

Pondering Paradigms:
Tracing the Development of Accounting Thought with Taxonomic and Citation Analysis

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Francisco Antonio Badua

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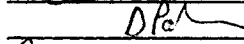

Graduate School of Management

Written under the direction of



Miklos A. Vasarhelyi,

And approved by



 (for Dralles)

Newark, NJ
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ABSTRACT OF THE DISSERTATION

Pondering Paradigms: Tracing the Development of Accounting Thought with Taxonomic
and Citation Analysis

By Francisco Antonio Badua

Dissertation Chairman: Miklos A. Vasarhelyi

This project employs various analytical techniques developed in the accounting information systems and econometrics fields to depict the paradigmatic structure of accounting research literature. In this study, the Rutgers Accounting Research Database, a proprietary database summarizing the taxonomic and citation characteristics of major accounting research journals, is used to ascertain the existence of distinct accounting research paradigms, characterize the paradigms according to their topical and methodological characteristics, determine the role each paradigm plays in disseminating accounting knowledge through citation references, and evaluates the intellectual influence of each paradigm. An evaluative metric (optimal taxonomic diversity) is also developed to gauge the contribution of each paradigm to accounting research. The study concludes that the accounting research network is comprised of several significantly different paradigms, but that these paradigms co-exist in a symbiotic network of citations. The study also finds that accounting researchers value diversity in topical and methodological approaches, as demonstrated by their citation preferences. These findings contrast with the traditional Kuhnian depiction of mutually exclusive and non-communicating paradigms which use narrow sets of research bases and methodologies.

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“Praetera illuminet postera.” (The past lights the way for the future.)

“Ang hindi marunong lumingon sa pinanggalingan, ay hindi makararating sa pinaroroonan.” (He who does not know how to look where he has been will not arrive at where he wishes to go.)

Content Table

Chapter 1: Introduction	1
1.1 Overview	1
1.1.1 <i>Structure</i>	2
1.1.2 <i>Background</i>	3
1.2 Purpose	9
1.3 Approach	13
1.3.1 <i>Scope</i>	14
1.3.2 <i>Taxonomic Classifications</i>	15
1.3.3 <i>Citation Analysis</i>	16
1.3.4 <i>Some Criticisms of the ARD Approach</i>	16
1.4 Relevance: Establishing the Place of the Proposed Research in the Context of Accounting Research Evolution Literature	18
1.4.1 <i>Papers Dealing with Accounting Research in General</i>	18
1.4.2 <i>Papers on Evolution of Specific Accounting Research Topics</i>	20
1.4.3 <i>Papers on Evolution of Individual Accounting Journals</i>	21
1.4.4 <i>Summary of the State of Evolutionary Research and Relevance of the Proposed Study</i>	21
Chapter 2: Literature Review	23
2.1 Overview	23
2.2 Papers Investigating Taxonomic Attributes	24
2.3 Development of Accounting Thought Papers Investigating Citation Patterns	30
2.3.1 <i>Descriptive Citation Analysis</i>	31
2.3.2 <i>Evaluative Citation Analysis</i>	38
2.4 Summary of Literature	42
Chapter 3 Hypotheses and Research Questions	45
3.1 Overview	45
3.2 Hypotheses	45
3.3 Research Questions	48
Chapter 4 Methodology	57
4.1 Overview	57
4.2 Data Gathering	58
4.2.1 <i>Taxonomic Classifications</i>	58
4.2.2 <i>Identification of Journal Group Paradigms</i>	59
4.3 Statistical Analyses	62
4.3.1 <i>Exploratory Data Analysis (EDA)</i>	62
4.3.2 <i>Classical Quantitative Statistics</i>	69
4.4 Citation Analysis Methodology	71
Chapter 5: Results	88
5.1 Overview	88
5.2 EDA Results	89
5.2.1 <i>EDA of Research Method</i>	89
5.2.2 <i>EDA of Mode of Reasoning</i>	91
5.2.3 <i>EDA of School of Thought</i>	93
5.2.4 <i>EDA of Foundation Discipline</i>	95
5.3 Classical Quantitative Statistical Results	97
5.3.1 <i>Classical Quantitative Statistics for Research Method</i>	97
5.3.2 <i>Classical Quantitative Statistics for Mode of reasoning</i>	103
5.3.3 <i>Classical Quantitative Statistics for School of Thought</i>	109
5.3.4 <i>Classical Quantitative Statistics for Foundation Discipline</i>	117
5.4 Summary of Taxonomic Analysis Results	125
5.4.1 <i>Socio-Policy Journal Group</i>	125
5.4.2 <i>Audit Journal Group</i>	127

5.4.3 <i>General Purpose Journal Group</i>	128
5.4.4 <i>The Economics and Finance Journal Group</i>	130
5.4.5 <i>The Information Systems Journal Group</i>	130
5.4.6 <i>History Journal Group</i>	132
5.5 Summary of Citation Analysis Results	132
5.6 Table of Findings by Hypothesis or Research Question	148
Chapter 6 Summary and Discussion	149
6.1 Overview	149
6.2 Paradigm Structure and Morphology	149
6.3 Paradigm Function and Influence	152
6.4 Optimal Diversity Metric	153
6.5 Summary: A Counter-Kuhnian Colloquy	160
6.6 Future Research	163
6.6.1 <i>Ameliorative Research</i>	163
6.6.2 <i>Investigative Research</i>	165
6.7 Concluding Caveats	168
References	170
Appendix: The Accounting Research Directory	175

Chapter 1: Introduction

1.1 Overview

This study investigates the development of accounting thought by identifying the characteristics of accounting academic papers, differentiating these papers into research paradigms, and analyzing the relationships between these paradigms within the accounting research network. This research is an empirical test of Kuhn's model of scientific paradigms, to evaluate the relationship of this model to accounting research. It also evaluates whether there is need for the Kuhnian model to be reinterpreted in order to better fit the accounting research network.

This dissertation provides a number of unique contributions to accounting research both in its findings and methodology.

The dissertation is the first in the literature to undertake a formal classification of existing accounting research, as represented by the journals in the Accounting Research Directory (ARD), into distinct paradigms. Findings identify the existence of several local paradigms, centered about a group of topically and methodologically similar journals, which together comprise the accounting research network. Furthermore, the findings suggest that one of these local paradigms appears to exert a significantly stronger influence upon other paradigms, such that this paradigm might be regarded as dominant in the accounting research network.

The dissertation also adopts several innovations in identifying, differentiating, and evaluating the paradigms of accounting literature. The deployment of Exploratory Data Analysis (EDA) in identifying paradigm differences within the entire canon of accounting research literature is unique to this dissertation. The adoption of the Gini index to quantify the diversity of a paradigm's influence, and to measure the degree to which a paradigm may benefit from topical or methodological diversity is yet another novel contribution. Thus, by bringing together a unique set of tools and metrics from the information systems, statistical, and econometric methodologies, this dissertation contributes to a better understanding of the accounting research network, and contextualizes the research within the framework of the philosophy of science and development of thought.

1.1.1 Structure

In general, the characteristics of the papers may be summarized by a set of topical and methodological categories, under which the papers are classified. These taxonomic categories are found in the Rutgers University Accounting Research Database, upon whose data this research bases its findings. The differences found between groups of papers in the characteristics manifested in the taxonomic categories will be used to determine research paradigm alignment. The nature of the relationships between paradigms will then be analyzed based on counts of citations within a selected time period to determine paradigm dominance, intellectual function, and network integration.

