methodological assumptions.

The Nature of Lens Model Research in Audit Judgement

Brunswik (10), in "The Conceptual Framework of Psychology", provides the conceptual formulation of BLM. Subsequently, Hursch, Hammond, and Hursch (29) introduced a modified form of the lens model together with a formal quantitative analysis of it to describe how an individual decision maker makes judgments in an uncertain environment. The BLM simply posits that individual judgment is a function of a number of factors: (1) environmental predictability, \( R_e \), which can be interpreted as the relevance of the complete information cue set to predict the criterion event, (2) response linearity, \( R_s \), which represents the strength of the individual's cognitive control or judgment insight, and (3) matching index, \( G \), which indicates the degree of similarity between the individual's cue weighting scheme and
that of the environment. These factors and their interrelationships are expressed as follows:

\[ ra = G \times Re \times Rs \]

where,

- \( ra \): achievement index, which indicates the correspondence between the individual's judgment outcome and the actual ex post environment event. This index provides a direct ex post measure of judgment accuracy.

In order to describe the impact of the uncertain environment on an individual's judgment, criterion values must be observable, even if observations may be inaccurate. However, Ashton (3) argues that specification of criterion values in accounting context involves many problems. It is because such criterion values are typically either:

1. separated from the cues by a period of time,
2. imprecise, because of measurement difficulties or
3. affected by events which are uncontrollable by (and possibly unknown to) the decision makers" (4, p. 725). In apparent recognition of criterion problems, the AAA Committee on Accounting

* In fact, Hursch, Hammond, and Hursch (29) formulation was later modified by Tucker (60) as follows:

\[ ra = G \times Re \times Rs + C \frac{1}{1 - Re} \times \frac{1}{1 - Rs} \]

where, \( G, Re \) and \( Rs \) represent the linear components of individual's judgment and, \( C \frac{1}{1 - Re} \times \frac{1}{1 - Rs} \) represent the nonlinear components. The reason for not presenting the nonlinear components will be discussed later.

** The detail discussions for each of the above indices can be found in Libby (35) and Naylor and Schench (48).
Valuation Bases (12) suggests that one can examine the use of information cues by decision makers when the criterion information is in absence. The committee's position is,

If criterion information [is] not available, one may evaluate such bases via experiments that provide judges with data secured via alternative bases and involve examination of the judges' cue-weighting scheme. In effect, this type of approach attempts to provide evaluations based upon the judge's choices (12, p. 550).

In essence, the research approach recommended by the committee is only a partial application of the BLM formulation. This is because under this approach the impact of environmental uncertainty on judgment accuracy is no longer a concern due to the absence of criterion information. Consequently, the committee's approach is concerned only with the use of information cues by the decision maker—specifically, how these cues are combined by the decision maker in reaching the final decision. This research approach has received considerable attention in auditing since most audit judgments are made in the absence of criterion information. A significant number of audit judgment studies have followed the approach recommended by the AAA committee. These studies have examined the following areas: evaluation of internal control, determination of materiality, examination of audit report message and assessment of litigation risk. Although the ultimate objectives of these studies were to understand,
evaluate, and suggest improvements to enhance the quality of audit judgment, the immediate goals were to (1) build mathematical models which paramorphically represent the relative importance of different information cues perceived by the auditor in the judgment process, and (2) measure the extent of judgment variability (e.g., consensus) among auditors. While low variability does not insure high judgment quality, high variability was taken as prima facie evidence of low judgment quality. The significance of this line of research (often called policy capturing) is obvious since judgment is the most important factor in any audit. Mautz and Sharaf emphasize the importance of audit judgment, by writing:

He [the auditor] is a professional judgment maker; many people rely on his opinion. Any error in his judgment may be confounded many times because others will accept his opinion as that of an expert [thus], he has a special responsibility in evaluating the evidence and in forming judgments (40, p. 91).

Policy-Capturing Model

Based upon the preceding discussion, the research approach recommended by the AAA committee (12) is also applicable to this thesis because there is no absolute benchmark against which judgment of IA independence can be evaluated. Such a judgment is a matter of perception. Furthermore, the committee's approach enables this thesis to rigorously represent the EAs' and IAs' perceptual processes when they exercise judgment on IA independence.
Specifically, the auditors' perceptual process can be expressed mathematically as follows:

$$F(y) = F(X_1, X_2, \ldots, X_n)$$

where,

- $F(y)$: dependent variable which denotes the auditor judgment on IA independence,
- and
- $F(X_1, X_2, \ldots, X_n)$: independent variables which denote the auditor's cue-weighting scheme in making IA independence evaluation.

A graphic presentation for this policy-capturing model is also available in Figure 3.

As indicated in Figure 3 this capturing model is concerned exclusively with the decision maker. Thus, the main concerns of the policy-capturing model are (1) between-judge consensus, (2) the relative importance of individual cues in the judgement process, (3) the judges' own self-insight or awareness of their judgemental processes, and (4) the functional form of the judgment rule. Each of these concerns is considered as a potential source of judgment variations.

1. **Between-judge consensus.**—This indicates the extent of agreement reached between two or more decision makers, given a set of normally specified information cues ($X_1, X_2, X_3, \ldots, X_n$) for a particular task (e.g.,
Judge Decision Task Judge

where,

\[ r_a = G R_{sa} R_{sb} \]

\( r_a \): Between-judge consensus

\( G \): Cue-weight similarity

\( R_{sa} \); \( R_{sb} \): Judgement insight of judge a, and b respectively.

If, the above index were measured in terms of multiple regression statistics, then (see Libby, 1981; Ashton, 1982; Hammond, 1980)

\[ r_a = r \hat{Y}_{sa} \hat{Y}_{sb}; \quad G = r \hat{Y}_{sa} \hat{Y}_{sb}; \]

\[ R_{sa} = r \hat{Y}_{sa} \hat{Y}_{sa}; \quad R_{sb} = r \hat{Y}_{sb} \hat{Y}_{sb} \quad \text{where,} \]

\[ \hat{Y}_{sa} = B_{a1} X_1 + B_{a2} X_2 + \ldots + B_{an} X_n \quad Y_{sa} = \hat{Y}_{sa} + u_{sa} \]

\[ \hat{Y}_{sb} = B_{b1} X_1 + B_{b2} X_2 + \ldots + B_{bn} X_n \quad Y_{sb} = \hat{Y}_{sb} + u_{sb} \]

\( r_{isa}; r_{fsb} \): Utilization Coefficient

Figure 3--Policy Capturing Model
evaluation of IA independence). This is denoted as $r_a$, usually referred to as **agreement in fact**.

2. **Cue-weight similarity.**—This represents the similarity of judgement policies between decision makers or whether different auditors ascribe identical cue-weights to the preselected ecological variables when evaluating IA independence. This is denoted as $G$, which is also referred to as **agreement in principle**, and often is considered one of the two major sources of lack of consensus.

3. **Judgment insight.**—Denoted as $R_{sa}$ or $R_{sb}$, this indicates the strength of decision maker's cognitive control—the degree to which he consistently utilizes his judgment policy vis-a-vis the perceived policy as represented by his own model (e.g., whether $r_{sa}$ equals $B_{ai}$).

4. **Functional form of the judgment rule.**—This refers to the manner by which the auditor combines judgment policies when reaching the final decision. Several functional forms are discussed in the literature (7, 15, 24, 45, 52). These functional forms can be broadly classified as compensatory and noncompensatory (35). The judgment rule is deemed compensatory when none of the decision cues has predominant effect on the decision maker's final judgment; rather, each cue contributes monotonically in an additive,
linear, or interactive manner to his final decision. On the other hand, the judgment rule is deemed noncompensatory when some decision cues are so predominant to the decision maker’s final judgment that the effects of the other cues become negligible. Libby (35) and others (e.g., 50) consider that the noncompensatory functional form will tend to occur in the initial stage of decision making in which decision makers use judgment heuristics to rule out some relatively unimportant factors. Compensatory form becomes more likely in the later stage of decision making since all of the remaining cues become important to the final judgment.

In the following section, some selected prior research in audit judgment is reviewed with special references to all of the above mentioned indices. Since the functional form of judgment rules is a debatable topic, a special section will be devoted to investigating this topic in detail.

A Summary of Policy-Capturing Studies in Audit Judgement

Studies of audit judgment based on policy capturing vary remarkably in terms of the issues addressed, their comprehensiveness, and quality. Since the quantity of these studies is also remarkably large, a study-by-study review is beyond the scope of this thesis. Consequently, only a brief synthesis of the findings and research strategies are discussed here. A more detailed review of these research
studies can be found in either Ashton (4) or Libby (35). Two major topics are used to synthesize these audit judgment studies: internal control evaluation and materiality determination.

**Internal control evaluation.**--Ashton (2) presented 63 auditors with 32 hypothetical payroll internal control cases constructed via a one-half 2 factorial design. The auditors were required to evaluate the strength of internal control in each case on a six-point Likert scale. The data from each subject were analyzed via ANOVA and omega square statistics. Six main effects explained, on the average, 80.2 percent of the variance in judgments, while the 15 two-cue interaction explained only 6.4 percent. This indicates that auditor judgment tends to be highly linear due to weak interaction effects (representing configural cue utilization). Cue-weight similarity (consensus) and judgment insight were also high as indicated by correlation analysis. Mean average correlations were .70 and .89 for consensus and insight, respectively. Ashton's study was replicated and extended by three subsequent studies: Ashton and Brown (5), Ashton and Kramer (6), and Hamilton and Wright (22). These three studies used ANOVA factorial design with a few modifications in the number and type of decision cues, and the subject selection in which subjects' audit experiences were manipulated. Their findings are quite consistent with those
of Ashton's 1974 study, although prior audit experience seems to affect consensus and insight (3, 22).

Joyce (31) also focused on auditor judgment of internal control evaluation but in a different area (e.g., accounts receivable). He argues that auditors might tend to agree in their evaluations of internal controls yet disagree about audit time to be devoted to various substantive testing procedures. A one-half replicated 2 factorial design was used. Joyce found auditors' judgments were also highly linear since high-order interactions at two-cue and three-cue levels only explained 3.3 percent of the variance, while main effects accounted for 74.7 percent. As in Ashton's and others' studies, separation of functions was the most important decision cue in determining judgment. Consensus among auditors was low and inversely related to years of experience. Insight was also moderate (Mean = .53), but was not related to length of experience.

Gaumnitz and others (19) tried to reconcile Ashton's finding of high consensus for internal control evaluations with Joyce's finding of low consensus for audit time estimations. They speculated that the lack of consensus in audit time may be attributable to auditors' perceptions as to the strength of internal controls. Consequently, they had auditors make an explicit internal control evaluation, followed by an audit time estimate, for 20 hypothetical
cases adapted from Joyce. Gaumnitz and others found consensus was relatively high for both internal control evaluation (.70) and audit time estimates (.62).

Materiality judgments.—Hofstedt and Hughes (26) studied factors affecting the disclosure decision in an experiment where 19 students acted as auditors. The experimental tool involved judgment on the probability of disclosure of loss from three materiality factors on a scale of 0 to 100. Three factors were varied systematically in a 3 factorial design. All subjects' judgments tended to be highly linear in that addition of interaction effects only increased 3 percent of average linear predictability of the regression model. Significant differences were found among subjects in cue utilization, which indicates a low consensus.

Two studies by Moriarity and Barron (44, 45) attempted to illustrate the use of conjoint measurement techniques to auditor materiality judgment. Their major argument for using conjoint analysis is that materiality is an ordinal variable which should not be analyzed via such techniques as ANOVA or regression, which require inputs at least to have interval scale properties. In their first study (45), the experimental cases were constructed via a 3X3X2 factorial design. Each of the 15 participants (partners of CPA firms) were requested to evaluate 18 cases and rank these cases in
a straight order in terms of the materiality of the item within the experimental case. Axiomatic conjoint measurement analysis was first applied to data analysis to determine the functional form of the auditors' judgments. They found that 11 out of 15 auditors' judgments were either perfectly additive or nearly additive. Numerical conjoint measurement analysis was subsequently performed on the 11 additive models to represent subjects' cue utilizations. As did Hofstedt and Hughes' (26) study, net income was found to be the most important cue. Moriarity and Barron's second study (44) utilized numerical conjoint measurement directly without first examining the functional form of judgment. Their major justification was that an additive form of modeling is sufficiently representative of auditors' judgments given their prior research findings. A highly fractional factorial design (via an orthogonal array method) was used to construct 30 cases in which 5 variables, each with four levels, were manipulated. In both of their studies, Moriarity and Barron found low consensus, although net income was still the most important cue to the auditor when making the materiality judgment.

**Functional Form of Audit Decision Making**

Based upon the preceding summary of audit judgment research, the findings seem to provide a reasonable conclusion that noncompensatory functional form of judgment
rules were not "used" by the auditor. This finding is also consistent with the conventional wisdom in auditing in which auditors tend to be conservative in making audit decisions when all decision cues are important to their final decisions.

Although another important finding is that the decision-maker's judgment could be represented by a simple linear model, it does not preclude the existence of some other models, nor does it suggest that the "reality of human judgment" is sufficiently uncovered. Hoffman (25) refers to such a model as "paramorphic" representation of individual judgment. In fact, many researchers (13, 15, 20, 24, 57) challenge this linear form of representation. In essence, the findings of all of these studies indicates that almost all the predictable variance in judgment is captured by simple linear models. The inclusion of more complicated terms (exponential, configural, etc.) adds very little to the representation of individual decision processes. For instance, Goldberg concludes that "human judges may behave in fact in a rather configurational fashion, but the power of the linear regression model is so great that it serves to obscure the real configural process in judgment." (20, p. 488). Slovic and Lichtenstein conclude their review of the nonlinear issue in multiple regression studies by stating, "The linear model accounts for all but a small fraction of
predictable variance in judgment across a remarkably diverse spectrum of tasks" (57, p. 681).

Furthermore, almost all the empirical studies in psychology, which compare the relative performance of man and his model, have reached the conclusion that linear models, because of their robustness and consistency, typically will outperform their human counterparts (e.g., *13). Dawes and Corrigan (13) explain the reasons for the success of linear models. First, when independent variables (cues) have a conditionally monotone relationship with the criterion dependent variable, or when a higher value on a cue predicts a higher value on the criterion independent of the values of the remaining cues, linear models have been shown to be good approximators of all nonlinear models. Hence, linear models are robust because conditional monotonicity exists in most situations. Second, the relative cue weights derived from a linear model are not affected by "error" in the criterion value. Third, error in the measure of the cues tends to make the optimal function more linear. Finally, Dawes and Corrigan (13) demonstrated that cue weights near the optimal predict almost the same output as optimal weightings. Therefore, if the decision maker knows at least something about the direction of the variables, the weightings will be near optimal.

* See Ashton (4) and Libby (35) for the review of these findings in psychology literature.
To recast briefly the preceding discussions, the policy capturing model used here in this thesis is a modified version of Brunswik's Lens Model. Various studies in audit judgment have used this model to provide rigorous representation of the auditor's judgment process such that an understanding of how the auditor makes judgment can be established. Since the criterion information is absent in most of the audit decisions, studies that applied policy capturing model were primarily concerned with the between-judge-consensus. Consensus, in this context, was used as the benchmark for evaluating the quality of the decision made by auditors. One of the most significant conclusions reached from the policy capturing studies is that the auditor's judgment can be represented (captured) by a small number of variables via a simple linear model. This conclusion was used here in this thesis.
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CHAPTER III

RESEARCH METHODOLOGY

Introduction

In order to accomplish the research objectives stated earlier, the research methodology used by this thesis primarily involved the following three methods. First, a laboratory experiment was conducted to collect data from both internal and external auditors. In this experiment, the auditors were asked to perform two tasks. The first task involved ranking a very brief set of experimental cases, constructed via a one-half fractional factorial design, the purpose of which was to elicit the auditors' judgment of internal auditor independence. The next task required completion of a brief questionnaire, the purpose of which was to elicit the subjects' perception of the organizational environment within which the internal auditors who participated in this experiment currently worked. Second, conjoint measurement analysis was used as the judgment modeling technique. Given each auditor's ranking of the experimental cases, conjoint measurement
analysis was used to represent each auditor's judgment of internal auditor independence. Finally, cluster analysis was used to classify the internal auditors into subgroups based upon their perceptions of their own organizational environment. Each of the above steps is explained in some detail in the following sections of this chapter.