The remainder of this chapter will be devoted to more specific definitions of the major questions to be answered in this research, the approach used to answer those questions, and the relevance of the research within the context of previous studies devoted to the study of the development of accounting research.

1.1.2 Background

Sciences and the academic disciplines that proceed from them are subject to certain patterns of intellectual development. The philosopher of science Thomas Kuhn describes this development as being cyclical, involving successive paradigms (Kuhn, 1970). Initially, academic scientists will accumulate observations about phenomena that are relevant to their particular field. Then they will offer up theories that try to explain the overall reality into which these seemingly isolated observations fit. The expression “puzzle solving” is used to describe this stage because it is similar to trying to fit in pieces of a jigsaw puzzle (the observations) according to what the academics believe to be the proper picture of the completed puzzle (theories). However, there exists a major difference between a regular jigsaw puzzle and the scientific puzzle solving just described. Whereas the parlor game has a picture of the completed puzzle on the box, the later type of puzzle does not. Rather, the supposed shape of the completed puzzle may shift, according to the changes in scientific theories proposed by academics. When a particular piece of the puzzle (an observation) does not appear to fit anywhere in the existing picture of the completed puzzle (current theory), a new vision of the completed

puzzle is formed (a new proposed theory), in order to accommodate the odd piece. This change is what Kuhn identified as the process of a paradigm shift.

A paradigm shift carries some characteristic hallmarks. It starts with some observed anomalous disconnect between observed reality and theory. A period of insecurity then ensues, wherein a variety of different theories emerge, often concurrent with an increase in the volume of research (both of the current and proposed theories). Then, the field narrows to theories that are considered the most plausible explicators of the reality observed, perhaps converging to one dominant new theory. This new theory would then hold until a new anomaly is observed, and the cycle erupts anew.

Accounting theory would benefit from the establishment of a nexus between the Kuhnian cycle and accounting research so as to instill an ordered arrangement of our discipline. There has been much controversy in accounting academe with regards to the status of accounting as an academic discipline. At one extreme is the notion that until very recently, accounting was not an academic discipline at all, but rather a hodgepodge of different methods concocted by accountants of firms in order to portray their employers' financial condition in the best light possible. As Watts and Zimmerman (1979) describe it: "no normative theory currently exists in the accounting literature that can justify accounting standards (p.301) because they are dictated by "the self-interest" and "advantages to individual firms (p.299)." Thus, there was not any theory to accounting, no theory which explains the procedures which measure and best report economic reality. Rather, accounting was a collection of procedures whose use is determined chiefly by

political processes, rather than coherent theoretical bases. Indeed as Sterling says, it did not identify what procedures “ought to” be used, but merely stated what “is” in terms of what procedures existed (Sterling, 1967).

From these observations, there arose an attempt to synthesize of accounting practices into a theory that more authoritatively defines what “ought to be.” This was motivated by a realization that the lack of theory behind accounting diminished the authority of prescribed accounting practice (Wells, 1976) and the redefinition of accounting’s role as a measurement-information system (Sterling, 1967) which again raised the call for more theoretically authoritative measurement procedures.

This recent self-awareness of accounting as an academic discipline overshadows any inquiry into how an accounting discipline relates to the Kuhnian cycle. Techniques required to answer this question are taxonomic and citation analyses. This is because the telltale signs of a Kuhnian paradigm shift may be documented via such analyses, in that they identify the volume, characteristics, and intellectual affiliations and sources of the research.

Accounting scholars involved in studying the development of accounting thought have previously dealt with the concept of paradigms. This tradition of accounting research has proposed the definition of a paradigm as a dominant explanation of a particular aspect of reality (Previts, 1972). In the case of this dissertation, the specific definition of a paradigm is a dominant explanation of a particular aspect of the accountant’s professional

reality, as well as the reality of the user of the accountant-prepared financial statements, and the intersection of these realities with those of members of society at large. Paradigms, as used in this dissertation, are dominant explanations of each network subset of reality that make up the total reality described by the accounting research network. This study suggests the term, local paradigms. At the conclusion of this dissertation, tests will be proposed to assess whether any of these local paradigms exert such strong influences on other local paradigms such that it might be referred to as a universally dominant paradigm.

An accountant's professional life is quite easily perceived to be divided among different functional aspects. Accounting's basic definition as the task of gathering, analyzing, and summarizing relevant data into financial communications that are useful for decision-making, encapsulates these aspects. Financial accounting as a field provides the principles, constraints, and assumptions by which the data gleaned from various transactions may be organized into such communications. Often, these procedures are based upon traditions and practices such as the double-entry system that dates back to the Renaissance, or even earlier, as some allege, to the centuries of the Medieval Islamic hegemony. Providing assurance for these financial communications is a service needed to insure the fairness and propriety of the information presented. Throughout this process, technology, in the form of accounting information systems pervade the accountant's reality, aiding in this task.

Beyond the domain of the accountant's functional realities, there lie the realities of users of the accountant's work, and of society in general, whose collective needs, expressed through various forms of regulation, leave their mark on the accountant's profession. Explanations of the user's reality, in particular, the user's decision characteristics when faced with accounting data about different investment options, are examined in financial accounting research. Policy research illuminates the larger, societal reality that so affects accounting.

As will be seen in succeeding chapters, these different focal realities correspond to paradigms: financial accounting, accounting history, auditing, information systems, policy, and general accounting. Each of these paradigms offers an explanation of the reality it purports to represent, and whose particular explanations become dominant among a group of scholars who affiliate themselves with each of these paradigms.

These affiliated scholars, by choosing to study a specific aspect of the accountant's reality, necessarily devote themselves to research that is identifiable by unique topics, for only those topical foci germane to a particular aspect of reality would be of interest to the scholar. Furthermore, because specialized study of different topical foci require different research methods and modes of argument, each paradigm's affiliated scholars produce work that tends to be distinctive methodologically. This dual feature of both unique topics and unique methods was first posited as an identifying mark of a paradigm by Kuhn, who referred to paradigms as consisting of "intertwined theory and methodological belief" (Kuhn, 1962, pp. 16-17).

Because of the relationship of realities, paradigms, topics, and methods, this study demonstrates and develops techniques by which the existence of such paradigms are formally identified and differentiated. Once these paradigms have been thus distinguished, this study will then develop techniques to determine the relationship of these paradigms to one another, to assess whether or not any of these locally dominant paradigms (that is, dominant within its own research community), is universally dominant as well (that is, does it exert its influence on scholars of other paradigms?). This study will also investigate which characteristics make these paradigms more likely to be universally dominant or to approach the status of universal dominance.

One limitation that arises is that whereas different local paradigms may have quantifiably different degrees of universal influence, the measurement of that influence is continuous rather than categorical. Consequently, while it may be possible to state that one paradigm is more (or less) influential than another, and therefore closer (or further) than that other to being universally dominant, it may not be possible to state categorically at what point a local paradigm is influential enough among its peer local paradigms to be universally dominant.

Nevertheless, if a certain local paradigm is found to be uniquely influential in both the extent of its influence among other local paradigms, and the diversity of its influence (that is, if it is not only referenced often, but also referenced by a wide spectrum of other

paradigms), then it may be appropriate to propose that it is a universally dominant paradigm.

The next section will deal with the basic questions of taxonomic and citation analyses in greater detail.

1.2 Purpose

The purpose of this research is to identify the paradigms that exist in accounting research, describe their characteristics, and analyze their interaction. Essentially, the major research question addressed by this analysis is: “What is the paradigmatic structure of accounting literature?” This query expands into a somewhat more specific set of operational sub-queries: “What are the characteristics of accounting research literature?” and “How is the research literature used by other researchers?” and “What is the interaction between the characteristics of this literature and its use by researchers?”