Although this thesis also uses other statistical methods (e.g., multiple regression), these are not discussed in this chapter because these methods, unlike conjoint and cluster, are used frequently in the literature. Thus, to avoid unnecessary repetition, the discussions related to the use of these methods are explained in the next chapter, Data Analyses and Results.

The Laboratory Experiment

Similar to most of the policy capturing studies mentioned earlier in the preceding chapter, this thesis used a laboratory experiment to collect its data. As Kerlinger points out, the laboratory experiment has the inherent virtue of the possibility of relatively complete control, thus, it enables the researcher to "achieve the fundamental prerequisite of any [empirical] research: internal validity" (21, p. 398). In the experiment conducted for this thesis, complete control is accomplished by the following methods:

1. The independent variables to be used to elicit the auditor's judgment of internal auditor independence are
systematically manipulated via a fractional factorial design; and

2. The research situation was isolated, to the extent that is feasible, apart from nearly all possible extraneous influences; that is, the confounding effects to the audit judgment of internal auditor independence were controlled at the maximum.

The following subsections are presented to explain how and why the experiment of this thesis was conducted.

**Experimental Cases Construction**

The experimental cases are the principal component of the experiment conducted for this study. These cases are constructed via a one-half fractional factorial design (10, pp. 189-196). Briefly, the design procedures involved in constructing the experimental cases are as follows:

1. The five organizational variables previously described were treated as the independent variables (i.e., factors). Each was dichotomized into two levels: yes and no;

2. A 2 fully replicated factorial design was then applied to these five yes-no dichotomized variables. As a result, thirty-two possible combinations of these five variables were derived; and

3. Sixteen (one-half) of the above combinations were selected as the experimental cases using the principle of fractional factorial design.
The above procedures are further demonstrated in Figure 4. In this figure, the five organizational variables are denoted as the factors A through E. As defined in Chapter II, these variables are:

A: Scope of internal auditing service;
B: Internal auditor reporting responsibilities;
C: Scope of internal auditor's audit;
D: Adequacy of organizational support; and
E: Formalization of internal auditing policies.

As can be seen clearly from Figure 4, the above (independent) variables—factors were fully manipulated across the thirty-two unique combinations. In this thesis, only the first sixteen combinations (case nos. 1-16) were selected as the experimental cases; the other cases are the aliases of the first sixteen. According to the factorial design principle, these aliases are considered as having the same treatment effects as those of the selected ones when the higher-order interactions are negligible (10, 1950, p.190). Since numerous previous research findings repeatedly indicate that the higher-order interactions are indeed negligible, the use of a one-half fractional replications herein is warranted.
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<td>A B C D E</td>
<td>YES (+) NO (-)</td>
<td>A B C D E</td>
<td>YES (+) NO (-)</td>
</tr>
<tr>
<td>1</td>
<td>- + + + + +</td>
<td>17</td>
<td>- - - - -</td>
</tr>
<tr>
<td>2</td>
<td>+ - + + +</td>
<td>18</td>
<td>- + - - -</td>
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<tr>
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<td>+ + - + +</td>
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<tr>
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</tr>
<tr>
<td>16</td>
<td>- - - - -</td>
<td>32</td>
<td>+ + + + +</td>
</tr>
</tbody>
</table>

* A: Scope of internal auditing service  
B: Internal auditing reporting responsibilities  
C: Scope of internal auditor's audit  
D: Adequacy of organizational support  
E: Formalization of internal auditing policies

Figure 4—Experimental cases profile
Complexity of Fractional Factorial Design

Although the design strategy used in the preceding section was applied extensively in the policy capturing studies, its complexity and limitation warrant some further discussions. First, the circumstances under which the factorial design is appropriate will be discussed. The limitations associated with such a design, as well as the actions taken in the experiment to mitigate the effects of these limitations, will also be discussed.

As a number of research studies (e.g., Ashton, 1979, 1982; Libby, 1981) point out, the factorial design strategy is appropriate when:

1. Multicollinearity exists between decision cues (i.e., independent variables) in the real world setting, and the degree of collinearity is difficult to assess;
2. Cue utilization is the focal point of interest;
3. A study focuses upon educating decision makers; and
4. The researcher is concerned with the managibility of the experiment in order to keep the task within reasonable cognitive and time constraints.

However, similar to other design strategies, the factorial design does have its limitations and shortcomings. The most well known limitation is that the factorial experiment becomes very large and unmanagible as the number of factors and levels is increased. As an example,
consider the experiment used in this thesis which involves 5 yes-no dichotomized factors. With a fully replicated factorial design, 32 possible combinations result. If the number of factors is increased to 6 or the number of factor levels is increased to 3, the number of possible combinations increases to $64 = 2^6$ and $243 = 3^5$, respectively. Thus, in most of the factorial experiments conducted, the researchers always kept the number of factors and their levels at a minimum.

Although the maximum number of combinations in this thesis is only 32, yet it can still induce the problem of subject fatigue if all combinations were used in the experiment. This is because the experimental procedures used herein, as will be explained later, demand the subject to rank the experimental cases. Thus, they are unlike those of the policy capturing studies, reviewed previously in Chapter II, in which subjects were asked to rate the cases on an interval scale. As one can easily notice, the ranking of 32 cases is far more demanding than the rating of these same cases. The one-half replicated factorial used in this experiment is an action taken to alleviate the problem of subject fatigue.

The other limitation of factorial design is that it is often criticized as not representative of a real-world setting. That is, it is weak in external validity. Since
human behavior is viewed as "a joint product of the observing system [the decision maker] and the environment system [the real world]," a too unrealistic task may alter the subject's behavior which may not otherwise be observed in the real-world setting (22, p. 41). The other related problem is that the subject may not be sufficiently motivated to perform "optimally" to provide results which adequately depict what might be done under actual professional conditions (36, pp. 63-64).

All of these criticisms are related to the caveat of mundane realism. However, the lack of mundane reality does not necessarily affect, in fact should not, the validity of this laboratory experiment. As Swieringa and Weick (34) and others (e.g., 7) correctly point out, the purpose of laboratory experiment is to promote not only theory testing but also theory construction and development. Since there are numerous factors that could have an impact on human behavior, and since no theory ever attempts to explain or incorporate all of these factors, deliberate artificiality may be appropriate for the discovery and verification of theories in a "pure" environment created specifically for these purposes. Swieringa and Weick further indicate that what is really important in experiments is to strive for experimental reality. Experimental reality refers to whether or not the events and situations employed in the
experiment are intended to be taken seriously by the participants.

In order to maximize experimental reality, the following courses of action were taken for this study:

1. Decision cue selection was made by extensive review of the literature and testing of validity via a pilot study and discussion with key audit practitioners [an approach suggested by Joyce, 19];

2. Background information of the cases was selected in ways to enhance internal validity. For instance, the company's financial stability, the competency of the internal audit staffs herein, and the quality of their work were controlled and held constant to prevent confounding effects [an approach suggested by Libby, 22, pp. 43-44]. Also, this information was prepared in a very concise manner to avoid subject fatigue due to information overload;

3. The experiment was administered in the presence of the researcher to maximize the subject's understanding of and motivation to the experiment materials; and

In addition, subjects were asked to rank for a second time four of the original sixteen cases after an intermediate task. The rankings on these four repeated cases were used for test-retest reliability purposes. This procedure, in essence, provide an ex post measure of internal validity. (A later analysis shown that subjects were very consistent
in ranking these four repeated cases. The average correlation between the two rankings across all subjects \(N = 56\) is .87.

**Research Sample**

The subjects of this experiment were selected from two groups of audit practitioners. The first group consisted of 39 internal auditors from 17 companies in the Dallas-Fort Worth area. The internal auditors who participated to this experiment were identified and contacted with the help from the Dallas Chapter of Internal Auditors. The selection criteria of the subjects were that the subjects must be in supervisory positions, and the staff size of the internal audit departments they work must be no fewer than 10. These are stipulations because the experimental tasks are very demanding of the subject's professional and administrative experiences in internal auditing. Since prior experience has been identified as an influencing factor in audit judgment studies (3, 4), the above selection criteria were designed to control for such a factor. There was no specific selection criterion concerning industrial classification of the companies for which these subjects worked. This was not stipulated because the notion of internal auditor independence should apply to all internal auditors from various industries.
The second group of subjects consisted of the external auditors who had audited the participating companies in the last audit season. Seventeen external auditors, one for each of the participating companies, were contacted with the help of the internal auditors in the first group. All of the subjects herein were selected based on the criterion that they must be the key persons in charge of the external audit team when evaluating the strength of the company’s internal audit function.

Table I presents the demographic data for the subjects of this experiment. These data clearly show that both groups of subjects, in general, have extensive experience which is related to the issue of internal auditor independence. For example, all of the internal auditors are at senior or higher levels within some very large internal audit departments. All but one company is a New York Stock Exchange listed company with a minimum of nine internal audit staff members. Also, the auditors' experiences in internal auditing are very impressive in that they have an average of 8.34 years of internal auditing experience, and nearly all of them have professional certifications.

All of the external auditors, on the other hand, are at the manager and partner positions within international CPA firms. All are the persons responsible for evaluating the independence of the participating companies' internal audit
### TABLE I

**DEMOGRAPHIC INFORMATION**

#### Internal Auditor

<table>
<thead>
<tr>
<th>(1) Years in Internal Auditing</th>
<th>(3) Current Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 5 Years</td>
<td>Director</td>
</tr>
<tr>
<td>6 - 10 Years</td>
<td>Manager</td>
</tr>
<tr>
<td>Over 10 years</td>
<td>Senior</td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
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<td>13</td>
<td>20</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>39</strong></td>
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<tr>
<td><strong>Average</strong> 8.54 years</td>
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<table>
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<tr>
<td>CMA</td>
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<tr>
<td>CIA</td>
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<td>CISA</td>
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<td>6</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td><strong>37</strong></td>
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</table>

| No Certification             |                      |
|-------------------------------|
| 5                             |                      |

#### External Auditor

<table>
<thead>
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<th>(1) Years in Public Accounting</th>
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</thead>
<tbody>
<tr>
<td>5 - 9 years</td>
<td>Manager/principal</td>
</tr>
<tr>
<td>10 - 15 years</td>
<td>Partner</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
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<tr>
<td><strong>Average</strong> 8.35 years</td>
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</table>

<table>
<thead>
<tr>
<th>(2) Years with Present Firm</th>
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</thead>
<tbody>
<tr>
<td>1 - 5 years</td>
</tr>
<tr>
<td>6 - 9 years</td>
</tr>
<tr>
<td>10 - 15 years</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td><strong>Average</strong> 8.06 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(4) Years Auditing the Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2 years</td>
</tr>
<tr>
<td>3 - 4 years</td>
</tr>
<tr>
<td>5 - 12 years</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td><strong>Average</strong> 4.30 years</td>
</tr>
</tbody>
</table>

* Some internal audit departments visited are the local office, thus, the internal audit staff size of both the local and its headquarter office are reported herein. The size of the internal audit departments visited ranged from 154 to 9.

** All the external auditors were certified as CPA.

*** Some internal auditors have more than one certifications.
function as a part of audit planning. They are also the key persons who make the necessary recommendations to the client company when its internal audit function, including the matters relating to independence, needs to be improved.

Since both groups of subjects have extensive experience in internal auditing, the confounding effects on their judgment, due to lack of experience, were controlled at the maximum.

**Experimental Procedure**

The experiment was conducted in each of the above subjects' office. When contacted, the subjects were asked to allocate about ninety minutes of their time to this experiment. The experiment began with a ten-minute briefing in which the purpose and procedure of this experiment were explained. Also, they were told that all their responses would be anonymous. During the experiment, the subjects were given the following material in sequential order:

1. An instruction sheet described the purpose and the procedure of the experiment. This instruction also contained background information on the experimental cases to control the confounding effects;

2. Sixteen fully randomized experimental cases designed to elicit the subjects' judgment of internal auditor independence. A two-step ranking strategy was used to ease the subjects' ranking of these cases (27). Subjects were
first asked to sort out all sixteen cases into four categories then rank the cases sorted within each category. Subjects were also encouraged to alter any previous rankings in step one or step two while completing the ranking of all sixteen cases. This procedure, together with the randomization of experimental cases, was designed to mitigate the order effect if it existed;

3. A questionnaire designed to elicit the subjects' assessment of the organizational environment of the internal audit department in which each worked (internal auditor) or for which each audited (external auditor);

4. Four repeated experimental cases designed for test-retest reliability purposes. Subjects were told to follow the two-step ranking procedures again when ranking these four repeated cases. Subjects were not allowed to refer to their previous rankings; this process ensured the validity of retest reliability.

Upon the completion of the above materials, subjects were asked to return these materials by mail via a stamped, pre-addressed envelope in order to keep the responses anonymous. Finally, an open-ended discussion was held in which subjects were asked to comment on the experimental cases, the questionnaire, and the issues related to internal auditor independence. In general, no subject felt the experimental cases and the questionnaire were unrealistic.
The experimental materials used in this thesis are included in Appendices A and B. Appendix A contains the materials used by the internal auditors. Appendix B contains the materials used by the external auditors. Notice that in both appendices only one experimental case is presented. The other fifteen cases are the same as the one included except for the prespecified answers to the yes-no dichotomized variables. Also notice that the questionnaire was designed to collect additional information relevant to the issue of internal auditor independence from the subjects. When responding to the questionnaire, the subjects were told to use the participating companies as the frame of reference. That is, for internal auditors, the company for which they currently work is the frame of reference. For external auditors, the frame of reference is the participating company they audited. The following discussion explains each questionnaire in some detail.

Internal Auditor Questionnaire.—The questionnaire responded to by internal auditors is designed to collect information tailored to the following purposes:

1. To assess the impact of role conflict and role ambiguity on the internal auditor's role perception and judgment of internal auditor independence;
2. To examine the impact of role conflict and role ambiguity on the internal auditor's perceived professional autonomy;
To provide demographic information on the subject; and
. To provide guidance for the future extension of this thesis.

The following discussion briefly explains the major components of this questionnaire:

1. Internal Auditor Role Conflict and Ambiguity—These two constructs were measured via the scale instrument developed by Rizzo, House, and Lirtzman (28). Their instrument is applicable to a wide variety of organizations and to various positional levels within a complex organization. This is evidenced by extensive applications of this instrument over the last decade in organizational behavior literature. Schuler, Aldag, and Brief (30) conducted an examination of the psychometric properties of the role conflict and ambiguity scales that included the factor structure, coefficients of congruency, internal reliabilities, test-retest reliabilities, and absolute levels of role conflict and ambiguity. Their findings suggest that the continued use of role conflict and ambiguity scales appears to be warranted. In the questionnaire, the items pertaining to the constructs of role conflict and role ambiguity are in section I. They are identified as follows:

. Inter-sender role conflict: items number 8, 10, 16, 22.

. Intra-sender role conflict: items number 5, 11.
2. **Professional Autonomy** - This construct is operationalized by a six-item measure in section I of the questionnaire (see items number 1, 2, 6, 14, 17, 19). A sample item of this construct is "Our department is able to determine its own course of actions."