Every paradigm bears its own unique set of topical and methodological characteristics. Kuhn states this several times, saying “research... based on a shared paradigm (is) committed to the same rules and standards of scientific practice” (Kuhn, 1970, p.11), and further, that a paradigm is an “implicit body of intertwined theory and methodological belief” (Kuhn, 1970, pp. 16-17). Thus, the first sub-question: “What are the characteristics of accounting research?” speaks to the task of paradigm identification. This task involves a taxonomic approach, because taxonomies are essentially

classifications based on characteristics. Taxonomic studies attempt to systematically classify phenomena according to certain attributes. In the context of research papers, one may carry out taxonomic classification based upon topical attributes (“What topics are researchers studying?”) or methodological attributes (“What are the methods that researchers use to study various topics?”). Taxonomies may take various forms, from a literature review of papers in a journal or topic, with some attention paid to discriminating between types of papers, to (more properly) formal classification of a body of papers into topical or methodological categories. However, the objective remains the same; it is to characterize the existing literature according to its topical and methodological qualities. There are many examples of taxonomic literature, and these will be addressed later.

If the characteristics of paradigms are useful for their identification, the manner by which paradigms make use of one another’s research is useful for determining their affiliation and interaction. Thus, the second question: “How is this research used?” investigates the type of relationships paradigms have with one another. This sub-question involves a citation approach. Essentially, citation studies consider a research artifact (a paper, a group of related papers, or a journal), and determine which other papers were referenced by it. When one research paper references another, this citation attribution indicates an intellectual influence by the cited paper upon the citing paper. Garfield refers to this phenomenon as “the conceptual association of scientific ideas as recognized by... research authors... by the references they cite in their research papers, authors make explicit linkages between their current research and prior work in the archive of scientific

literature.” (Garfield, 1994) This indication has two implications. First, it answers the question: “Which research cites which other research?” In so doing, it implies a relationship among papers, such that the frequency that papers cite each other would indicate the degree of affinity among these papers. Possibly, more frequent citation within a subset of the research network would imply the existence of a distinct research front corresponding to a research paradigm, or in some cases, a branch of the research network with a very high degree of specialization indicating its non-integration into the larger accounting research canon. Thus, this branch of citation research is herein defined as being of a descriptive-integrative kind, in that it describes how discrete pieces of research are related, and integrates them into topical groupings. As will be addressed later, there are several examples of this type of research in the accounting citation literature. Secondly, it answers the question: “Which research is cited most?” which would then serve as an indication of the importance of the cited research. Indeed, the frequency of citation attributed to a paper or journal has been used to evaluate sources or products of research in several studies. Hence, this research defines this branch of citation analysis as being of an evaluative kind. While there are several examples of this in the economics and finance citation literature, there is less evidence of a comparable amount in the accounting citation literature. Therefore, in defining the use of accounting research literature, citation analysis is useful in identifying which artifacts of research are used in which other research, and which of these tend to numerically predominate and possibly dominate others as a cited source of intellectual influence.

The third question is: “What is the interaction between the characteristics of this literature and its citation use in other research?” This question brings together the taxonomic and citation analyses that hitherto had been treated separately. It also provides insight into the nature of paradigm competition and interaction in the accounting research network. Developing this insight would support identifying the existence of any dominant paradigm, indicate the occurrence of a paradigm shift, or at least identify those competing paradigms most likely to initiate such a paradigm shift. This would involve the combined use of taxonomies and citation studies. Specifically, intuitively, there would be some differential effect of characteristics of research that make it more or less appealing as a reference by other researchers. Thus, a means of ascertaining this effect would be to document the taxonomic characteristics of frequently cited papers. This type of analysis of accounting literature has been lacking at the macro-level, and is a gap that this research would attempt to fill.

In all of these questions, there is repeated reference to research paradigms, paradigm competition, and paradigm shifts. The importance of identifying competing paradigms and their relationship to one another is central to the validity of an academic discipline. An academic discipline’s function is to represent reality. The use of a paradigmatic classification offers a coherent and logical framework for such a representation. To the extent that an orderly process can be demonstrated which identifies a paradigm, the view of reality it underpins can be better represented. On the other hand, if no dominant paradigm can be identified, or if an academic discipline is fragmented into various competing paradigms, no comprehensive or cohesive statements can be made about the

reality the academic discipline purportedly represents (Bricker, 1989). Indeed, in the extreme case it would be possible to have an academic field whose constituent competing paradigms do not even have a consensus of what aspect of reality they ought to study.

In summary, the flow of major questions would be captured in the following schematic:

What is the paradigmatic structure of accounting literature?

- a. What are the characteristics of accounting research?
 - i. What topics are researchers studying?
 - ii. What methods are the researchers using to study these topics?
- b. How is this research literature used?
 - i. Which research is being cited by which other research?
 - ii. Which research is cited most?
- c. What is the interaction between the characteristics of the research and its citation use in other research?

1.3 Approach

Operationally, this study will attempt to answer the aforementioned flow of questions through a combination of taxonomic and citation analyses. Specifically, it will attempt to characterize the nature of accounting research by identifying its characteristics through taxonomic analysis, tracing patterns of intellectual influence and evaluating the strength of this influence by citation analysis, and establishing links between the characteristics of research and its usefulness to other researchers by combining the two analyses. The

specific database which supports the proposed research is the Accounting Research Directory (ARD). The ARD, in its original form, was created over two decades ago by Vasarhelyi and Berk (1984) as a taxonomic classification of five leading accounting journals. Over the decades it has evolved in both content and scope, such that it now encompasses twelve scholarly accounting journals, and includes citation analysis data as well. It has been employed in numerous research papers, such as Brown, Gardner and Vasarhelyi (1987), Vasarhelyi, Bao, and Berk (1988), Bricker (1989), and Badua, Previts, and Vasarhelyi (2003).

1.3.1 Scope

The ARD was created to facilitate the research of accounting academics and practitioners. It lists and taxonomically categorizes the major articles published since 1963 and in leading accounting journals. It also traces citation links among and between articles in the journals. These journals include the Journal of Accounting Research (JAR), The Accounting Review (TAR), Accounting, Organizations and Society (AOS), Journal of Accounting, Auditing and Finance (JAAF), Journal of Accounting and Economics (JAE), Auditing: Journal of Theory and Practice (AUD), Contemporary Accounting Research (CAR), the Accounting Historians Journal (AHJ), the Journal of Accounting and Public Policy (JAPP), and the Journal of Information Systems (JIS). A more comprehensive discussion of the taxonomic and citation indices will appear in a latter section.

1.3.2 Taxonomic Classifications

As mentioned earlier, answering the question: “What is the paradigmatic structure of accounting literature?” requires a taxonomic approach. The papers included in the ARD are analyzed according to several taxonomic classification schemae. These included mode of reasoning, research method, school of thought, information, treatment, area, geography, objective, and foundation discipline. These schema will be used to address the question: “What are the characteristics of accounting research?”

Information, treatment, area, and school of thought may be grouped together as topical taxons, because they identify what specific concepts or topics are studied in the research, and under what general accounting area or research stream the paper falls. Thus, for example, these taxons would assist in identifying what topics researchers are studying.

In contrast, mode of reasoning, research method, and foundation discipline may be viewed as methodological taxons, indicating what type of statistical tests, data gathering and theory or paradigm was used to facilitate the research. These taxons would therefore respond to one of the sub-questions listed earlier, namely: “What methods are researchers using to study these topics?”