3. **Demographic Information** - This information was collected via the questionnaire items in section IV of the questionnaire. Since all this information has been presented and discussed earlier in this chapter, no further explanation is needed.

4. **Information Collected for Future Research** - A large portion of this questionnaire is designed for this purpose. For example, the entire section II is designed to collect data about the subject's turnover intention (items number 1, 4) and perception of the role-sender (items number 2, 3). Section III is designed to collect data about the subject's job satisfaction. Also, in section I, the subject's perception of his own internal audit department was measured by five items (see items number 3, 9, 12, 20, 25). As can be easily seen, these five items are the five organizational variables used in constructing the experimental cases. The subject's responses to these questions provide some
interesting information as to how perception is related to his judgment of internal auditor independence. Chapter V of this thesis further explains the use of this information in future research.

**External Auditor Questionnaire.**—The questionnaire responded to by external auditors was designed to collect information tailored to the following purposes:

- To provide demographic information about the subjects;

and

- To provide guidance for future research.

While the demographic information (see section II) has been presented and discussed earlier, the information collected for future research needs to be explained briefly. The questionnaire items in section I are designed to elicit the external auditor's assessment of the internal audit department he evaluated in the last audit season. Specifically, questionnaire items number 1, 2, 4, 7, 8, and 9 are the scale measure for the level of professional autonomy of the internal auditor as perceived by the external auditor. The remainder of the questionnaire items in this section are designed to measure the external auditor's assessment of the organizational environment of the internal audit department. Again, the use of this information for the future extension of this thesis explained in some detail in Chapter V.
Conjoint Measurement Analysis

Conjoint measurement analysis was used to model auditor judgment on internal auditor independence. The term conjoint measurement (hereafter, CJM) is simply derived from the two words, consider and jointly (23). This technique was initially developed from the fields of mathematical psychology and psychometrics that are used extensively in marketing for analyzing consumer preference and other perceptual judgments (16, 17, 18). In an accounting context, there are limited CJM applications (e.g., 25, 26, 29).

In the following discussions, CJM analysis is examined briefly in the following contexts: First, the use of CJM analysis in modeling judgment, with emphasis on the discussion of the circumstances under which CJM analysis is appropriate; Second, the mathematical formulation and the application of CJM analysis in which different approaches of CJM are discussed. Since all methods, including CJM analysis, have their own limitations, the limitations associated with CJM analysis are discussed whenever appropriate.

Use of Conjoint Measurement Analysis (CJM) in Modeling Judgment

To date, CJM analysis has been primarily applied to the analysis of preference judgments for multifactor alternatives. In essence, this technique measures the
joint-effect of two or more factors (independent variables) on the ranking--ordering of a response (dependent variable). Thus, only ordinal data are required for CJM analysis, while both ANOVA and regression require at least interval scaled data. As Green and Srinivasn (16) also point out, the major difference between CJM and ANOVA (and regression) lies in the measurement scale of the dependent variable, although they all are a decompositional approach when analyzing human judgment. While most of the audit judgment studies use either ANOVA or regression as modeling techniques, one cannot presume that they are applicable to all judgment tasks such as the ones involving internal auditor independence.

As compared to most of the previous research in audit judgment, this thesis is different because it involves the measurement of auditor perception or judgment of internal auditor independence—an ordinal measure at best. All previous studies using ANOVA assume that the dependent variable (e.g., judgment on the strength of internal control) is suitable for interval scale measure, with the rating being unique up to linear transformations. However, when interval scale measures are used, the researcher assumes, knowingly or unknowingly, that the difference between scales is of equal distance. Obviously, such interval scale measures cannot be used to scale the
auditors' judgment of internal auditor independence. To illustrate, Clark, Gibbs, and Schroeder (8) use an interval scale to measure the EA's judgment of internal auditor independence on a four-point rating scale. The use of interval scale measures raises two problems that may threaten internal validity. First, the subjects may not perceive these intervals are of equal distance. Second, even though these scale points are verbally anchored, the descriptive phrases (e.g., "most objective") may have different meanings to different subjects. Moriarity and Barron (26) consider that these perceptual threshold differences may induce higher judgment variations among different auditors.

Since CJM analysis requires only an ordinal measure in which the auditor merely ranks situations according to independence, it is far more realistic than asking the auditor to "create" judgments such as "A is twice as good as B." Also, as Green and Srinivasan (16) point out, ranked data collected are likely to be more reliable because it is easier for the subject to express his preference according to an ordinal scale as compared to an interval scale. However, the use of a ranking procedure to collect data is time consuming, thus creating the potential for subject fatigue and response error when the number of cases is large. This problem is one of the limitations associated with CJM analysis which will be discussed further.
Mathematical Representation and Applications of Conjoint Measurement Analysis

As stated earlier, CJM analysis is concerned with the joint effects of two or more independent variables on the ordering of a dependent variable. CJM analysis consists of two complementary approaches, axiomatic and numerical. The axiomatic approach is primarily used to determine the proper compositional rule of decision makers’ judgment. The numerical approach presumes a composition rule (e.g., additive) and is primarily concerned with searching for the best-fitting scales. These two approaches to CJM analysis are discussed in the following paragraphs.

Axiomatic Conjoint— An axiomatic approach to conjoint measurement asks whether it is possible to create interval scales for the independent variables which, when combined according to a composition rule, are consistent with the ordering of the dependent variable. To answer this question, axiomatic CJM examines the structure of the data set. Given the state of its development, axiomatic CJM currently is designed to diagnose the following four composition rules:

- additive

\[ Y = F_1(X_{j1}) + F_2(X_{j2}) + F_3(X_{j3}) + F_4(X_{j4}) + F_5(X_{j5}) \]

* For illustration purposes, a five-factor model is used since this thesis involves five variables.
**multiplicative**

\[ Y = F_1(X_{j1}) \cdot F_2(X_{j2}) \cdot F_3(X_{j3}) \cdot F_4(X_{j4}) \cdot F_5(X_{j5}) \]

**distributive**

\[ Y = F_1(X_{j1})[F_2(X_{j2}) + F_3(X_{j3}) + F_4(X_{j4}) + F_5(X_{j5})] \text{ and other similar combinations} \]

**dual-distributive**

\[ Y = F_1(X_{j1}) + [F_2(X_{j2}) \cdot F_3(X_{j3}) \cdot F_4(X_{j4}) \cdot F_5(X_{j5})] \text{ and other similar combinations}, \]

where

\[ Y = \text{the dependent variable; the subject's judgment of internal auditor independence given his ranking of the experimental cases}, \]

\[ F_i(X_{ji}) = \text{the effect of independent variable } i \text{ at level } j, \text{ and the functions } F_1, F_2, F_3, F_4, F_5 \text{ are the part-worth functions}. \]

The part-worth functions relate changes in the level of one variable, while holding all other variables fixed, to changes in the dependent variable, perceived internal auditor independence. For interpretation purposes, these part-worth functions are analogous to the standardized regression coefficients of multiple regression or the omega squared of analysis of variance. Thus, they represent the cue-weights the subject ascribed to the independent variables when evaluating internal auditor independence.

Krantz and Tversky (20) provide a diagnostic procedure for identifying whether a data set is consistent with the above four simple polynomials. Briefly, the procedure is
based on five necessary (but not sufficient) properties (axioms) of ordinal relationships: (1) single-factor independence, (2) joint independence, (3) double cancellation, (4) distributive cancellation, and (5) dual-distributive cancellation. Barron (6) also provides a tutorial on the axiomatic approach.

Applications using axiomatic CJM.—Due to its late development, only a few research studies have used axiomatic CJM in modeling audit judgment. Moriarity and Barron (26) applied axiomatic CJM to examine auditor's judgment of materiality. One of their research objectives was to uncover the composition rule of auditor's judgment. By using Ullrich and Cummins' conjoint measurement program (PCJM), their research found eleven out of fifteen auditors' judgment were either perfectly or nearly additive. Schneider (29) also used the axiomatic CJM approach to analyze (external) auditor's judgment of internal audit function. A computer program, CONJOINT, developed by Holt and Wallsten was used to test the composition rule. Schneider also found that fifteen out of eighteen subjects' composition rules were additive.

Limitations of axiomatic CJM.—Although axiomatic CJM has been used for model diagnosis purposes, it is deceptive to claim that axiomatic CJM will provide unambiguous results. First of all, axiomatic CJM can only be used to
diagnose four composition rules: additive, multiplicative, distributive, and dual-distributive, all of which are in the form of simple polynomials. However, if one is to "uncover" the decision makers' judgment rule, then it is too restrictive to presume that the domain of judgment rules must be in the form of simple polynomials. Second, as Krantz and Tversky (20) point out, it is impossible to create a list of necessary conditions (axioms) that will also be sufficient conditions for any composition rule. Thus, even if one restricts oneself to the diagnosis of the simple polynomials form of composition rules, axiomatic CJM analysis provides no guarantee that the composition rules can be satisfactory diagnosed. Third, axiomatic CJM assumes error-free data; therefore, in theory, any diagnostic failures should lead to the rejection of a model. With empirical data, however, it is unlikely that the data are error-free; thus, when a model cannot satisfy all the necessary conditions specified under the diagnosis procedures, it is not clear whether the model is in fact inadequate or the data are noisy. To overcome this problem, most studies using axiomatic CJM have adopted ad hoc rules for a "reasonable number" of errors before rejecting a particular model. For instance, both Moriarity and Barron's 1976 study and Schneider's 1984 study adopted a 20 percent error-rate as the ad hoc rule.
A number of research studies found that axiomatic CJM made numerous errors in determining the composition rules. A study by Emery and Barron (12) found that axiomatic CJM failed to diagnose a dual-distributive model and tended to diagnose nonadditive models as being additive. Another study by Messier and Emery (24) also confirmed the inaccuracy of axiomatic CJM. In this research, they use the experimental materials designed by Moriarity and Barron in their 1976 study. Ten subjects were invited to participate to the experiment. Messier and Emery found identical results to those of Barron and Emery. The major difference between these two studies is that the former study used synthetic, thus error-free data, and the latter study, on other hand, used experimentally derived data. To provide more evidences on axiomatic CJM's diagnostic ability, Emery, Barron and Messier (11) designed a simulation study to test axiomatic CJM's diagnostic ability when error-laden data are used. The simulation results show the complete inability of axiomatic CJM to provide satisfactory diagnoses.

**Numeric conjoint measurement.**—As stated earlier, numeric CJM is primarily concerned with the scaling of the part-worth functions associated with the independent variables. Thus, numeric CJM focuses on the representation of judgment rather than detecting the underlying judgment rules. To scale the part-worth functions, numeric CJM
assumes a composition rule and then searches for the scales that best fit the data. The search most often is an iterative, gradient search technique that minimizes a statistic called STRESS. This measure simply indicates how well or bad the data "fit" a model and is analogous to \((1-R^2)\) of the regression model. Currently, numeric CJM is capable of scaling the part-worth functions for an additive model, a distributive model, and a dual-distributive model. The computer programs for scaling of part-worth functions under each of the above models are also available.

Applications using numeric CJM.—There are many numerical CJM applications in the literature. Most of the applications of numerical CJM are in marketing, and all presume an additive composition rule. In accounting, only three studies have applied this methodology. These studies are by Mariority and Barron (26), Schneider (29), and Mariority and Barron (25). The first two studies use numeric CJM after the results from axiomatic CJM "indicated" that the composition rule is additive. The second Mariority and Barron study used numeric CJM by itself with the presumption that the composition rule is additive.

* The computer programs for scaling a distributive model and a dual-distributive model are called DIST and DULDST respectively. See Emery (13, 14) for detail.
Use of Numeric Conjoint Measurement in Modeling Audit Judgment of Internal Auditor Independence

For the purpose of this thesis, only numeric CJM is used to model the subjects' audit judgment, with the presumption that the composition rule is additive. This is justified for the following reasons:

1. The previous research findings in both accounting and psychology indicate that auditor judgment can be sufficiently represented via an additive model. Furthermore, the research that used axiomatic CJM failed to reject the hypothesis that an additive composition rule is a good representation of auditor's judgment. Thus, the assumption here is not a priori but on the basis of the previous research findings.

2. There is no theoretical reason to believe that any of the independent variables will have a predominant effect on auditors' judgments' on internal auditor independence. Thus, a compensatory additive model is sufficient.

3. As a feasibility consideration, axiomatic CJM, together with the numerical CJM applicable to a nonadditive model, are applicable only to the three-variable case due to its early stage of development. However, this research needs to deal with five independent variables. Furthermore, given the inaccuracy of axiomatic CJM in model diagnosis, it is currently unfeasible to detect the correct judgment rule.
4. Given the exploratory nature of this research, the interpretations of various function forms of judgment are at best ad hoc, if they do become detectable.

5. As Cliff (9) points out,

> It has been observed that psychologists concerned with scaling [modeling] fall largely into two categories; those who are concerned with the construction of exquisite mathematical structures [the axiomatizers] and those who are concerned with methods for wringing a numerical result from a given data sets (the representationalists). It seems to me that there should be no essential conflict between the two approaches. I would agree that if the model is fitted willy-nilly without even examining the data relations themselves to see which kinds of violation have taken place, then the injustice is grave. However, an equal injustice may occur if we attempt to limit our study to data which exactly conform to a consistent axiom set." (pp. 497-498)

Similar to axiomatic CJM, numeric CJM also suffers from limitations. One of the limitations is that numeric CJM, like other scaling techniques, always provides numerical estimates of the scale value whether or not the composition rule is appropriate. Thus, it is impossible for the researcher to determine what is the composition rule. The other related limitation of numeric CJM is that the measure of "goodness of fit" (e.g., STRESS) has no theoretical interpretation when it "significantly" deviates from the perfect fit—zero. Because of this, ad hoc rules have been developed for evaluating the results achieved. Messier and Emery (24) conclude from a review of a number of studies concerning the interpretation of STRESS, that in general
STRESS values as high as 5 to 10 percent are considered indicative of a good fit between a model and a data set. In this thesis, this ad hoc rule as suggested by Massier and Emery is used to evaluate the scaling results. Finally, when Kruskal's MONANOVA program is used, the researcher is faced with the problem of determining the validity of the results achieved because a local rather than global minimum may have been achieved. To overcome this problem, Schneider (29) adopted a multiple-run strategy to check the validity of the results achieved. However, this multiple-run strategy, due to its arbitrary nature, cannot guarantee the optimal solution. Unlike Schneider's, this thesis uses the algorithm that always derives the global minimum. LINMAP, linear programming for Multidimensional Analysis of preference judgments, which was designed by Srinivasan and Schocker (32, 33), is the numeric CJM program that is used in this thesis. LINMAP differs from Kruskal's MONANOVA in that it uses linear programming as compared to the classical calculus method used by MONANOVA. The use of linear programming always enables LINMAP obtain global solutions for the parameter estimates such as part-worth functions and goodness-of-fit measure. The mathematical details underlying LINMAP can be found in Srinivasan and Schocker (32, 33). As a result of performing numerical CJM analysis using the LINMAP program for all the subjects, the information derived is as follows:
1. The derived utility scales for all the experimental cases \((N=16)\) for each subject. These utility scales are consistent with the subject's original rank-orders to the cases he evaluated in the experiment. These utility scales can then be used to analyze inter-subject judgment consensus via Kendall's tau and Spearman's rho correlation statistics;

2. The derived part-worth utility scales for all the independent variables on the subject-by-subject basis. As stated earlier, the part-worth utility function is analogous to the standardized regression coefficient or omega squared; it is thus interpreted for the analysis of scaling results;

3. A measure of goodness-of-fit, which is equivalent to the STRESS measure of Kruskal's MONANOVA. This statistic indicates how well or bad the data "fit" an additive model.

Cluster analysis of Internal Auditors

In this thesis, cluster analysis is used in order to analyze the impact of the organizational environment on the internal auditor's audit judgment. The general purpose of a cluster analysis is to classify a number of "objects" into various clusters so that the objects within the same cluster are more homogeneous than are those between different clusters. Therefore, cluster analysis is a generic term for a wide variety of procedures that can be used to create classification from an initially unclassified data set (15). According to Aldenderfer and Blashfield (1, p. 9), most of
the varied uses of cluster analysis can be subsumed under four principal goals:

1. Development of a classification;
2. Investigation of useful schemes for grouping objects;
3. Hypothesis generation, through data exploration; and
4. Hypothesis testing.

Of these goals, the development of classification accounts for the most frequent application of cluster analysis, while hypothesis testing is the least frequently used. This is because cluster analysis is still under a very primitive, yet rapid, stage of development. Consequently, the use of cluster analysis frequently demands the researcher's heuristic assessments when choosing the analysis procedures and interpreting the research findings.

In this thesis, cluster analysis is used only for the purpose of creating classifications in which the internal auditors considered the objects to be clustered. Specifically, these internal auditors were classified on the basis of their responses to the scale measure of role conflict and ambiguity. As a result, the internal auditors within the same cluster are more homogeneous than those between different clusters, given the types or combinations of role conflict and ambiguity they experienced. These clusters of internal auditors were further analyzed to
determine the characteristics of audit judgment that they had in common.

The following paragraphs briefly explain the cluster analysis procedures used in this thesis. Specifically, the discussions emphasize the justifications and the limitations of the chosen cluster procedures. A comprehensive review of cluster analysis is beyond the scope of this thesis.

**Complexity of cluster analysis**

Since cluster analysis is designed to create homogeneous groups, it is logical to consider that the technique can provide unambiguous evidence about the number of clusters that exist given unclustered objects. Unfortunately, this fundamental step, determining the number of clusters, is still among the as yet unsolved problems of cluster analysis (1, 15, 31). This is because all the clustering methods available to date rely on heuristics rather than statistical inference in determining the number of clusters.

The commonly used methods of clustering fall into two general categories: hierarchical and nonhierarchical. In the hierarchical methods, the analysis begins with N clusters, i.e., each object constitutes its own cluster. In successive steps, the two most similar are classified into...

* For those interested in cluster analysis, a comprehensive discussion of the technique can be found in Aldenderfer and Blashfield (1), Everitt (15), and Sneath and Sokal (31).
one cluster, thus reducing the number of clusters by one. The same procedure is repeated N-1 times until all the objects are classified into one cluster. In the nonhierarchical methods, the clustering is made via an iterative partitioning search process. Briefly, according to Aldenderfer and Blashfield, this partitioning process works in the following fashion (1, pp. 45-48):

1. Begin with an initial partition of the objects into some specified number of clusters;
2. Compute the centroids for each of these clusters;
3. Allocate each object to the cluster that has the nearest centroid. That is, if the object is closest to its own cluster, leave it in that cluster; otherwise, reassign it to the cluster whose centroid is closest to it;
4. Repeat steps 2 and 3 until no objects need to be reassigned.

Both of the above clustering methods require heuristic assessments in determining the number of clusters. Hierarchical methods require an ex post subjective interpretation, while nonhierarchical methods require prespecification.

In this thesis, a nonhierarchical clustering method, K-Means clustering is used because of the following considerations. First, hierarchical methods frequently
result in local optimal, no matter how carefully the interpretation is made, because once an object has entered a cluster, it never leaves that cluster. Consequently, a poor earlier classification of the objects cannot be modified later when all the objects are examined. On the other hand, the K-Means clustering procedure, because of its iterative search process, is frequently capable of producing the optimal solutions regardless of the starting partition (15). Second, when a K-Means clustering method is used, statistical indices (e.g., $F$ ratio) are available to the researcher to guide interpretation. For example, when a K-Means clustering program such as BMDPKM is used, the program produces a test statistic for the equality of means of each of the variables used in clustering the objects.

**Validation Techniques for Cluster analysis**

Although the $F$ ratio statistic is helpful in guiding the interpretation, it is not statistically valid for hypothesis testing purposes. As Aldendefer and Blashfield (1, p. 64) point out, any significant test on the variables used to create clusters is statistically inappropriate. Thus, techniques such as multiple discriminant analysis or multivariate analysis of variance cannot be used in this thesis as cluster validation techniques because cluster analysis, by definition, will separate the objects into clusters that have virtually no overlap along the variables.
being used to create the clusters. Significant tests for differences among the clusters along these variables will always produce positive yet artificial results.

However, cluster results must be validated given the heuristics involved in determining the number of clusters. To validate the clustering results, this thesis uses the technique strongly proposed by Aldenderfer and Blashfield (1, p. 66). Basically, the technique is to perform significant tests that compare the clusters on the variable(s) not used to generate the cluster solution. That is, it is a significant test on the external variables that were not used in the original analysis. The variable selected in this thesis is the professional autonomy perceived by internal auditors. The reason for selecting this variable is that professional autonomy is theoretically relevant to both role conflict and ambiguity. If differences between clusters persist with respect to this external variable, then this is evidence that a useful and valid solution has been obtained.

In the next chapter, the applications of both CJM and cluster analysis to the analyses of the collected research data for this study are further explained. It is worth mentioning again that both statistical methods have their inherent limitations due to their early stage of development. Thus, the limitations discussed in this chapter should always be aware of.
CHAPTER BIBLIOGRAPHY


23. Luce, R. Duncan, and John W. Turkey, "Simultaneous Conjoint Measurement: A New Type of Fundamental


CHAPTER IV

DATA ANALYSES AND RESULTS

Introduction

The purposes of this chapter are to explain the procedures used in analyzing the data collected and to present the results of this research. Specifically, the discussions in the present chapter are presented in accordance with the four research questions stated in the Chapter II of this thesis. These four research questions are as follows:

1. How does the external auditor perceive the relative importance of five selected factors when exercising judgment on internal auditor independence?

2. What is the degree of consensus among external auditors when exercising judgment on internal auditor independence?

3. How does the internal auditor perceive the relative importance of five selected factors when exercising judgment on internal auditor independence?

4. What is the degree of consensus among internal auditors when exercising judgment on internal auditor independence?
In the following sections, these four research questions are investigated in the following sequence: First, both internal and external auditor judgment are modeled using numerical CJM analyses so that their judgment process of independence can be represented. With these modeling results, the degree of judgment consensus reached within the auditor group can then be assessed via correlation statistics. Second, the external auditor's judgment and that of the internal auditor are compared to determine whether or not there is a significant difference between the two auditor groups when they exercise judgment on IA independence. Finally, the impact of organizational environment on internal auditor judgment is investigated in which multiple regression and cluster analysis were used to further analyze research questions three and four.

At the various points of the following discussion, some possible interpretations of the results are also discussed. However, the primary implications of these results are discussed in the next chapter.

Analyses and Results of Auditor Judgment

In the previous chapter, it was stated that the experimental cases were arranged in accordance with a one-half fractional factorial design, and numerical CJM analysis was performed on the data collected from each subject. These methods are very successful in representing the
subject's judgment of independence. Specifically, the subject's judgment is represented via the following additive model:

\[ Y = F_1(X_{j1}) + F_2(X_{j2}) + F_3(X_{j3}) + F_4(X_{j4}) + F_5(X_{j5}) \]

where

\[ Y = \text{the dependent variable; the subject's judgment of IA independence given his ranking of the 16 experimental cases.} \]

\[ F_i(X_{ij}) = \text{the effect of independent variable i at level j,} \]

and the functions \( F_1, F_2, F_3, F_4, F_5 \) are the part-worth utility functions related to the five organizational variables A, B, C, D, and E respectively.

These part-worth functions indicate how each of the five organizational variables was used by the subject when exercising judgment on IA independence; that is, they are the ascribed decision cue weights and are used to represent the subject's judgment process. Other than the part-worth functions, the utility scales of the 16 experimental cases were also derived for each subject. Since these derived utility scales are consistent with the subject's original rankings of the cases he evaluated in the experiment, these utility scales are used to assess the degree of judgment consensus reached between different subjects.
In the following subsections, the external auditors' judgment process and judgment consensus are first presented followed by those of the internal auditors. The judgments of two auditor groups are then compared.

Description of External Auditor Judgment

The external auditors' judgment process are presented by data shown in Table II. As indicated in these data, the "goodness of fit" measure—stress measure, for each auditor is nearly perfect in that the highest stress measure among the 17 auditors is only .024 and 14 of the 17 auditors have the stress measure below .01. Given the "5%-10%" ad hoc rule proposed by Messier and Emery (12), the low stress measures obtained here from the external auditors indicates that their judgment processes are well represented by the additive model. As also indicated in this table, Kendall's tau measure for each auditor is extremely high since all auditors' scores are above .90. These high Kendall's tau scores suggest that each subject was very consistent with himself when ranking the experimental cases. This indicated that the subject attended the experiment seriously. Thus, it is concluded that this experiment did not suffer from lack of experimental realism.

The data shown in Table II also present the relative part-worth utility functions of the five organizational variables for each auditor. The part-worth functions are
### Table II

**EXTERNAL AUDITOR JUDGMENT PROCESS**

<table>
<thead>
<tr>
<th>Auditor No.</th>
<th>Stress</th>
<th>Kendall Tau</th>
<th>Relative Cue-Weights of ORG. Variables</th>
</tr>
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<td></td>
<td></td>
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</tr>
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<td>.9333</td>
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</tr>
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<td>33.80</td>
</tr>
<tr>
<td>17</td>
<td>.0044</td>
<td>.9417</td>
<td>24.30</td>
</tr>
</tbody>
</table>


* ORG. Variables: ORG.A--Scope of Internal Audit Service, ORG.B--Internal Auditor's Reporting Responsibility, ORG.C--Scope of Internal Auditor's Audit, ORG.D--Adequacy of Organizational Support, ORG.E--Formalization of Internal Auditing Policies. Also, % and % stand for rank order and percentage of these cue-weights, respectively.
presented both by percentage and rank-order. The part-worth function, when expressed in a percentage, indicates the magnitude of the cue-weight ascribed by the auditor to the variable. When expressed in rank-order, the part-worth function indicates the relative importance of the variable to other variables.

Two general conclusions can be drawn from the relative part-worth functions presented in Table II. First, all the organizational variables were not perceived as equally important by the auditors. In fact, organizational variables A, Scope of internal audit service, and variable C, Scope of internal auditor's audit, were perceived as more important than the other organizational variables. This is evidenced by the fact that both of these variables, in terms of rank-order, were ranked equally as the most important factor to IA independence by 7 of the 17 auditors. On the other hand, none of the auditors perceived organizational variable E, Formalization of internal auditing policies, as the most important factor to IA independence. On the contrary, this variable was viewed as the least important factor by 10 of the 17 auditors. When viewed from the average percentage of part-worth functions, organizational variables A and C were perceived as almost equally important, followed by variable B, D, and E. Notice that variables A, B, and C were perceived as more than twice as important as variable E.
Second, there is no uniformity across the 17 auditors as to which variable is definitely the least (and the most) important factor to IA independence. Interestingly, all variables except variable C were perceived by some auditors as the least important factor. On other hand, all variables except variable E were perceived as the most important factor by some auditors. The lack of uniformity across the auditors can be further demonstrated by the variability of the percentage of the part-worth functions. For example, viewed from the part-worth function of variable A, the cue-weight ascribed by auditors no. 2 and no. 11 are 50.90 percent and 47.80 percent, respectively. Auditors no. 4 and no. 17, on other hand, ascribed only 21.70 percent and 24.30 percent of the cue-weight respectively to the same variable. Interestingly, although all of these auditors perceived this variable as the most important factor, the magnitude of the cue-weights ascribed by these auditors indicates a sizeable difference.

Judgment Consensus among External Auditors

The judgment consensus reached among external auditors is based upon the utility scales of the 16 experimental cases derived from the auditors. To measure the degree of consensus reached among these auditors, both Kendall's tau and Spearman's rho correlation statistics were calculated. The calculations were made by correlating all possible pairs
of external auditors on their derived utility scales for the 16 experimental cases. Thus, for each set of correlation statistics, 136 correlation indices were obtained \([136 = 17 \times (17 -1) / 2]\). To measure the consensus, the correlation indices within each set were averaged \((3, 16)\). The average correlations are 80.59 percent and 67.18 percent for Spearman's rho and Kendall's tau, respectively. When compared with prior research findings in policy capturing, the consensus indices obtained in this thesis suggest that the degree of consensus reached among the participating external auditors is very high.

To support the above interpretation, the consensus indices of the prior studies reviewed in Chapter II are presented in Table III. As can be seen from these data, among the studies that concluded high consensus, the correlation indices ranged from a low 60 percent to a high 70 percent.

**Description of Internal Auditor Judgment**

The internal auditor's judgment process is presented by the data shown in Table IV. Similar to that of the external auditors, the stress measure of the internal auditors is also nearly perfect. The highest score of this measure is .057 and 29 of the 39 of the auditors have a stress measure below .001. Again, this indicates that an additive model is a good representation of the internal auditors'
TABLE III

A SUMMARY OF AUDITOR JUDGMENT CONSENSUS FROM PRIOR RESEARCH STUDIES

<table>
<thead>
<tr>
<th>Researcher (Year)</th>
<th>Study Focus</th>
<th>Results</th>
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<tbody>
<tr>
<td>Abdel-Khalik and others (1983)</td>
<td>Internal audit function as a whole</td>
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<tr>
<td>Ashton (1974)</td>
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<td>Ashton and Brown (1980)</td>
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<td>Ashton and Krammer (1980)</td>
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<td>Brown (1983)</td>
<td>Internal audit function as a whole</td>
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<tr>
<td>Clark, Gibbs and Schroeder (1981)</td>
<td>Internal audit function as a whole</td>
<td>.35*</td>
</tr>
<tr>
<td>Gaumnitz and others (1982)</td>
<td>Internal control evaluation-account receivable and audit time estimate</td>
<td>.70** .62</td>
</tr>
<tr>
<td>Hamilton and Wright (1982)</td>
<td>Internal control evaluation-payroll</td>
<td>.77**</td>
</tr>
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<td>Hofstedt and Hughes (1977)</td>
<td>Probability of disclosure of loss (from the write down of a subsidiary)</td>
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<td>Joyce (1976)</td>
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<tr>
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</tr>
<tr>
<td>Moriarity and Barron (1979)</td>
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<tr>
<td>Schneider (1984)</td>
<td>Internal audit function as a whole</td>
<td>.73**   .60</td>
</tr>
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</table>

* conclude low consensus.
** conclude high consensus.
*** consensus indices were not disclosed but conclude low consensus.
TABLE IV

INTERNAL AUDITOR JUDGMENT PROCESS

<table>
<thead>
<tr>
<th>Auditor No.</th>
<th>Stress</th>
<th>Kendall Tau</th>
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<td>21.40</td>
<td>22.50</td>
<td>17.90</td>
<td>20.20</td>
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</table>

Avg. Cue-Weights

19.77  23.82  29.96  14.80  12.03

* ORG. Variables: ORG.A—Scope of Internal Audit Service, ORG.B—Internal Auditor's Reporting Responsibility, ORG.C—Scope of Internal Auditor's Audit, ORG.D—Adequacy of Organizational Support, ORG.E—Formalization of Internal Auditing Policies. Also, KK and % stand for rank order and percentage of these cue-weights respectively.
judgment process. The Kendall's tau measures of these auditors are also very high; only 5 of the 39 auditors have a Kendall's tau measure below .80, with the lowest being .70. Thus, it is concluded that the experiment conducted herein was also unlikely to suffer from lack of experimental realism.