A more detailed explanation of these taxons and their underlying classes will be given in an Appendix.

1.3.3 Citation Analysis

The ARD also includes a section wherein citations in ARD research papers to research papers in other major accounting journals in the ARD are tallied. Such an analysis would be useful in answering “How is accounting research used?” and its related sub-questions “What research is being cited by which researchers?” and “Which sources of research are cited most?” The aforementioned journals covered in the taxonomic classification comprise the population from which this citation data is gathered. This approach contrasts with some other citation studies that also include citations found in journals that are not in the same research field as the contributing journals (Liebowitz et al. 1984) or citations whose sources are from another field (Hamelman et al. 1974). However, because the taxonomic attributes of the papers in the ARD already capture indications of cross-disciplinary intellectual influence (foundation discipline taxon), the exclusion of non-accounting journals from the citation analysis seems warranted.

1.3.4 Some Criticisms of the ARD Approach

Admittedly, the dependence on the ARD produces issues and possible problems related to its taxonomic and citation classifications.

With regard to the taxonomies, while these categories would appear most comprehensive, it must be remembered that accounting is a very dynamic field, with new topic areas and methodologies emerging frequently. Thus, there is always the possibility that certain

taxonomies may need to be developed in order to accommodate new topics or methods. Another issue stems from the very wide scope of the journal set. Not only does it consider general purpose accounting journals, but also specialist journals like AOS, JIS, and AHJ. While this characteristic of the ARD might otherwise be a strength, on the other hand, it would imply that certain taxonomic categories might not be common between journals in disparate fields of specialization. For example, when applied to the AHJ, certain paper attributes were difficult to classify under existing taxons, particularly because historical papers tend to use distinct methods applied to taxons not germane to other journals.

Yet another issue, one that most directly impacts the citation study, is the journal set. Although most of the journals appear in lists of premier accounting academic outlets, there will always be difficulties in generating a universally acceptable set of “best” journals acknowledged by all to be worthy of inclusion in this study. “Empirical evidence... seems to reinforce... conclusions that it may not be valid to construct rankings at all.” (Milne, Working Paper, p.1, 2001) Therefore, a sufficiently broad set, such as the ARD, may be the optimal basis for the purposes of the study.

Hence, the ARD classifications and journal set offer a valid and reasonably comprehensive rubric for representing a dynamic and diverse accounting literature.

1.4 Relevance: Establishing the Place of the Proposed Research in the Context of Accounting Research Evolution Literature

At this point, it is necessary to document how earlier research has attempted to answer the main question of this study, and determine if the proposed research offers incremental value in the responses it may provide. For this purpose, previous research is divided into those papers that deal with accounting research in general, those that deal with specific accounting topics, and those that deal with individual accounting journals.

1.4.1 Papers Dealing with Accounting Research in General

Papers dealing with accounting research at a general level tend to concentrate on either taxonomic attributes or citation patterns exclusively. To the group of taxonomic research belong such formal taxonomic classification studies as Brown et al. (1989), and Vasarhelyi et al. (1988). The former paper applies taxonomic analysis according to the attributes of accounting area, research method, school of thought, and geographical focus to papers published in the journals *Accounting Organizations and Society* (AOS), *The Accounting Review* (TAR), *Journal of Accounting and Economics* (JAE), and *Journal of Accounting Research* (JAR) between 1976 and 1984. The latter expands the scope to papers published in the four aforementioned journals plus two additional ones, the *Journal of Accounting, Auditing, and Finance* (JAAF), and *Auditing: Journal of Practice and Theory* (AUD). Other evolutionary papers that delve into taxonomy but without formal classification are exemplified by Ball et al. (1982), Chua (1986), and Tomkins et

al. (1983). These papers offer general perspectives of previous research and discriminate between different blocs, but do not purport to be full formal taxonomies. Ball et al. (1982) classifies corporate financial literature into four areas: corporate disclosure, accounting method choice, time-series analysis, and financial distress analysis, and gives a general review of research paradigms and summarizes various methodological concerns according to statistical validity. Chua (1986) offers a general perspective of accounting literature, which is dichotomized into interpretive and critical world-views, while Tomkins et al. (1983) similarly supplies six alternative world-views (these will be summarized in greater detail in the hypotheses section). Citation studies include Bricker (1989), Brown et al. (1985), and McRae (1974). Bricker (1989) carries out citation analysis for papers published in *Abacus*, AOS, TAR, JAE, JAR, and *Journal of Accounting and Public Policy* (JAPP), from 1983 to 1986, in order to find the presence of and relationships between topic areas in accounting. In the same vein, McRae (1974) carries out citation analysis to find topic clusters and influences between them for papers published in TAR, JAR, *Abacus*, *Management Accounting (UK)*, *Management Accounting (US)*, *Financial Executive*, *Journal of Accountancy*, *New York CPA*, *Accountancy*, *The Accountant*, *Accountants Magazine*, *Certified Accountant Journal*, *Certified Accountant in Australia*, *Australian Accountant*, *Accountants Journal*, *Canadian Chartered Accountant*, and *South African Chartered Accountant*, from 1968 to 1969. Brown and Gardner (1985) perform citation analysis for the rather different purpose of evaluating faculty and doctoral programs in various universities, by sampling TAR, JAR, JAE, and AOS, for the years 1976 to 1982.

1.4.2 Papers on Evolution of Specific Accounting Research Topics

With regard to papers dealing with the evolution of thought in a specific accounting topic, they tend not to involve full, formal classification under taxonomic attributes, but rather, give general reviews of the literature on the topic (which is a type of informal taxonomy), or trace their development by citation analysis. The review papers include Felix et al. (1982), Libby et al. (1977), Lev (1989), Ball (1971) and Parker (1988). Felix et al. (1982) concentrates on research in audit opinion formulation, listing various important papers and placing them in the context of the development of the topic, and categorizing them according to which portion of the auditor's opinion formulation process the papers study. Libby and Lewis (1977 and 1982) review the evolution of research in human information processing, and classify the constituent papers according to their research paradigms. Lev (1989) reassesses research in financial markets, examining the usefulness of accounting earnings to investors, highlighting declines in statistical power, and proposes a research agenda for accounting theory based on this reassessment. Finally, Ball (1971) Parker (1988) both offer bibliographic compilations of papers dealing with empirical research, arranged by topic, and accounting history, arranged by historical epoch, respectively. Among the citation papers are Gamble and O'Dougherty (1985 and 1987) and Hofstedt (1976). These papers focus on income smoothing, agency theory, and behavioral accounting and securities price research, respectively, with the purpose of describing the intellectual relationship the papers devoted to these topics have among themselves and with other papers (descriptive-integrative focus).

1.4.3 Papers on Evolution of Individual Accounting Journals

Regarding papers that study the evolution of specific accounting journals, these involve both formal and informal taxonomies, and citation studies. These include Brown et al. (1987), Smith et al. (1984), Chatfield (1975), and Dyckman et al. (1984). Brown et al. (1987), as the title of the paper implies, focuses on AOS, carrying out taxonomic analysis on taxons, in order to find out if there has been an increase in the rate of growth in topic areas relevant to AOS since its inception and determine its intellectual orientation, as well as limited citation analysis to identify AOS articles that have been most influential. Smith and Krogstad (1984) focuses on AUD, reporting on a citation analysis of the first six issues of the journal, documenting the diversity of its intellectual sources, which span both practice and academic literatures. Chatfield (1975) gives a general summary of the topical evolution of papers published in TAR. Similarly, but rather more exhaustively, Dyckman and Zeff (1984) looks at JAR, contrasting its topical evolution with TAR, supplying references to papers which exemplify the dominant topic areas of each journal, and brief citation summaries.

1.4.4 Summary of the State of Evolutionary Research and Relevance of the Proposed Study

There is an extensive and diverse set of evolutionary papers, all of which concentrate on either taxonomic attributes or citation distributions, almost exclusively. Therefore, although these papers are helpful in defining the characteristics of accounting research

both in regard to what topics are studied, and what methods are used to study these topics, and also in identifying the patterns in the citation use of the research, there remains the question of: “What is the interaction between the characteristics of research and their use in citations?”

Another related issue is that several of these papers are from an earlier period of the literature, and may need updating. For example, the latest development of accounting thought papers were published in 1989, and a decade and a half has passed since any comparable research has been published.

Thus, there appears to be an ongoing need for research that investigates the latest trends in the characteristics and uses of accounting research, thoroughly and systematically, and which also relates these two distinct sets of data, in an attempt to establish relationships between them. This research responds to this need in that it comprises both taxonomic and citation analyses, and is capable of employing them to delineate the latest developments in the literature and to find meaningful relationships between the two sets of data. In other words, it offers an update and more complete answer to the basic question: “What is the paradigmatic structure of accounting literature?”

Chapter 2: Literature Review

2.1 Overview

In the previous chapter (Ch. 1, Introduction), several papers were cited to summarize and contextualize the state of accounting literature. The objective was to define the contribution of past research in understanding the development of accounting literature as related to the main questions identified for this research undertaking. In contrast, this chapter (Ch. 2, Literature Review) will define the manner in which these past studies relate to the major questions, with a view to adapting them for use in this project. These papers will be dealt with in more detail than in the previous chapter. Moreover, several other papers, not mentioned before will also be identified and discussed. These papers are drawn mostly from the finance and economics literature, but are relevant to this project because they provide further background about citation analysis. Furthermore, their evaluative focus may be differentiated from the descriptive-integrative approach, which predominates in the accounting citation literature. Such an approach offers a useful adaptation for use in this research. This chapter is organized in terms of the question schema stated in Chapter One, such that each of them will be addressed in sequence.

2.2 Papers Investigating Taxonomic Attributes

The papers in this section provide formal or informal taxonomic analyses of various accounting research papers in order to determine their topical and methodological characteristics.

The first few papers, Tomkins and Groves (1983), Hopwood (1978), and Dyckman et al. (1984), do not involve formal taxonomic classification, but are related because they analyze intellectual influences, points of view, or changes that are measurable in terms of taxonomic attributes. Thus, these papers present research perspectives that may be used to motivate taxonomic analysis of the accounting literature.

Tomkins and Groves (1983) outlines six different research styles (methodologies) which it matches with types of research (topics) that are most amenable to use of this style. Currently, most research is done in the scientific style, wherein stylized and often unrealistic models of behavior are used in conjunction with statistical validation. An alternative is the naturalistic style, which studies phenomena in their natural setting. Six styles of research ranging from scientific to naturalistic are then enumerated.

According to the authors, the research styles respectively envision reality as a concrete structure, as a concrete process, as a contextual field of information, as symbolic discourse, as social construction, and as a projection of human imagination. With reality as a concrete structure, phenomena are viewed as fixed and determinate relationships that

one can discover by appropriate observation, as consistent with market studies. With reality as a concrete process, such relations between phenomena are considered as undergoing organic change, and are viewed as appropriate for research in the effects of accounting reports and their use, thus searching for generalizable patterns of change. Reality as a contextual field of information views the organic change as being generally harmonious and predictable, but with periodic instability, and is amenable to accounting research involving models of organizations which simulate probabilistically the behavior of the firm to various stimuli. Reality as symbolic discourse views the world as one in which people form separate impressions through interaction and negotiation, and is viewed as appropriate for research about how accountants attribute value and meaning to various events, people and things, such as in auditor behavior. Where viewed as a social construction, reality is subjectively valued on an event-by-event basis, with valuations changing constantly. Social construction is useful for studying compliance with accounting or auditing standards and their (non) application. Finally, when reality is viewed as a projection of the imagination, accounting behavior may be modeled as a function of such imaginings. Thus, Tomkins and Groves (1983) investigate both topical and methodological characteristics of accounting research, and suggest that there are proper pairings between these topics and the methods that ought to be used to study them. These findings confirm the Kuhnian idea that topically differentiated paradigms would have attendant methodologies unique to them, a postulation that is used in this study in order to identify the paradigms in accounting research.

Hopwood (1978) proposes approaches to an organizational framework for the study of accounting and information systems. In the course of doing so, he mentions intellectual influences, changing interests and concerns, and emerging issues. Among the intellectual influences identified is a geographical orientation. Whereas US organizational studies tended to deal more with micro, pragmatic, and functional topics, European studies are broader, more environmental, and conceptual and take into account historical and other influences on the organization. Hence, Hopwood (1978) points to an interesting geographical determinant of topical characteristics of accounting research.

Dyckman and Zeff (1984) trace the evolution of the content of JAR during its first two decades (1963 to 1982). They also characterize the academic climate prior to and during those years and outline the academic environment as initially being very normative in nature, then, during the 1960's, and spurred on to some extent by JAR towards a more positive focus, characterized by the adoption of mathematical and statistical methodology. The evolution of research in various areas (audit, tax, managerial, earnings vs. time series, international) and the use of various research rubrics (agency theory, behavioral, information economics, and market studies) are also outlined. In sum, Dyckman and Zeff (1984), describe changes in both topical and methodological characteristics of accounting research, as presented in JAR. They also suggest the idea of a particular journal as the embodiment of a research paradigm. As will be considered in succeeding chapters, the idea of journal embodiment of distinct paradigms is important to the paradigm identification methodology of this dissertation.

The papers Brown, Gardner, and Vasarhelyi (1987 and 1989), and Vasarhelyi et al. (1988) directly employ ARD taxons to investigate the evolution of accounting research, and are therefore formal taxonomic studies. The unit of study varies from accounting in general (Brown, Gardner, and Vasarhelyi 1989, and Vasarhelyi et al. 1988), to the development and contribution of a unique specialist journal in particular (Brown, Gardner, and Vasarhelyi, 1987).

Brown, et al. (1989) examines how certain attributes (research area, research method, school of thought, and geographical focus) are reflected in accounting research in terms of longitudinal changes in the number and proportion of articles exhibiting these attributes and citing such articles. The paper then models how trends in article attributes could be used to infer future proportions and numbers of articles having these attributes and citing them. For this purpose, AOS, TAR, JAE, and JAR papers published between 1976 and 1986 were subjected to attribute classifications and citation measures.

The study formulated two publication metrics, relative publications (the proportion of papers published in a year exhibiting a particular taxonomic attribute) and relative impact factor (the number of citations to a paper with a particular attribute in a year, divided by the sum of all papers with that attribute from 1976 to that year). These metrics were used to detect cross-sectional and longitudinal patterns, to relate relative publications and relative impact factors to time via regression to detect any temporal trends, and to investigate the predictive power of publications analysis to relative impact factor analysis.