Based upon the relative part-worth utility functions presented in Table IV, the two general conclusions reached earlier from analyzing the external auditors' judgment are also applicable here. That is, all five organizational variables were not perceived as equally important to IA independence by the internal auditors themselves. Also, there is no uniformity across the internal auditors as to which variable is definitely the most important factor. For example, all five organizational variables were perceived by some auditors as the most important factor. All variables except variable C were perceived as the least important factor by some auditors. In terms of the magnitude of the cue-weight ascribed by the auditor, individual differences also exist. To illustrate this, auditors no. 11 and no. 29 seemed to place substantial weights to variable C; they ascribed cue-weights of 79.30 percent and 83.30 percent, respectively to this variable. On the other hand, auditors no. 12, no. 30 and no. 32 seemed to place identical yet heavy weights to the first three variables and very light weights to variables D and E.
In spite of the lack of uniformity, variables C and B, however, seem to be perceived as more important than the other variables. Both variables are considered as the most important factor for independence by 20 of 39 auditors and 13 of 39 auditors for variables C and B, respectively. Furthermore, both variables are considered to be the second most important factor by nearly the same number of auditors (11 of 39 and 10 of 39 for variables C and B, respectively). When viewed from the average part-worth functions, the internal auditors, in general, perceived variable C as the most important factor to IA independence followed by variable B, A, D, and E.

As compared to those of the external auditors', the average part-worth functions ascribed by the internal auditors exhibit a different pattern. To highlight this difference, the average part-worth functions of the five organizational variables for both groups of auditors are plotted in Figure 5. As can be seen from figure 5, the major difference between the two groups of auditors is the cue-weights they ascribed to organizational variable A, scope of internal audit service. On the average, the external auditors seemed to emphasize the scope of internal audit service more so than the internal auditors did when evaluating the issue of IA independence. The two groups of auditors seemed to agree as to the relative importance of
Figure 5.—Comparison between internal and external auditor's cue-weight usage.
the other variables to IA independence. Notice that both groups of auditors considered variable C, *scope of internal auditor's audit*, as the most important factor and variable E, *formalization of internal auditing policies* as the least important factor.

**Judgment Consensus among Internal Auditors**

Similar to that of external auditors, the judgment consensus among internal auditors was measured via average correlation statistics. Both Kendall's tau and Spearman's rho correlations were calculated by correlating all possible pairs of internal auditors on their derived utility scales on the 16 experimental cases. For each set of statistics, \(741 \text{ [}741 = 39 \times (39 -1) / 2\text{]}\) correlation indices were obtained. The average correlations are 71.66 percent and 58.57 percent for Spearman's rho and Kendall's tau respectively. Again, the consensus indices obtained suggest that the 39 participating internal auditors, on the average, reached a very high degree of consensus when ranking the experimental cases, although they are not as high compared to those of the external auditor.

In the next section, the internal auditors' judgment is compared to that of the external auditors. Specifically, the comparisons are focused on the testing of the differences noted earlier to determine whether or not they are also statistically different.
Comparison of Judgment of Independence between Internal Auditor and External Auditor

Test of between groups judgment.—As noted earlier, there is a lack of agreement between the two auditor groups on the cue-weights ascribed to variable A, although they both agree on the cue-weights ascribed to the remaining four variables. To substantiate the above observations, t-tests were performed for each of the organizational variables in which the auditor's ascribed cue weight is the dependent variable and his group membership is the independent variable. The results of the t-test indicated that the lack of agreement between the two groups of auditors on variable A is significant at the .03 probability level, while no significant differences were found for other variables.

A possible explanation for this finding is that often the internal audit department is used in the organization as a "backup" function to assist and consult other departments (e.g., accounting and data processing) in performing their duties, even though some of which may be incompatible with internal auditing activities. As a result, some of the internal auditors may have viewed this as unavoidable. (Chapter V shall discuss this implications in more detail.)

Test of between groups consensus.—As also noted previously, the judgment consensus reached within the external auditor group is higher than that reached in the internal auditor group when viewed from both average
Kendall's tau and Spearman's rho statistics. To test whether or not the above observation is also statistically significant, the following procedures were used.

First, within each auditor group, random sampling procedures were applied to both sets of Kendall's tau and Spearman's rho correlation indices in order to select a smaller set of indices. This is because the sizes of the correlation indices (741 vs. 136) for the two groups of auditors are extremely unbalanced. These sampling procedures resulted in four smaller but balanced sample groups. For the external auditor group, the size of sampled correlation indices is 35 for both Kendall's tau and Spearman's rho statistics; for the internal auditor group, the size of sampled correlation indices for these two statistics is 42.

Second, both the Mann-Whitney U test and the \( t \)-test were applied to the above four sets of sampled correlation indices. Specifically, the sampled Kendall's tau indices of the internal auditor group were compared with those of the external auditor group by using both the Mann-Whitney U test and the \( t \)-test. The same procedures were also performed on the sampled Spearman's rho indices of the two auditor groups. The results of these tests are presented in Table V.

* While the \( t \)-test is appropriate to sufficiently test of the between-sample differences, the Mann-Whitney U test was also used as a conservative measure.
TABLE V

TEST OF BETWEEN AUDITOR GROUP JUDGMENT CONSENSUS

<table>
<thead>
<tr>
<th>Sampled Correlation Indices</th>
<th>Kendall's tau</th>
<th>Spearman's rho</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal Auditor Group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample size = 35</td>
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<td></td>
</tr>
<tr>
<td>Mean</td>
<td>.6102</td>
<td>.7439</td>
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<tr>
<td>Std. dev.</td>
<td>.1682</td>
<td>.1614</td>
</tr>
<tr>
<td>Std. error</td>
<td>.0260</td>
<td>.0249</td>
</tr>
<tr>
<td>Maximum</td>
<td>.8408</td>
<td>.9498</td>
</tr>
<tr>
<td>Minimum</td>
<td>.2468</td>
<td>.3188</td>
</tr>
<tr>
<td><strong>External Auditor Group</strong></td>
<td></td>
<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td>Mean</td>
<td>.7196</td>
<td>.8490</td>
</tr>
<tr>
<td>Std. dev.</td>
<td>.1462</td>
<td>.1228</td>
</tr>
<tr>
<td>Std. error</td>
<td>.0247</td>
<td>.0208</td>
</tr>
<tr>
<td>Maximum</td>
<td>.9662</td>
<td>.9926</td>
</tr>
<tr>
<td>Minimum</td>
<td>.3448</td>
<td>.4645</td>
</tr>
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</table>

Test of the equality of means between the IA group and the EA group

<table>
<thead>
<tr>
<th></th>
<th>Mann-Whitney U test</th>
<th>* Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.0010</td>
<td>.0027</td>
</tr>
<tr>
<td></td>
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<td>*</td>
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<tr>
<td></td>
<td>.0031</td>
<td>.0018</td>
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</table>

* Level of significance
As can be seen from the data in Table V, when the two auditor groups were compared with each other via either Kendall's tau or Spearman's rho correlation indices, both the Mann-Whitney test and the t-test showed that the degree of judgment consensus reached within the external auditor group is significantly higher than that of the internal auditor group. The results are expected since the participating internal auditors were selected from various organizations whose judgment may be impacted as a result. In the next section, the impact of organizational environment on the internal auditors' judgment is analyzed in turn.

The Impact of Organizational Environment on Internal Auditor Judgment

The investigation of organizational impact on internal auditors' judgment involves a three-phase analysis. In phase one, the internal auditors' perception of the organizational settings of their own departments is analyzed. Specifically, the analysis is focused on the hypothesized inverse relationship between the auditors' professional autonomy and their role conflict and role ambiguity. The purpose of this analysis is to confirm, empirically, that an improperly structured organizational setting not only induces role conflict and ambiguity but also limits professional autonomy. In phase two, the participating internal auditors were clustered on the basis of the kinds of role conflict
and role ambiguity they experienced. The purpose of clustering was to classify these auditors so that the auditors in the same cluster were more homogeneous than those between different clusters. In the final phase, these clusters of auditors were further analyzed to determine whether or not the auditors in different clusters were also different in the characteristics of their judgment. That is, in this phase, both research questions three and four are further analyzed with explicit recognition of the organizational impact on judgment given the research findings from the previous phases of investigation. The following subsections present the results of each phase's investigation.

The Relationship between Role Stress and Professional Autonomy

As explained in Chapter II, whenever an internal auditor experiences role conflict and role ambiguity, it is also likely that he will experience low professional autonomy. To test this relationship, stepwise multiple regression was used in which the auditor's perceived professional autonomy is the dependent variable and his perceived role conflict and role ambiguity are the independent variables. The results of this testing are presented by data shown in Table VI.

As can be seen from these data, the hypothesized inverse relationship is confirmed because (1) nearly 55
TABLE VI

RELATIONSHIP BETWEEN ROLE STRESS AND PROFESSIONAL AUTONOMY

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Zero-Order CORR.</th>
<th>BETA</th>
<th>Part CORR.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person-role Conflict</td>
<td>-.669 *</td>
<td>-.5727 *</td>
<td>-.5288 *</td>
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<td>-.483 *</td>
<td>-.2426 **</td>
<td>-.2229 **</td>
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<tr>
<td>Role Overload</td>
<td>-.245 **</td>
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<td>n/s.</td>
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<tr>
<td>Inter-sender Role Conflict</td>
<td>-.475 *</td>
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<td>n/s.</td>
</tr>
<tr>
<td>Intra-sender Role Conflict</td>
<td>-.487 *</td>
<td>n/s.</td>
<td>n/s.</td>
</tr>
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</table>

* Probability ≤ .001  
** Probability ≤ .05  
*** Based on stepwise multiple regression results in which Multiple R equals .7425 and R Square equals .5514, and the F ratio is significant at ≤ .00001 probability level.  
**** Not significant at .05 probability level.

2 percent (R = .5514) of the observed variability in professional autonomy is explained by the variations in role conflict and role ambiguity. This relationship is also statistically significant, as indicated by the F ratio at a smaller than .00001 probability level; (2) As indicated by the zero-order correlation, all the independent variables are in the predicted (inverse) relationship with the dependent variable at a smaller than .05 probability level. When viewed from multiple regression results, however, only
the relationships between professional autonomy and person-role conflict, and between professional autonomy and role ambiguity, are statistically significant. This can be seen clearly from both the standardized partial regression coefficients (BETAs) and the part correlation coefficients.

The results from multiple regression indicated in the above must be interpreted with caution. In this analysis, multiple regression is used in a predictive rather than explanatory manner. That is, no attempt is made to assign importance to the relative strengths of the independent variables due to intercorrelations among these variables. This consideration of multicollinearity between the independent variables is based upon role theory, which considers that different types of role conflicts and role ambiguity may be conceptually distinct but empirically correlated (11, 13).

In this research, multicollinearity does exist among the independent variables, as indicated by the zero-order correlations between these variables in Table VII. For example, the correlation between person-role conflict and inter-sender role conflict, and between person-role conflict and intra-sender role conflict, are .561 and .519, respectively; both are significant at a smaller than .001 probability level.

In view of the problem of multicollinearity, neither the standardized partial regression coefficients (BETAs) nor
TABLE VII

CORRELATION BETWEEN INDEPENDENT VARIABLES

<table>
<thead>
<tr>
<th>Role Ambiguity</th>
<th>Inter-sender RC</th>
<th>Person RC</th>
<th>Intra-sender RC</th>
<th>Role Overload</th>
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<td></td>
<td></td>
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<tr>
<td>Inter-sender RC</td>
<td>.346 (.015)**</td>
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<td></td>
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<tr>
<td>Person RC</td>
<td>.384 (.008)</td>
<td>.561 (.001)</td>
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<td></td>
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<tr>
<td>Intra-sender RC</td>
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<td>.600 (.001)</td>
<td>.519 (.001)</td>
<td>1</td>
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<tr>
<td>Role Overload</td>
<td>.100 (.272)</td>
<td>.339 (.017)</td>
<td>.017 (.459)</td>
<td>.491 (.001)</td>
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</table>

* RC: Role Conflict  
** Level of significance

part correlation coefficients presented in Table VI can be interpreted as indicators of the relative importance of variables. Thus, it is inappropriate to conclude that person-role conflict is the most important variable, followed by role ambiguity, in explaining the variation in professional autonomy, while the other independent variables are not important. To explain this, as indicated by zero-order correlations, both inter-sender role conflict and intra-sender role conflict are correlated (at -.475 and -.487, respectively) significantly with professional autonomy, but when multiple regression is used to adjust for the effects of other variables, they become not significantly
correlated with professional autonomy. Given the high correlations between these two variables and person-conflict previously mentioned, it is quite possible that the effects of these two variables are confounded with person-role conflict which, as a result, shows extremely high BETA and part correlation coefficients. The same reasoning can also apply to the BETA and part correlation coefficient related to role ambiguity since this variable is also significantly correlated with all other independent variables except role overload.

To conclude from the above discussions, the results obtained from multiple regression do confirm the predicted inverse relationship between the auditor's perceived level of professional autonomy and the level of role conflict and role ambiguity he experienced. However, given the existence of multicollinearity between different types of role conflict and role ambiguity, no specific interpretation can be made as to the relative importance of these individual role stress variables on professional autonomy.

Cluster Analysis of Internal Auditors

In this phase of investigation, the 39 participating internal auditors were classified via cluster analysis. The analysis was made by clustering the participating auditors on the basis of their responses to the role conflict and role ambiguity scale measures.
A nonhierachical clustering method, K-Means clustering, was used. Since this method, as explained earlier in Chapter III, requires a prespecification of the number of clusters, this analysis began with a prespecification of five clusters in that there are five independent variables involved in the analysis—four related to different types of role conflict and one related to role ambiguity. Since the number of preselected clusters is rather heuristical, four more cluster runs were also made with different preselections of cluster numbers. The results of these clustering are presented in Table VIII.

As shown by data in Table VIII, the cluster memberships of these 39 internal auditors are fairly stable when the number of clusters reached five. To illustrate, when the number of clusters increased from five to six, the memberships of the auditors who are in clusters B to E remain unchanged. All 4 auditors in the new cluster F are from cluster A in the previous step. When the number of clusters increased from six to seven, all the auditors' membership still remained unchanged except for those in cluster C in which 5 auditors now belong to the new cluster G. Given the fairly stable membership, it appears that five clusters may be sufficient to differentiate these internal auditors in terms of the types of role conflict and role ambiguity they experienced.
### TABLE VIII

#### K-MEANS CLUSTER RESULTS

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<tr>
<td>2</td>
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<td>f</td>
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<td>e</td>
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</tbody>
</table>

**K**: The prespecified number of clusters.

**Summarized auditor cluster membership belonging when the number of clusters increased from five to seven.**

***Auditor cluster memberships are denoted as a, b, c, d, e, f, and g in corresponding to the cluster groups A, B, C, D, E, F, and G, respectively.***
To validate the above observations, the strategy proposed by Aldenderfer and Blashfield (2) was used. The variable selected for validating the cluster results is professional autonomy. This variable, as explained in Chapter II, is conceptually related to role conflict and role ambiguity; its relationships with role conflict and role ambiguity are also empirically supported by the evidence presented earlier in this chapter. Thus, professional autonomy is the best available "external variable" to be used in validating the cluster results.

To validate the cluster results, analysis of variance was performed in which the auditor's perceived level of professional autonomy is the dependent variable and his cluster membership is the independent variable. The result of this validation shows that, in terms of professional autonomy, the auditors in different clusters are also significantly different from each other at the .0028 probability level. The above evidence suggests that the five clusters obtained here are valid, or useful, for differentiating the auditors on their experienced role conflict and role ambiguity. This evidence is also consistent with the findings of Miles and Perreault (13), who found that individuals can be grouped on the basis of patterns of specific types of role conflict they experience, and these patterns are significantly different between groups.
The data shown in Table IX present the average scores on the five stress variables for the auditors in each of the five cluster groups. These average scores provided a basis of comparison for the five cluster groups.

**TABLE IX**

AUDITOR ROLE CONFLICT AND ROLE AMBIGUITY PROFILE BY CLUSTERS

<table>
<thead>
<tr>
<th></th>
<th>Cluster A</th>
<th>Cluster B</th>
<th>Cluster C</th>
<th>Cluster D</th>
<th>Cluster E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inter-sender RC</td>
<td>4.22*</td>
<td>2.96</td>
<td>3.54</td>
<td>3.13</td>
<td>2.32</td>
</tr>
<tr>
<td></td>
<td>(.54)**</td>
<td>(.68)</td>
<td>(.80)</td>
<td>(1.24)</td>
<td>(.96)</td>
</tr>
<tr>
<td>Person RC</td>
<td>3.93</td>
<td>2.62</td>
<td>3.93</td>
<td>2.50</td>
<td>1.76</td>
</tr>
<tr>
<td></td>
<td>(1.31)</td>
<td>(.52)</td>
<td>(.64)</td>
<td>(.71)</td>
<td>(.46)</td>
</tr>
<tr>
<td>Intra-sender RC</td>
<td>4.83</td>
<td>2.43</td>
<td>2.61</td>
<td>2.00</td>
<td>1.86</td>
</tr>
<tr>
<td></td>
<td>(.94)</td>
<td>(.67)</td>
<td>(.66)</td>
<td>(.00)</td>
<td>(.38)</td>
</tr>
<tr>
<td>Role overload</td>
<td>4.44</td>
<td>4.57</td>
<td>2.86</td>
<td>1.50</td>
<td>2.14</td>
</tr>
<tr>
<td></td>
<td>(1.51)</td>
<td>(.53)</td>
<td>(.53)</td>
<td>(.71)</td>
<td>(.38)</td>
</tr>
<tr>
<td>Role Ambiguity</td>
<td>4.06</td>
<td>2.36</td>
<td>2.65</td>
<td>5.17</td>
<td>1.88</td>
</tr>
<tr>
<td></td>
<td>(1.10)</td>
<td>(.94)</td>
<td>(.46)</td>
<td>(1.89)</td>
<td>(.61)</td>
</tr>
</tbody>
</table>

* Mean Average  
** Standard Deviation

To facilitate comparison, these average scores are plotted in Figure 6. In this figure, only the average scores of four cluster groups are presented since cluster D consists only of two auditors, which may not be meaningful for intercluster comparison. It should be emphasized that the five cluster groups are quite different with respect to
Figure 6.--Comparison of role conflict and role ambiguity between four cluster groups.
both magnitude and pattern, given their scores on the five stress variables.

Cluster A is characterized by high levels of role conflict and role ambiguity. In fact, in this cluster, the scores of these variables are consistently higher as compared to those of the other cluster groups; the only exception is its score on role overload, which is a bit lower than that of cluster B. On the other hand, cluster E is characterized by low levels of role conflict and role ambiguity. Its scores on all of the stress variables are the lowest among the four cluster groups. Cluster B exhibits a very different pattern in that its score on role overload is the highest among the four groups, but the scores on other variables are relatively low. This suggests that the auditors within this cluster experience too much work, but not other types of role conflict and ambiguity. Cluster C, however, shows relatively low scores on intra-sender role conflict, role overload, and role ambiguity, but relatively high scores on inter-sender role conflict and person-role conflict. It becomes obvious that, patternwise, clusters B and C are very different in that the auditors in these groups experienced different types of role conflicts.

In summary, cluster analysis uncovered five distinct cluster groups that are based on very different combinations of role conflict and role ambiguity the auditors experienced. The next two subsections explore whether or not the auditors
in these different cluster groups are also different in judgment of internal auditor independence. Specifically, the analyses conducted in the following subsections are, first, the auditor's judgment process is analyzed to determine how the auditors, among different cluster groups, use the five selected organizational variables when exercising judgment. Second, the within-cluster judgment consensus is examined for each cluster group and compared with that of the entire internal auditor group to determine organizational impact on judgment consensus.

**Between Clusters Audit Judgment**

To assess how the auditors in different clusters use the five organizational variables when exercising judgment of independence, the average part-worth functions of the five organizational variables for each cluster group were used. These part-worth functions, as presented in Table X, reflect how the auditors in the same cluster use the five organizational variables.
<table>
<thead>
<tr>
<th>Cluster Group</th>
<th>ORG. A</th>
<th>ORG. B</th>
<th>ORG. C</th>
<th>ORG. D</th>
<th>ORG. E</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (N = 9)*</td>
<td>18.59**</td>
<td>24.48</td>
<td>25.90</td>
<td>17.58</td>
<td>13.44</td>
</tr>
<tr>
<td>B (N = 7)</td>
<td>23.30</td>
<td>25.66</td>
<td>33.36</td>
<td>10.47</td>
<td>7.22</td>
</tr>
<tr>
<td>C (N = 14)</td>
<td>19.07</td>
<td>21.68</td>
<td>33.89</td>
<td>14.21</td>
<td>11.27</td>
</tr>
<tr>
<td>D (N = 2)</td>
<td>27.30</td>
<td>25.05</td>
<td>27.90</td>
<td>18.05</td>
<td>9.15</td>
</tr>
<tr>
<td>E (N = 7)</td>
<td>17.00</td>
<td>25.07</td>
<td>24.53</td>
<td>15.82</td>
<td>17.34</td>
</tr>
</tbody>
</table>

* The number of auditors in the group.
** The percentage of cue-weight the auditors, on the average, in the same cluster group ascribed to the variable.

To facilitate comparison, these average part-worth functions are also plotted in Figure 7. Since cluster D consists of only two auditors, its part-worth functions are not plotted in this figure.

As can be seen from Figure 7, clusters B and C exhibit nearly identical patterns in these part-worth functions. In both cluster groups, variable C has the highest part-worth function followed by those of variable B, A, D, and E, respectively. It should be emphasized that the percentage of cue weight the auditors ascribed to variable C is much
Figure 7.—Comparison of cue-weight usages between four cluster groups.
higher than that of other variables. This suggests that the auditors in clusters B and C considered variable C as a much more important factor to IA independence than other variables. On other hand, the auditors in clusters A and E also exhibit nearly identical patterns in part-worth functions. Unlike those in clusters B and C, the auditors in clusters A and E seem to ascribe more "balanced" cue weights to the five organizational variables, although the cue weights they ascribed to variables B and C are higher than those ascribed to other variables.

When considering the nature of role conflict and role ambiguity that characterizes these cluster groups, two interesting observations are unveiled. First, as discussed earlier, the auditors in cluster B scored very high on role-overload but not on other scale measures, while the auditors in cluster C scored relatively higher on inter-sender role conflict and person-role conflict as compared to others. Both groups of auditors, however, ascribed nearly equal heavy cue weights to variable C. On the other hand, the auditors in cluster A (E) scored consistently high (low) on all the stress variables measures. The auditors in these two cluster groups seem to ascribe more "balanced" cue weights to the five variables. The identical cue-weight patterns ascribed by the auditors in groups A and E are easily comprehensible, since both groups experience similar types of role stress despite differences in the magnitude of
role stress. With respect to the cue-weight patterns ascribed by groups B and C, it is not clear why the patterns are identical even though the conflicts these auditors experienced are different in kind. One possible reason is that there are high degree of multicollinearity among different kinds of role conflicts as indicated earlier.

Second, the auditors in group B who exhibit the highest score on role overload also ascribe a relatively heavier cue-weight (23.30%) to organizational variable A compared to those in other groups. This means that the auditors who experience too much work tend to consider that the performance of operational responsibilities becomes a greater threat to independence. A possible explanation for this finding is suggested by Kahn and others (11), who consider role overload as a kind of conflict in which a focal person is overwhelmed with legitimate expectations because of performing a wide variety of tasks. However, it may be virtually impossible for him to complete all tasks within the limit of his ability given the time limits. As a result, the focal person is faced with a conflict of priorities: he must decide which expectations to comply with and which to hold off. To an internal auditor, if he must hold off his audit responsibilities (e.g., timing and scope of audit) because of operational responsibilities, it is not surprising that he viewed the improper scope of audit service as a threat to independence.
In summary, based upon the descriptive statistics discussed earlier, the internal auditor's judgment process seems only moderately affected by his perception of role conflict and role ambiguity. The auditors in clusters A and E, given the identical types of experienced role conflict and ambiguity, are similar in cue-weight usage, and their cue-weight usage patterns are also different from those auditors in clusters B and C. However, the auditors in clusters B and C also exhibited identical cue-weight usages, even though they experienced quite different role conflicts and role ambiguity.

Within Cluster Judgment Consensus

In order to assess the degree of judgment consensus among auditors within the same cluster, averaged correlation statistics were calculated for each cluster. Similar to the procedures discussed earlier, within each cluster, both Kendall's tau and Spearman's rho correlations were calculated by correlating all possible pairs of auditors on their derived utility scales on the experimental cases. These correlation indices were then averaged. The results are presented in Table XI.
TABLE XI

MEAN AVERAGE CORRELATION OF WITHIN CLUSTER
AUDIT JUDGMENT

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<tbody>
<tr>
<td>Spearman's rho</td>
<td>71.93</td>
<td>73.95</td>
<td>72.03</td>
<td>82.27</td>
<td>80.04</td>
</tr>
<tr>
<td>Kendall's tau</td>
<td>57.31</td>
<td>59.36</td>
<td>58.01</td>
<td>70.75</td>
<td>65.39</td>
</tr>
</tbody>
</table>

* The number of correlation indices within the cluster; each represents the correlation between a pair of auditors' rankings on the experimental cases.

As can be seen from these data, the degree of consensus reached within each cluster is also very high. This means that the auditors who experience similar role conflict and role ambiguity are also quite similar when ranking the experimental cases in audit judgment. These results are expected since the auditors within the same cluster are homogeneous with respect to the types of experienced role conflict and role ambiguity. However, when compared to the average correlation statistics for entire internal auditor group (Spearman's rho = 71.66%, and Kendall's tau = 58.57%), the average correlation statistics of clusters A, B, and C are higher only by a very small margin. Only the judgment consensus of cluster E is notably higher than that of the entire internal auditor group.
Notice that the average correlation statistic for the entire internal auditor group represents the grand mean for the correlations between all possible pairs \((N = 741)\) of auditors' rankings; most of which are between auditors with heterogeneous experiences in role conflict and role ambiguity. Thus, this average correlation statistic should be much lower than that of each cluster if the auditor's judgment of independence is affected by the role conflict and role ambiguity he experienced. In view of the marginal differences between the consensus indices of the cluster groups and that of the entire internal auditor group, it seems that the internal auditors' judgment consensus is not affected by role conflict and role ambiguity.

Summary of Research Findings

The major research findings presented in this chapter can be summarized as follows:

1. The five organizational variables were not perceived as equally important by both internal and external auditors. In fact, variable C, scope of internal auditor's audit, is considered by both groups of auditors as the most important variable to internal auditor independence. On the other hand, variables D, adequacy of organizational support, and variable E, formalization of internal auditing policies, are considered to be of relatively less importance to independence by the two groups of auditors.
2. Both groups of auditors disagree, significantly, on the relative importance of variable A, scope of internal audit service. The external auditors considered this variable almost equally important with variable C, while the internal auditors considered it is even less important than variable B, internal auditor reporting level.

3. Within each auditor group, large individual differences existed; each variable is the most important for at least one auditor, and each variable, except for variable C, is the least important for at least one auditor.

4. On the average, the degree of judgment consensus is high within each auditor group, although the degree of judgment consensus is significantly higher in the external auditor group.

5. The internal auditor's perceived role conflict and role ambiguity are inversely related to his perceived level of professional autonomy which suggests that an improperly structured organizational environment is detrimental to professional autonomy.

6. The internal auditor's judgment is not notably affected by the perception of his own organizational environment. It is based upon the following results:
   
   a. Cluster analytic procedures showed that the participating internal auditors are not only different in the types of role conflict and role ambiguity they experienced but also different in the
levels of professional autonomy they experienced. However, the auditors in different cluster groups only exhibit moderate differences in cue-weight usages and virtually no differences in judgment consensus.

The results of the research are discussed in more detail in Chapter V. Specifically, the discussions are to focus on the implications and limitations of these results and to suggest the directions for future research.
CHAPTER BIBLIOGRAPHY


CHAPTER V

DISCUSSIONS, CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The value of internal auditing and the viability of the auditor's role in the organization depend upon the fundamental assumption that internal auditors are independent. Although independence is basically a "state of mind," internal auditors' ability to maintain independence and to be perceived as such are affected immensely by the organizational settings of internal audit department. In the following sections, the research findings of this study are first discussed, followed by conclusions and suggestions for future research.

Discussion

One of the important findings of this research is that both groups of auditors perceived the scope of internal auditor's audit as the most important factor of independence. This finding is also consistent with both Brown's (3) and Schneider's (10) findings, although their research objectives are different from those of the present study. Both Brown and Schneider found that this variable is perceived as the most important factor by external auditors when evaluating
the effectiveness of the internal audit function. In the present study, the same variable is also found to be the most important factor to internal auditor independence, even though independence is only a part of the evaluation of internal audit function.

Some participants commented that if the internal audit department is restricted from investigating certain areas of internal controls, it suggests that the internal auditors are not free from undue interference from management or from the auditee. Some external auditors specifically viewed this as inadequate audit coverage which is also an indication of poor work quality for an internal audit. As a result, the extent of their reliance on the internal auditor will be very limited. The implication of this findings is that the internal audit department should always strive for the full authority to determine its scope of audit, and it should also avoid personal or managerial influences leading to exclusion or limitation of any area that would have been included in the audit.

The next important finding is that both groups of auditors disagree, significantly, on the relative importance of variable A, scope of internal auditor service. While external auditors considered this variable as almost equally important as variable C, scope of internal auditor's audit, internal auditors considered it is even less important than variable B, internal auditor reporting level. To illustrate
this further, data in Table IV indicate that 8 of 39 internal auditors (auditor no. 1, 9, 11, 16, 17, 23, 29, 38) ascribed only a very light weight to this scope of service variable. On the other hand, none of the external auditors ascribed a light weight to this variable (see Table II).

This finding is disturbing in that it suggests a potential source of conflict between the two audit groups. As mentioned previously, often, internal auditors are expected to back up and consult other departments whenever their expertise is needed. (This situation is analogous to an accounting firm providing consulting services to its client company, while serving as an external auditor.) Some participating internal auditors commented that their companies use the internal audit department as a "training ground" for persons interested in accounting related functions. As a result, the internal auditors who ascribed a light weight to the variable in question may have viewed the performance of operational duties as unavoidable and as opportunities to provide services. On other hand, clearly the external auditors did not perceive this as a trivial threat to independence. Consequently, a conflict between the two may develop. The issue can be further compounded since currently there are no clear guidelines from both the IIA and AICPA on the proper boundaries of internal audit
services. That is, there is no standard "benchmark" to which the auditors can appeal as a means of settling their disagreement.