The findings reveal that the dominant publication topic was financial accounting, followed in order by managerial, audit, information systems and tax, although the relative impacts of financial and managerial papers had declined as the impact of audit and information systems increased. The dominant research methods during the last two years in the study period were internal logic, primary archival, and laboratory studies, with significant increases in primary archival, laboratory studies, and opinion surveys, and significant declines in internal logic, case studies, and field studies. Papers using secondary archival and fields studies became more influential, as primary archival and laboratory studies became less influential. Finally, it was found that though the relative importance of these publications could be predicted with considerable success, the relative amount of future publications in an attribute area could be predicted with only rather limited success. The paper is another examination of topical and methodological characteristics, with the addition of citation analysis, to assist in identifying characteristics of highly cited papers. Brown et al. suggests that taxonomically distinct sets of research, whether or not they self-consciously identify themselves as paradigms, or are regarded as such by the research community, have different citation profiles as well. This concept is considered in this research project, wherein paradigms that have been identified are contextualized in the accounting research network, as receivers or distributors of intellectual influence, through their citation profiles.

Vasarhelyi et al. (1988) expands the scope Brown, Gardner, and Vasarhelyi (1989) by including two additional journals, JAAF and AUD, and increases the time period to study

papers published between 1963 and 1984. Taxons of interest were foundation discipline, school of thought, research method, and mode of reasoning. It was found that certain journals were so similar in their taxonomic attributes that they could be paired together (TAR and JAAF, JAE and JAR, and AOS and AUD). An increase in empirical, quantitative methodology was also documented. Borrowings from economics and psychology as foundation disciplines were found to be increasing significantly. Hence, this investigation of topical and methodological characteristics is distinguished by its attempt to discriminate between clusters of papers whose attributes seem to indicate their common membership in certain research groups. This descriptive-integrative focus is found mostly in citation rather than taxonomic development of accounting thought research. Thus, Vasarhelyi et al. echo Dyckman et al. in the apparent finding that journals, or groups of journals embody research paradigms.

Brown, et al. (1987) examines how the inception of AOS in 1976 as a specialist journal to investigate specifically international, behavioral, social and organizational research, has led to the furtherance of research in these topics. A method was to ascertain whether AOS has had a complementary rather than a merely supplementary effect on the research on these topics, as would be evidenced by a higher rate of growth in these articles after AOS inception. Specifically, the paper measured the percentages of articles that were devoted to the aforementioned research topics in AOS between 1976 and 1984, and in TAR and JAR, two general audience journals, between 1963 and 1984. It was found that not only had AOS published substantially many more papers on these topics, but also that in one area, international research, TAR and JAR had greatly increased their proportion

of publication in the area, while maintaining steady growth in the percentage of papers in the other aforementioned topics. A further contribution of the paper is its documentation of the differential nature of foundation disciplines and research methods in order to determine the intellectual positioning of AOS vis-à-vis other journals. This was done by categorizing AOS papers under the ARD taxons enumerated in the Appendix and comparing the distribution to those papers in TAR and JAR. It was found that AOS was very differently positioned intellectually from TAR and JAR, in that its foundation disciplines and research methods were frequently different from the other two. Limited citation analysis was also carried out to identify AOS papers that have been most influential.

Apart from the important findings outlined above, Brown et al. (1987) provides this study with a specific method of finding paradigms, which is paradigm self-identification. The specific manifestation of this technique is discussed in succeeding chapters.

2.3 Development of Accounting Thought Papers Investigating Citation Patterns

The papers in this section engage in citation analysis in order to determine how scholars employ previously published research papers. Specifically, such an approach answers questions about which research cites which other research (a descriptive-integrative inquiry), and about which research is cited the most (an evaluative query).

2.3.1 Descriptive Citation Analysis

Bricker (1989) infers a structure of accounting research. The paper is essentially interested in finding the degree of integration or fragmentation of accounting as a research discipline. An integrated discipline may be comprised of several research areas possessing common attributes, which are themselves associated with one another as one goes up the research hierarchy from more specialized areas to less specialized domains, eventually culminating in one general area. On the other hand, a fragmented discipline will have less association between constituent research areas, and may have more than one most general research domain at the top of the hierarchy. Thus, the paper investigates the extent of research nesting between areas, the number of research areas at the most general level, and the role of accounting journals in the integration process. Using data from an earlier version of the ARD (for papers published in *Abacus*, AOS, TAR, JAE, JAPP, and JAR between 1983 and 1986) it develops a schema that measures how different areas of accounting research differ in their specialization using cocitation and clustering analysis. Cocitation clustering assumes that there is an intellectual relationship between every possible pair of papers in a bibliography. Papers are cocited if they appear in the same bibliography. The more times a pair of papers is found in a particular set of bibliographies, the stronger the cocitation strength. The level of association between papers was measured by varying cocitation thresholds (from 3 times to 12 times), and content analysis and discriminant analysis were used to identify frequently occurring taxonomic classifications in order to define topical clusters. It finds that the process of accumulation of knowledge in accounting research is similar to that of the basic sciences in that accounting citations tend to be relatively recent, that certain

journals are cited in other journals disproportionately more than others, and that certain topical clusters exist based on cocitation strengths between articles in that research area. Furthermore, it was found that certain research clusters were quite isolated, leading to the conclusion that accounting as a research discipline is incompletely integrated, which may not bode well for the explanatory or predictive power of the research. Thus, this paper addresses questions about which groups of research tend to be cited together by other research, indicating the structure and degree of integration of accounting research, offering a descriptive-integrative perspective. Bricker's findings and methodologies do not have a direct impact on this dissertation, because the unit of study that Bricker researched (individual papers) are different than those studied in this dissertation (journal groups/ paradigms). Nevertheless, Bricker raises some critical issues about the degree of integration of artifacts of research, both within research sectors and also into the mainstream of the accounting research network. These concerns are revisited in this study, specifically in the part that paradigm integration plays in calculating the extent of its optimal diversity.

McRae (1974) documents patterns of citation density and flows of accounting research influence, thereby describing the intellectual role of various journals. As mentioned in the previous chapter, the paper uses citation data from 17 journals over the period 1968 to 1969. It investigates the manner in which knowledge clusters are formed and interact with one another, by measuring such features as complexity, congruence, propensity to store, and propensity to distribute knowledge. Complexity of an area of research is quantified as inversely related to the proportion of messages transmitted into it from other

areas via citation. Congruence is defined as the extent to which one area both sends and receives citations to other areas. Journals are revealed to be either storers or distributors of knowledge based on citation flows, and its degree of specialization is indicated by the extent to which it cites itself. It was found that the intellectual field of accounting is relatively open to outside influence, although, conversely, it wields less influence among other fields. Three topical areas emerge: academic oriented, management oriented, and professional oriented. Citation profiles of the various journals are also provided. Hence, this paper, describing the roles of journals within accounting research via citation analysis, falls under the descriptive-integrative group of development of accounting thought papers. McRae's efforts at finding the specific roles that various journals play in the accounting research network will be revisited in this study, with the difference that rather than individual journals, distinct paradigms will be the focus of the investigation.