Lack of clear guidelines also poses a problem on internal auditor independence. To top management, the resources devoted to the internal audit department are substantial. Thus, to avoid idle capacity and maximize return on investment, there is a tendency to make the internal audit more than "just an audit department." To some internal auditors, performing operational duties can be a stepping stone to a broaden future career path, to a smoother working relationship with auditee, and to a better understanding of auditee's operation for a more efficient and effective audit. Admittedly, all these arguments are frequently proposed to justify the internal auditor's involvement in operational duties. For example, in the area of EDP system design, many companies utilize internal auditors as advisors to system development teams. The proponents hold that internal auditors can provide valuable advice on control and security issues during the design phase when control features are most economically incorporated into computer-based systems.

In this study, clearly external auditors and a large proportion of internal auditors perceived that performance of operational duties is a threat to independence. Also, in the previous chapter, when analyzing between-cluster audit
judgment, it was found that the auditors who experienced high role overload (cluster C) also considered the performance of operational duties as a threat to independence. These findings, in essence, challenge the wisdom of having internal auditors perform operational duties without proper limits.

What also is needed is a set of guidelines on how to participate in these areas without making auditors lose their de facto independence. When discussing the issue of external auditor independence, Mautz and Sharaf write that "In a great many cases, however, the greatest threat to independence is a slow, gradual, almost casual erosion of his honest disinterestedness" (9, p. 208). The same argument is also applicable to internal auditor independence. Within any profession, there is a considerable range of individual abilities to resist the forces influencing professional judgment. The internal audit profession is no exception. Thus, to establish proper guidelines on the participation of operational duties becomes critical to minimize the opportunities of "misparticipation."

The findings concerning the internal audit reporting level are also interesting. At group level, this variable was not ranked as the most important factor by either audit group, although it is definitely an important factor when

* Also, by the very nature of a profession, the scope of its services must have limits, else how can it be recognized?
viewed from the ascribed cue-weight of both groups. Thus, this implies that it is not appropriate to use this variable as the only surrogate for internal audit independence. Some participants commented that reporting to the board of directors and audit committee complements the scope of the internal auditor's audit by promoting the auditor's authority, and enhancing the channel of communication. However, the high reporting level can be purely cosmetic if the board members do not have the commitment to fully support the auditors' work. Viewed from this perspective, the enactment of FCPA of 1977 (and other attempts) which designated the legal responsibilities on these corporate executives, seems to be also in the right direction to enhance internal auditor independence.

The relatively light cue-weights ascribed by both audit groups to variables D and E suggest that these two are not as important to independence when compared to the first three variables discussed earlier. Variable D, adequacy of organizational support, has two dimensions. The first concerns the funding and staffing of the internal audit department, thus it indicates *ex ante* support. The next dimension concerns the acceptance of internal auditors' recommendations, thus it indicates *ex post* support. Some participants commented that these are necessary but not sufficient conditions to independence because resources can be used inefficiently, and legitimate recommendations may
not always be cost effective. While their comments may explain why some participants discounted the relative importance of this variable when evaluating independence, the results must be interpreted with caution. First, in the long run, an internal audit department cannot consistently lack organizational support without losing its auditors' confidence and authority. Thus, its impact on independence become obvious. Second, at the individual level, the ascribed cue-weight of this variable is still heavy (e.g., around 20 percent) for a notable portion of auditors from both groups (see Tables II and IV). Thus, the average cue-weight at group level obviously included significant offsetting effects from the auditors who heavily discounted the importance of this variable because of the reasons explained earlier.

Variable E, formalization of internal audit policies, is perceived as the least important factor to independence by both groups of auditors. As discussed in the literature, this variable is important to independence in that it makes the auditor's audit more "routine," thus it reduces the auditee's ability to influence the auditor's decisions. Furthermore, it facilitates the quality control of the auditor's work to mitigate the possibility of a lack of de facto independence. In this study, however, this variable was found to be not as important as the literature has
suggested, given the ascribed average cue-weight by both audit groups, still, it is perceived as a nontrivial threat to independence by some participants. One possible explanation of this event is that internal auditing consists of two types: financial and operational. Internal auditing of financial data concerns compliance of prescribed control procedures. When performing audits of this type, the auditors may perceive that formalization of internal audit policies is needed and helpful to maintain independence. On the other hand, internal auditing of operational data concerns operational efficiency and effectiveness. By its very nature, the evaluation of efficiency and effectiveness involves qualitative and uncertain information, and there is no one "right" way to perform such an audit. As a result, formalized policies may not be viewed as critical and needed by some participants. It is then possible that the average cue-weight at the group level may have included significant offsetting effects from those participants. However, the scope of this study did not allow the substantiation of this tentative explanation. Thus, additional investigation is needed to explore further the difference between operational and financial audits.

Another important finding is that, on the average, judgment consensus was fairly high at the group levels, even though a notable level of individual differences was found in the weights ascribed to the organizational variables.
This finding is consistent with that of the prior studies in policy capturing. Ashton (1), for example, found large individual differences in cue-weighting, yet the average judgment consensus at the group level was found to be high. Schneider (10), who uses a different modeling technique from Ashton's, also found this phenomenon. In fact, this phenomenon is due to the robustness of the linear model with respect to weighting parameters (2, 4). As a result, in policy making, the impact of individual differences found in this study should be carefully evaluated despite the high average consensus reached at the group levels. To evaluate such an impact, the following characters of individual differences need to be considered. First, individual analyses revealed that all five organizational variables are perceived by the participants as threats to internal auditor independence, even though their perceptions varied on the magnitude of the threat. This implies that policies which mandate the adoption of these five variables for independence evaluation should encounter little or no resistance from practice. Second, to external auditors, the variations in the ascribed cue-weights suggest a potential problem. Viewed from Bayesian decision theory, differentiation in ascribing cue-weights represents variation in assessing the prior probability (6, 7). Since the evaluation of internal audit independence is an
important part of audit planning, and since the auditor's decision processes are probabilistic in nature, such variation in assessing "priors" may affect the scope and quality of the audit. Thus, the task facing the external audit profession is to identify the causes of these individual differences and to examine possible remedies for the problem. For example, if the causes are attributable to lack of guidance in the professional standards, then more guidance should be provided. If the causes are purely attributable to the cognitive differences among individual auditors in decision making, then more training and education are needed to mitigate the effects of these differences.

In this thesis, attempts were also made to examine the impact of the internal audit department's organizational setting on its auditors' judgment of independence. The investigation involved a three-phase analysis. The purpose of phase-one was to confirm the research hypothesis that there will be an inverse relationship between the auditors' professional autonomy and their role conflict and role ambiguity. In phase-two, the purpose was to determine whether these auditors were systematically different with respect to the kinds of conflict and ambiguity they experienced. In the final phase, the characteristics of the auditors' judgment were analyzed in light of the nature of experienced role conflict and role ambiguity so that the
impact of the auditors' experienced conflict and ambiguity on their judgment could be assessed. The results of these analyses are discussed in the following paragraphs.

The results of the phase-one analysis indicate that there is an inverse relationship between the auditors' professional autonomy and their role conflict and role ambiguity. Based upon role theory, this suggests that an improperly structured audit department not only induces the occurrence of role conflict and role ambiguity but also impairs its auditors' professional autonomy. Note that professional autonomy means whether or not the auditors are free to do their audit work and exercise professional judgment. Thus, if auditors perceived low levels of professional autonomy, it suggests that their ability to maintain _de facto_ independence was also impaired. This finding has profound implications for the internal audit profession. Unlike their counterpart auditors, the internal auditors' organizational base is part of a larger nonprofessional environment. Given the very nature of this type of organizational base, the auditors' work is bound to be subject to bureaucratic influences if the audit department is not properly structured to allow its auditors to alleviate the conflicts that arise between professional norms and organizational norms. This is because the internal audit profession is not highly "restrained" from,
thus "supported" by, what may be described as "built-in anti-independence factors" (e.g., legal liabilities).

In phase-two, the results show that the auditors varied considerably in the nature of experienced role conflict and ambiguity. Although this analysis is directed to cluster subjects for further examination of their judgment characteristics, the finding has an important implication for future role theory research. The multivariate nature of role conflict and ambiguity is explicitly recognized in Kahn and others' (7) framework. In the present study, when cluster analytic procedures were used, the multivariate nature of role conflict and ambiguity was also empirically confirmed. This means that the univariate-averaging approach to conflict variables, frequently used in recent research in organizational behavior, may obscure the real nature of the conflict and ambiguity an individual experiences. As a result, the suggested remedies from these studies to alleviate role stress may not be successful or effective.

In the final phase of analysis, it was found that the auditors' judgment characteristics, both cue-weights and consensus, are not notably affected by the nature of their experienced role conflict and ambiguity. This means that the auditors' judgment of independence is not affected by their perception of their own organizational environment. However, this observation is only tentative and needs to be
interpreted with caution. Lack of notable differences across different clusters of auditors may be attributed to the following two reasons. First, the existence of multicollinearity between different types of role stress variables may have undermined the distinctive nature of role conflict and ambiguity the auditors experienced. Second, the magnitude of role stress experienced by the auditors in each cluster was only moderate. This can be seen clearly from the data shown in Figure 6 (Chapter IV). Note that cluster A is the one which exhibits the highest scores on nearly all the stress variables. However, these variables only scored between 4 and 5, even though the measure is based on a 7-point Likert scale. Thus, in future research, the above mentioned causes should be taken into consideration. One possible way to mitigate these empirically caused problems is to increase the sample size. With a large sample size, the problem of multicollinearity can be overcome via factor analysis so that the highly correlated stress variables can be combined. The larger randomized sample size could also help to induce higher variations in the stress measure.

Conclusion

This study examined the judgment of two expert groups of auditors concerning the issue of internal auditor independence. Five organizational variables were selected
to model their judgments of independence with the purposes of examining how they use these variables and what is the degree of consensus. While the modeling results show that some variables are more important than others, none of these variables should be interpreted as unimportant to internal auditor independence. To both internal and external auditors, the modeling results should be very useful in that the average cue-weights, in essence, highlight the decision process of their counterpart auditors. To policy making bodies such as the AICPA and the IIA, the results indicate how their standards were implemented by the practitioners in the field. Thus, they provide valuable feedback to these authorities. To the top management and audit committees, the results can serve as important inputs to strengthen the company's internal audit department. As this research also indicates, when the internal audit department is not properly structured, the auditors not only suffer from role conflict and role ambiguity but also experience low professional autonomy. The latter, in essence, represents a lack of de facto independence. Thus, if the top management and audit committees are to use internal audit staffs to discharge accountability demanded by the public, the organizational settings of internal audit departments must be carefully structured.
Similar to other laboratory experiments, the findings and conclusions of this study are subject to several limitations. First, a laboratory experiment is often weak in external validity, the results should not be over generalized beyond the laboratory setting. For example, as a repeated measures' factorial design, the variables analyzed must adapt to the levels represented in the experiment—in this study, "yes" and "no." To the extent that this dichotomy fails to reflect the real world setting, the subjects may behave differently than they would in real world settings. The next limitation is that the subjects of this study are extremely experienced compared to the general population of both internal and external professionals. Note that the participants of this study were identified by the Dallas Chapter of Internal Auditors. While its assistances are invaluable in gaining the participants' cooperations, these participants may not be representative due to nonrandom selection. Thus, the degree of consensus reported in this study may be overstated compared to what is actually achieved in practice. Another limitation is the possible threat caused by demand characteristic, that is, subjects may attempt to respond cooperatively with the researcher's intent. In this study an effort was made to reduce the likelihood of this type of reaction by presenting the research materials and wording the instructions for the experiment task in as neutral a manner as possible. In
addition, since the research instrument also contained questions collected for future extension of the present research, the researcher's intent was disguised considerably.

Suggestions for Future Research

This thesis has raised more questions than it has answered. While some of the suggestions for future research have been made when discussing the research results, additional extensions of the present study are required to increase our knowledge in this virtually neglected area.

One fruitful extension of the present study is to change the method of inquiry from a laboratory experiment to a field study. As discussed earlier, laboratory experiment is weak in external validity due to its intended artificiality. When a field study is used, real companies instead of hypothetical ones can be used to examine the issue of internal auditor independence. This alternative method of inquiry was considered in the present study. Recall that in the questionnaire, both internal and external auditors were asked to respond to a set of questions concerning the organizational settings of the participating internal audit departments. These questions are also the ones used in constructing the experimental cases in the present study. Since the subjects were asked to use these real life participating departments as their frames of
reference when responding to these questions, their responses can be compared with conjoint modeling results to see the extent of agreement between the two methods of inquiry.

The next possible extension of the present study is to incorporate managements' views of internal auditor independence. Specifically, how do the top management and audit committees evaluate their internal audit department? What is the extent of agreement between the evaluations of independence by these corporate executives, the external auditors, and the internal auditors? Viewed from role theory, the top management and audit committees are the primary role-senders of the internal auditors. Thus, their perceptions of internal audit independence represent very powerful role expectations with which internal auditors may need to comply. If their expectations differ substantially from those of the internal auditors, it symbolizes a typical conflict between organizational norms and professional norms. Can internal auditors still remain independent?

Another related extension is to compare the top management and audit committees' perceptions of internal auditor independence with those of the external auditors. If disagreements exist, they are the potential factors that may cause conflicts between the audit firm and management when negotiating the audit fee. A recent study by Knapp
(8) shows that management is perceived as more capable of influencing the auditors' decisions when precisely defined professional standards are absent. Since the evaluation of internal auditor independence is a typical example of this kind, it would be interesting to examine whether or not the audit firm is able to withstand management's pressure. A related question concerns the impacts of management pressure on the quality of audit if the audit firm fails to withstand such pressure.
CHAPTER BIBLIOGRAPHY


APPENDIX--A

Research Instrument for
Internal Auditors
INSTRUCTION

Internal Auditor Independence is considered as one of the most important attributes for the internal audit professional. Both the IIA and the AICPA have stressed repeatedly the importance of Internal Audit Independence in their official pronouncements. However, it is not clear how the issue of Internal Audit Independence should be evaluated due to the lack of explicit guidelines.

The purpose of this research is to ask you to express your opinion, as an internal auditor, concerning some of the most important issues relevant to Internal Auditor Independence. Your participation to this research consists of two phases as follows:

Phase <I>- You will be asked to rank a set of 16 cases. Each case contains five organizational-related factors that depict a hypothetical situation faced by the internal audit department of a financially sound company. For the purpose of your ranking, you shall assume that the internal auditor therein has a reasonable degree of competency in auditing and is familiar with the company's operations. Also, the company's internal audit documentation (working papers) is satisfactory both in quantity and quality.

To ease your ranking, please rank these 16 cases according to the following two steps:

Step-1: Separate these 16 cases into four groups A, B, C, and D. Each group reflecting your opinion on "the risk that internal auditor independence may be impaired". For your convenience, the groups are designated as follows: A: Very High Risk, B: High Risk, C: Moderate Risk, and D: Low Risk.

All of the 16 cases must be assigned to one of the above groups before you can proceed to Step-2.

Step-2: Within each group, rank the cases in this group from the "Most Risky" to the "Least Risky".

NOTE: You are encouraged to alter any previous ranking in Step-1 and/or Step-2 while completing the ranking of all 16 cases.

Phase <II>- You will be asked to respond to a brief questionnaire designed to elicit your assessment of the organizational environment of your own internal audit department.

Your personal response will be kept strictly confidential. For complete anonymity, a stamped, self-addressed envelope is provided for your convenience.

Thank you for your participation.
<table>
<thead>
<tr>
<th>CASE NUMBER</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Scope of Internal Audit Service: Are internal auditors free from operational responsibilities and from performing other incompatible functions or conflict of interest assignments?</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>2) Internal Auditor Reporting Responsibilities: Does the internal auditor report findings to the adequate organizational level and have frequent access to the board of directors (and its audit committee)?</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>3) Scope of Internal Auditor's Audit: Do internal auditors have enough ability and authority to investigate significant areas of company's operations and system of internal controls?</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>4) Adequacy of Organizational Support: Is the internal audit department adequately staffed and funded and its recommendations frequently been adopted by the organization?</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>5) Formalization of Internal Auditing Policies: Does the company have explicit policies with respect to the internal auditor performance standards, internal audit practices and internal auditor position responsibilities?</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

**STEP 1** - Please assign this scenario case into one of the following groups:

- (A) Very High Risk
- (B) High Risk
- (C) Moderate Risk
- (D) Low Risk to Very Low Risk

**STEP 2** - Please number the ranking of this scenario case within the group you assigned in STEP 1. The rank number should be assigned in ascending order, i.e. the most risky one should be assigned a number of "1", the second risky one "2", etc.,.

Rank number within the group ________
This questionnaire is not coded on an individual basis for complete anonymity. Please answer all questions. Your responses will be kept strictly confidential.

SECTION I

Please indicate the extent of your agreement with the statements below by checking "X" the corresponding box using the following scale:

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Somewhat Agree</th>
<th>Neither Agree</th>
<th>Somewhat Disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

1. Our department is able to determine its own course of action.
2. People outside our department decide on what audit work we are to do.
3. My company does not have explicit policies with respect to internal auditor performance standards, internal audit practices and internal auditor position responsibilities.
4. I know that I have scheduled my time properly.
5. I receive an assignment without the manpower to complete it.
6. In my company, there is a conflict between the work standards and procedures of the company and my own ability to act according to my professional judgment.
7. I have enough time to complete my work.
8. I work with two or more groups who operate quite differently.
9. I am not satisfied with the organizational level to which our department reports findings as well as the frequency of access to the board of directors (and its audit committee).
10. My works are apt to be accepted by one person and not accepted by others.
<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>I receive an assignment without adequate resources and material to execute it.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>Our department does not have enough ability and authority to investigate significant areas of company's operations and system of internal controls.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>I perform work that suits my values.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>The type and structure of my work environment give me adequate ability and opportunity to exercise my own professional judgment in carrying out my duties.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>I know what my responsibilities are.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>I have to violate a rule or policy in order to carry out an assignment.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>We are often under pressure from other parties within the company.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>I feel certain about how much authority I have.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>Our department can select a course of action without consulting others.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>Our department is not free from operational responsibilities and from other &quot;incompatible&quot; functions (or conflict of interest assignments).</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>I know exactly what is expected of me.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>I receive incompatible requests from two or more people.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>Explanation of my assignments is clear as to what has to be done.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
<tr>
<td>7</td>
<td>I work on unnecessary things.</td>
<td>7, 6, 5, 4, 3, 2, 1</td>
</tr>
</tbody>
</table>
### SECTION II

1. How likely is it that you will actively look for a different organization to work for in the next year? (Check "X" the corresponding number)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Likely</td>
<td>Somewhat Likely</td>
<td>Somewhat Not Likely</td>
<td>Not Likely</td>
<td>Certain Unlikely</td>
<td>Highly Unlikely</td>
<td></td>
</tr>
</tbody>
</table>

2. Which of the following person(s) can significantly help or hinder your job performance as an internal auditor? (Check as many as apply)

- [ ] Member of audit committee
- [ ] Chief financial officer
- [ ] Auditee
- [ ] Other, please specify
- [ ] Chief executive officer
- [ ] Controller
- [ ] External auditor

3. For each of the people you just identified, please indicate your relationship with them based upon the following questions (A, B, and C) using the following scale:

<table>
<thead>
<tr>
<th>[5]</th>
<th>[4]</th>
<th>[3]</th>
</tr>
</thead>
<tbody>
<tr>
<td>To a very great extent</td>
<td>To a considerable extent</td>
<td>To some extent</td>
</tr>
</tbody>
</table>

A. Suppose you were having some sort of difficulty in your job. To what extent do you feel each of these persons would be willing to help you if you asked for it? (Score those you identified only)

- [ ] Member of audit committee
- [ ] Chief financial officer
- [ ] Chief executive officer
- [ ] Controller
- [ ] Auditee
- [ ] External Auditor
- [ ] Other
B. We all respect the knowledge and judgment of some people than others. To what extent do you have this kind of respect for each of these people? (Score those you identified only)

- Member of audit committee
- Chief financial officer
- Auditee
- Other
- Chief executive officer
- Controller
- External Auditor

C. How well do you like each of these people personally? (Score those you identified only)

- Member of audit committee
- Chief financial officer
- Auditee
- Other
- Chief executive officer
- Controller
- External Auditor

4. What is the likelihood that you will be employed by another company in the next year? (Check “X” the corresponding number)

- Highly likely
- Likely
- Somewhat likely
- Not certain
- Somewhat unlikely
- Unlikely
- Highly unlikely

SECTION III

The following statements will help you describe how you feel about your job. Think about your experience while working on this job and check those statements which most accurately and honestly tell how you feel about it.

1. Place a check mark in front of the statement which best tells how good a job you have.

   - A. The job is an excellent one, very much above the average.
   - B. The job is a fairly good one.
   - C. The job is only average.
   - D. The job is not as good as average in this kind of work.
   - E. The job is a very poor one, very much below the average.

2. Place a check mark in front of the statement which best describes your feelings about your job.

   - A. I am very satisfied and happy on this job.
   - B. I am fairly well satisfied on this job.
   - C. I am neither satisfied nor dissatisfied - it's just average.
   - D. I am a little dissatisfied on this job.
   - E. I am very dissatisfied and unhappy on this job.

3. Check one of the following statements to show how much of the time you are satisfied with your job.

   - A. Most of the time.
   - B. A good deal of the time.
   - C. About half of the time.
   - D. Occasionally.
   - E. Seldom.
4. Place a check mark in front of the statement which best tells what kind of an organization it is to work for.
   _____ A. It is an excellent organization to work for - one of the best organizations I know of.
   _____ B. It is a good organization to work for but not one of the best.
   _____ C. It is only an average organization to work for. Many other are just as good.
   _____ D. It is below average as an organization to work for. Many others are better.
   _____ E. It is probably one of the poorest organizations to work for that I know of.

5. Place a check mark in front of the statement which best tells how your feelings compare with those of other people you know.
   _____ A. I dislike my job much more than most people dislike theirs.
   _____ B. I dislike my job more than most people dislike theirs.
   _____ C. I like my job about as well as most people like theirs.
   _____ D. I like my job better than most people like theirs.
   _____ E. I like my job much better than most people like theirs.

6. Place a check mark in front of the statement which best tells how you feel about the work you do on your job.
   _____ A. The work I do is very unpleasant. I dislike it.
   _____ B. The work I do is not pleasant.
   _____ C. The work is just about average. I don't have any feeling about whether it is pleasant or not.
   _____ D. The work is pleasant and enjoyable.
   _____ E. The work is very enjoyable. I very much like to do the work called for on this job.

7. Check one of the following which best describes any general working conditions which affect your work or comfort on this job.
   _____ A. General working conditions are very bad.
   _____ B. General working conditions are poor - not so good as the average for this kind of job.
   _____ C. General conditions are about average, neither good nor bad.
   _____ D. In general, working conditions are good, better than average.
   _____ E. General working conditions are very good, much better than average for this kind of job.

8. Check one of the following statements which best tells how you feel about changing your job.
   _____ A. I would quit this job at once if I had anything else to do.
   _____ B. I would take almost any other job in which I could earn as much as I am earning here.
   _____ C. This job is as good as the average and I would just as soon have it as any other job but would do so if I could make more money.
   _____ D. I am not eager to change jobs but would do so if I could make more money.
   _____ E. I do not want to change jobs even for more money because this is a good one.
9. Suppose you had a very good friend who is looking for a job in your line of work and you know of a vacancy in this organization which your friend is well qualified to fill. Would you:

- A. Recommend this job as a good one to apply for?
- B. Recommend this job but caution your friend about its shortcomings?
- C. Tell your friend about the vacancy but not anything else, then let him decide whether to apply or not?
- D. Tell your friend about the vacancy but suggest that he or she look for other vacancies elsewhere before applying?
- E. Try to discourage your friend from applying by telling the bad things about the job?

10. On the scale below, please check "X" the corresponding number to show how well satisfied you are with this job.

Completely satisfied More satisfied About half More dissatisfied Completely dissatisfied than dissatisfied and half than satisfied dissatisfied

SECTION IV

1. How many years of internal auditing experience do you have? ________ Years.

2. How many years have you worked for your present company? ________ Years.

3. Approximately how many internal auditors are employed in this internal audit department?

4. Is your company a New York Stock Exchange company? YES ________ NO ________

5. What is your current position in the company?

- Senior internal auditor
- Internal audit manager
- Director of internal auditing
- Other, please specify

6. How many years have you been in your current position? ________ Year(s)

7. Do you presently have any of the following certificates?

( Check as many as apply )

- CPA YES ________ NO ________
- CMA ________ YES ________ NO ________
- Other, please specify ________ YES ________ NO ________
- None of these

8. Have you had any previous experience in the following positions?

( Check as many as apply )

- Internal auditor YES ________ NO ________
- Corporate Accountant ________ YES ________ NO ________
- Data Processing Engineer ________ YES ________ NO ________
- Other, please specify ________ YES ________ NO ________
9. If you have had public accounting experience, please answer the following: (If not applicable, skip to the next question)

A. What was your last position in the public accounting firm in which you most recently worked for?
   - Staff
   - Senior Staff
   - Supervisory Staff
   - Manager/Principal
   - Partner
   - Other, please specify

B. Did you ever evaluate an internal audit department when serving in the above position?  
   - YES
   - NO

C. Was the public accounting firm that you most recently worked for one of the "Big Eight" or international firms?  
   - YES
   - NO
   (If YES, please specify the name of the firm)

10. Approximately how many internal auditors are employed in the internal audit department of your company as a whole.
APPENDIX--B

Research Instrument for
External Auditors
Internal Auditor Independence is considered as one of the most important attributes for the internal audit professional. Both the IIA and the AICPA have stressed repeatedly the importance of Internal Audit Independence in their official pronouncements. However, it is not clear how the issue of Internal Audit Independence should be evaluated due to the lack of explicit guidelines.

The purpose of this research is to ask you to express your opinion, as an external auditor, concerning some of the most important issues relevant to Internal Auditor Independence. Your participation to this research consists of two phases as follows:

Phase (I)- You will be asked to rank a set of 16 cases. Each case contains five organizational-related factors that depict a hypothetical situation faced by the internal audit department of a financially sound company. For the purpose of your ranking, you shall assume that the internal auditor therein has a reasonable degree of competency in auditing and is familiar with the company's operations. Also, the company's internal audit documentation (working papers) is satisfactory both in quantity and quality.

To ease your ranking, please rank these 16 cases according to the following two steps:

**Step-1:** Separate these 16 cases into four groups (A, B, C, and D). Each group reflecting your opinion on "the risk that internal auditor independence may be impaired". For your convenience, the groups are designated as follows: A: Very High Risk, B: High Risk, C: Moderate Risk, and D: Low Risk.

All of the 16 cases must be assigned to one of the above groups before you can proceed to Step-2.

**Step-2:** Within each group, rank the cases in this group from the "Most Risky" to the "Least Risky".

NOTE: You are encouraged to alter any previous ranking in Step-1 and/or Step-2 while completing the ranking of all 16 cases.

Phase (II)- You will be asked to respond to a brief questionnaire designed to elicit your assessment of the organizational environment of your client company's internal audit department.

Your personal response will be kept strictly confidential. For complete anonymity, a stamped, self-addressed envelope is provided for your convenience.

Thank you for your participation.
1) Scope of Internal Audit Service: Are internal auditors free from operational responsibilities and from performing other incompatible functions or conflict of interest assignments?

2) Internal Auditor Reporting Responsibilities: Does the internal auditor report findings to the adequate organizational level and have frequent access to the board of directors (and its audit committee)?

3) Scope of Internal Auditor's Audit: Do internal auditors have enough ability and authority to investigate significant areas of company's operations and system of internal controls?

4) Adequacy of Organizational Support: Is the internal audit department adequately staffed and funded and its recommendations frequently been adopted by the organization?

5) Formalization of Internal Auditing Policies: Does the company have explicit policies with respect to the internal auditor performance standards, internal audit practices and internal auditor position responsibilities?

STEP 1 - Please assign this scenario case into one of the following groups:

[A] Very High Risk
[B] High Risk
[C] Moderate Risk
[D] Low Risk to Very Low Risk

STEP 2 - Please number the ranking of this scenario case within the group you assigned in STEP 1. The rank number should be assigned in ascending order, i.e. the most risky one should be assigned a number of "1", the second risky one "2", etc.

Rank number within the group ___.
This questionnaire is not coded on an individual basis for complete anonymity. Please answer all questions. Your responses will be kept strictly confidential.

SECTION I

The following statements will help you describe how you feel about your client company. Please indicate the extent of your agreement with the statements below by checking "X" the corresponding box using the following scale:

* [5] Somewhat Agree [1] Strongly Disagree *
* [4] Neither Agree Nor Disagree

1. The internal audit department is able to determine its own course of action.
2. People outside of the internal audit department decide on what audit work they are to do.
3. My client company does not have explicit policies with respect to internal auditor performance standards, internal audit practices and internal auditor position responsibilities.
4. In my client company, there is a conflict between the work standards and procedures of the company and the internal auditor's ability to act according to his/her professional judgment.
5. I am not satisfied with the organizational level to which the internal audit department reports findings as well as the frequency of its access to the board of directors (and the audit committee).
6. The internal audit department does not have enough ability and authority to investigate significant areas of company's operations and systems of internal controls.
7. The type and structure of my client company's environment give its internal auditors adequate ability and opportunity to exercise their own professional judgment in carrying out their duties.
7 6 5 4 3 2 1

8. The internal audit department are often under pressure from other parties within the company.

7 6 5 4 3 2 1

9. The internal audit department can select a course of action without consulting others.

7 6 5 4 3 2 1

10. The internal audit department is not free from operational responsibilities and from other "incompatible" functions (or conflict of interest assignments).

7 6 5 4 3 2 1

11. The internal audit department is frequently understaffed and underbudgeted and its recommendations are not frequently adopted by the company.

7 6 5 4 3 2 1

12. The internal audit staff of my client company has a reasonable degree of competency in auditing and is familiar with the company's operations.

7 6 5 4 3 2 1

13. My client company's internal audit documentation (working paper) is satisfactory both in quantity and quality.

SECTION II

1. What is your current position in the firm?

   Senior staff
   Supervisory staff
   Manager/Principal
   Partner
   Other, please specify ________________________________

2. How many years have you been in your current position?

   Year(s)

3. Do you presently have any of the following certificates?

   (Check as many as apply)

   CPA   YES   NO
   CMA   YES   NO
   CIA   YES   NO

   Other, please specify ________________________________

   None of these
SECTION III

1. How many years have you been auditing your present client company? _____ Year(s).

2. To whom does the internal auditor of your client company have the primary (solid-line) reporting responsibility?
   - Board of directors/Audit committees
   - Chief executive officer
   - Chief financial officer
   - Controller
   - Other, please specify

3. To whom does the internal auditor of your client company have the secondary (dotted-line) reporting responsibility?
   - Board of directors/Audit committees
   - Chief executive officer
   - Chief financial officer
   - Controller
   - Other, please specify

4. Approximately what has been the division of internal audit activities between financial audit and operational audit of your client company's internal audit department?
   - A. Financial audit activities are more than those of operational audit.
   - B. Operational audit activities are more than those of financial audit.
   - C. Financial and operational audit activities are about half and half.

5. On the scale below, please indicate the level of the risk that the independence of your client company's internal audit department may be compromised.

   [A] Very High Risk
   [B] High Risk
   [C] Moderate Risk
   [D] Low Risk
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