Three similar papers attempt the same task in other academic fields. Eagly (1975) describes information exchange among eighteen economics journals for papers published between 1961 and 1964, and 1970-1971. The paper uses citation data in several ways to describe the intellectual structure and interaction within the corpus of the research. Specifically, the paper investigated the degree of network congruence, journal sending-receiving ratio, extent of journal self-feeding, traffic filtering, international balance, and network structure of finance research. Network congruence is the extent to which a journal cites other journals in proportion to the number of times the journal is itself cited, such that it would indicate the degree of similarity between that journal and other journals in the population. The sending-receiving ratio is defined as the ratio of the number of

times it is cited by other journals to the number of times it cites other journals, where a high value indicates that the journal is a feeder of network information, while low values indicate that it is a storer of information. The self-feeding ratio is defined as the relative frequency the journal cites itself, suggesting its degree of specialization in a particular topic. Traffic filtering is another measure of a journal's specialization, computed as the number of citations a journal makes to papers devoted to a particular area of study. The international balance of information exchange was quantified as the receptivity ratio, which is computed as the ratio of the frequency a journal cites US journals, to the frequency it cites international journals. Finally, network structure was identified by orienting the journals graphically according to their sending frequency (frequency of times they are cited). It was found that the degree of feeding and centrality in the network structure was correlated to independent survey assessments of journal prestige. It was also found that international journals tended to be more open (receptive) to foreign influences than US journals. Eagly provides a number of very useful methodologies for citation analysis, several of which are adopted in this dissertation. These citation metrics are specified and explained in detail in succeeding chapters.

Stigler et al. (1995) examines the principal journals of economics, focusing on inter-journal citations between 1987 and 1990. The paper develops the concept of a cited journal's paper's export score, measured as the relative propensity of a journal to be cited by other journals, as compared to other cited journals. A further contribution is the measurement of journal segregation, to document the degree of specialization of each journal, by using the ratio of the odds that a journal in a particular group (group A) will

cite another journal in that group vs. a journal in another group (group B), to the odds that a journal in group B will cite a group A journal vs. citing another group B journal. Finally, Stigler (1994) reviews and analyzes citation data for 33 statistical journals. It undertakes simple citation counts, measures of the "balance of trade" to determine if a journal is a net importer or exporter of intellectual influence (number of citations to other journals/ number of times cited by other journals), analyzes the impact factor of the journal (ratio of the number of times it was cited by other journals to in the last two years to the number of papers published in that journal during the same period), the extent and diversity of its intellectual export market (Gini index, calculated as 100 times the sum of the square of the number of times a journal is cited in a particular other journal), and measures of bilateral trade (export score, calculated as the log odds that a journal is being cited by other journals). Stigler's use of the Gini index is adopted for use in many ways in this study. As will be seen in later chapters, the Gini index will provide a measure to measure the intellectual influence of paradigms, and also to characterize their taxonomic profiles, as well.

The next three papers, Gamble et al. (1985 and 1987) and Hofstedt (1976) are similar in that they specifically focus on particular accounting research topics, rather than on accounting research in general.

Gamble et al. (1987) uses citation analysis to trace the development of thought in the agency theory area of accounting research. It compiles citations by papers in the agency area published from 1972 to 1984, using literature review papers as a reference for listing

which papers are classifiable as agency papers, and collecting citations to them using the Social Science Citation Index. Gamble then proceeded to break down citations by journal and by age, correlate the cumulative number of citations to the cumulative number of papers during the same time period, and carry out cocitation analysis for papers with seven or more citations in order to create a cocitation network diagram for frequently cited papers. Gamble finds that the rate of growth of papers was positive over time, and that the rate of growth of citations with respect to papers was positive, and over time was negative (older papers are less cited than newer ones). The cocitation analysis revealed that economics had a greater impact on the agency literature than accounting, and that certain papers were perceived to be highly related.

Gamble (1985) suggests the use of citation indexing and analysis as tools useful for the research process. It defines citations as formal links between papers, and indexing and analysis of such links by documentation and subsequent mathematical manipulation yields some useful information. Gamble focuses on accounting research specifically studying income smoothing. The paper makes use of two types of citation analysis: cocitation analysis and bibliographic coupling. As mentioned before, cocitation documents how frequently a pair of papers is cited in a third paper. For this study, only papers cited at least ten times were included for cocitation analysis. On the other hand, bibliographic coupling records how often a pair of papers shares a common reference by citing a third paper. Thus, it might be said that both measures would reveal how closely two papers are related, either because they are perceived to be so by the same citing author (cocitation), or because they share common building blocks (bibliographic

coupling). Findings with regard to cocitation reveal strong relationships between certain papers, the emergence of a research front as shown by the linkage of more recent papers to a specific subset of the earlier papers, and a shift in the focus of the literature from the development of the income smoothing hypothesis to the testing of that hypothesis.

It was also found that there was an apparent absence of a relationship between cocitation and bibliographic coupling (pairs of papers appearing in a third paper, and are deemed to be related by users, strangely do not often share references, indicating that they may not have been deemed to be related during their conception).

Hofstedt (1976) evaluates the literature on behavioral accounting research (BAR), comparing and contrasting its development with that of securities price research (SPR). The comparison is carried out using citation analysis. Papers in these areas of research were identified from TAR, JAR, and *Empirical Research in Accounting: Selected Studies* (ERA). Sources of citations indicated in the BAR and SPR papers were identified, and these sources were analyzed as to what journal, topic area, and age.

It was found that SPR papers tended to cite more recent papers, and papers from a narrower topic area set than BAR; this lead to the conclusion that BAR was relatively less mature (“pre-paradigmatic”) than SPR as a research area.

Therefore, there exist in the descriptive-integrative citation literature examples of papers, which attempt to describe the intellectual development of specific branches of accounting

research. These various citation analysis papers are useful to this study because they provide important precedents to the use of citation analysis in investigating the characteristics and relationships between topically oriented subsets of the accounting research network.

2.3.2 Evaluative Citation Analysis

The previous section on descriptive-evaluative citation literature reviewed research which focused upon addressing the question “How is accounting research being used?” in terms of which research cites which other research, and delved into the implications of these research in terms of inferring a structure of research in an academic area, describing the roles of research journals, and describing the development of specific topics within the academic field. The remaining papers will be devoted to the evaluative question, “Which research is cited most?” As has been alluded to earlier, while accounting citation literature has tended to be descriptive-evaluative in nature, citation literature in finance and economics often use citation data to explicitly rank research outlets according to their intellectual impact. This implies that finance and economics citation literature has evolved a more evaluative orientation. Therefore, a multiplicity of citation impact metrics is developed, which may be adopted for use in evaluating accounting research.

Alexander and Mabry (1994) examines a set of finance journals (*Journal of Finance*, *Journal of Financial Economics*, *Journal of Financial and Quantitative Analysis*, and *Review of Financial Studies*) to determine citation patterns in their constituent papers.

The paper measures a cited paper's article effectiveness, impact efficiency, and half-life. Article effectiveness is measured by dividing the number of times a journal is cited by the number of articles in that journal. Impact efficiency is the number of times a journal is cited divided per 10,000 words published in the journal. Thus, these two metrics indicate how highly regarded a journal is, scaling for volume of output per journal. Half-life is measured as the median year of publication of all cited paper's published in a journal, for any particular year of citations. Hence, it is a measurement of the rate of decay of its intellectual importance. The paper generates a ranking of various journals and other sources of citations (working papers, books, etc.) based on the extent of their contributions to the four aforementioned journals, rating these sources according to impact efficiency and article effectiveness. The paper goes on to document average half-lives, as well as rankings of specific authors and papers.

Borokovich et al. (1995), studies finance research productivity across 661 academic institutions from 1989 to 1993. It bases its rankings of institutions by studying the impact of their faculty's papers, as quantified by the impact factor. This factor is calculated as the number of citations per year attributed to papers published in a particular journal in the two preceding years, divided by the total number of papers published in that journal in the two preceding years. The paper also engages in regression analysis with citation impact factors included as predictors of the type of academic institution (accredited vs. non-accredited, public vs. private, prestige ranking).

Borokovich et al. (1999), examines the performance of the journal *Financial Management*, and also uses the concept of a cited journal's impact factor, as well as other citation metrics. The immediacy index metric, calculated as the number of times a journal's papers are cited in a year, divided by the number of articles published in the journal that year, is similar to the impact factor as both are an indication of a journal or paper's recent influence. The paper also adopts the Deurenberg index, computed as the product of the impact factor and the half-life, which contrasts with the other two metrics, as it is a measure of the long-term influence of a journal.

Bush et al. (1974) carries out citation analysis of several economics journals (*American Economic Review*, *Econometrica*, *Review of Economics and Statistics*, *Journal of Political Economy*, *Journal of the American Statistical Association*, *Quarterly Journal of Economics*, *Journal of Finance*, *National Tax Journal*, *Canadian Journal of Economics*, *International Economic Review*, *Southern Economic Journal*, and others). The objective was to document the contribution of each journal to the research during the time period 1966 to 1970. Longitudinal trends of citations patterns (both including and excluding self-citations) as well as percentage breakdowns of citations by journal to every other journal were identified. It was found that journal rankings based on citations were very similar to rankings obtained by surveys of researchers.

Liebowitz et al. (1984) analyzes citation patterns recorded in the SSCI for over 100 economics journals based on papers published between 1975 and 1979. The study generates a number of alternative journal rankings, based on total number of citations,

citations adjusted for origin (where citations from non-economic or less influential economic journals were weighted less), citations deflated by the number of characters printed, and citations deflated by number of papers published in the journal. The latter two measures attempted to control for journal size or research volume.

Hamelman et al. (1974) analyzes citation data for 41 finance journal papers published between 1966 and 1970. It ranks journals according to their propensities to be a source of citations. It also documents the concentration ratio of a journal, which is the ratio of the number of journals containing a given percent of citations to the total number of journals cited during the same time period, and is thus a measure of the width of the disciplinary base of the journal. Finally, it categorizes the source journals of citations according to their field (accounting, economics, general business, finance, management, and marketing), in order to identify cross-disciplinary citation patterns.

Finally, Ederington (1979) points out that previous studies find that citation counts are a reliable source of the intellectual caliber of a paper, because they indicate the esteem that other experts in a research area feel for the work of a researcher, and because they correlate positively with other forms of academic recognition. With this motivation, it explores the various characteristics of highly cited papers. Data is based on SSCI citation index, focusing on cited finance papers published in the *Journal of Finance* and the *Journal of Finance and Quantitative Analysis* between 1967 and 1972. The paper determines characteristics of significant (highly cited) works, by testing hypotheses that the number of authors, the academic affiliations of authors, and the length of the article

correlate positively with the number of times it is cited. The findings support these hypotheses.

This body of evaluative citation analysis research provides important insight and guidance for citation analysis as a measure of the intellectual importance of artifacts of research. It should be noted that most all of these evaluative citation papers are from the fields of economics, finance, and statistics. This study will provide one of the first attempts to deploy these evaluative citation measures to the accounting research literature.

2.4 Summary of Literature

Today, there exists a rich, diverse body of accounting literature. This study will employ methods established in previous work as to taxonomic and citation analyses in order to address the main topic of interest: “What is the paradigmatic structure of accounting literature?”

While some of the papers do not actually involve taxonomic classifications, they constitute a nexus or point of contact by providing a study of research perspectives or intellectual influences related to the evolution of accounting research through time. A number of papers provide examples of taxonomic classification and types of studies that could be carried out using such classification, in order to trace the topical and methodological development of accounting literature. Hence, they provide a variety of

answers to the questions: “What topics are researchers studying?” and “What methods are researchers using to study these topics?” Specifically, Tomkins and Groves (1983), Hopwood (1978), and Dyckman and Zeff (1984), while not offering a comprehensive and systematic answers to these questions, offer guidance by identifying influences on topics and methods. More formal taxonomic studies, such as Brown et al. (1987 and 1989) and Vasarhelyi et al. (1988), carry out systematic classification of papers according to topics and methods. Furthermore, these papers are important in that they also explore how characteristics of papers may influence how often they are cited, albeit for a rather limited subset of journals (Brown et al. 1989), how journals cluster together around certain common attributes (Vasarhelyi, 1988), and how a specialist journal exhibits unique attributes while influencing the attributes of other journals (Brown, et al. 1987).

At least one important distinction arises in these works about citation analysis. There is a divide between those studies focused on describing and integrating the intellectual research networks comprising the accounting literature (Which research cites which other research?), and those focused on evaluation of the intellectual influence of cited research (Which research is cited most?). To the former group belong Bricker (1989) who integrates accounting research into an intellectual structure, McRae (1974) who describes the roles that journals play in the accounting research network, and is similar to Eagly (1975) and Stigler (1994 and 1995), which do the same for economics and statistics, and Hofstedt (1976) and Gamble et al. (1985 and 1987), which describe the development of specific accounting topics. To the latter group belong Alexander et al. (1994), Bhorokovich et al. (1995 and 1999), Bush et al. (1974), Liebowitz et al. (1984), and

Hamelman (1974), all of which develop metrics based on citation frequency to gauge the influence of research.

This study will employ several concepts and techniques found by this broad body of research literature. As mentioned above, the taxonomic phase of analysis benefits greatly from the paradigm identification methodologies of several accounting research papers surveyed in this chapter. The citation analysis component of this study will employ several metrics developed by citation analysis papers from fields other than accounting, such as economics and finance.

The next chapter (Ch. 3, Hypotheses and Research Questions) will explain how the proposed research will employ this literature to a variety of issues using data in the ARD. The objective will be to document taxonomic and citation patterns as has been accomplished in previous research and also to further the literature by combining the two perspectives to ascertain whether or not they affect one another.

Chapter 3 Hypotheses and Research Questions

3.1 Overview

This chapter will develop a number of hypotheses and research questions related to the paradigmatic structure of accounting literature. As indicated in previous chapters, the hypotheses and research questions will follow a specific flow of inquiry. First, paradigms are distinguished by establishing systematic differences in topical focus and research methodology. Second, the various roles played by these paradigms within the citation structure of the accounting research network are defined, and their intellectual influence upon one another is measured. Finally, characteristics that contribute to increased intellectual influence will be identified. The papers that motivate these hypotheses and research questions have already been mentioned and described in Ch. 2 (Literature Review) and in some cases, in Ch. 1 (Introduction).

3.2 Hypotheses

The first level of inquiry in defining the paradigmatic structure of accounting literature requires that the different paradigms of accounting research be identified, and their distinguishing characteristics be described. The hypotheses concern themselves with these tasks.

The Kuhnian model of paradigm shifts basically involves the periodic replacement of one view of reality with an alternative one. Every specific view of reality necessarily constricts its focus to a subset of real phenomena, to the exclusion of other aspects of reality. As Benbasat and Weber (1996, p.397) state: “we cannot conceive of any single paradigm or even a group of paradigms that could ever account for all the phenomena that are properly the concern of members of an academic discipline.” A similar conclusion is expounded by Mingers (2001, p.248): “different paradigms provide us with different perspectives or insights into a reality that is forever more complex than any one theory can capture.” Consequently, each paradigm is necessarily limited to a distinct topical area. Thus it is possible to view the formation of a paradigm as a collection of research around a particular academic topic, or, as in the ARD, a collection of papers categorized under the same school of thought.

Thus, H1: There will be significant differences in the frequencies at which the different paradigms study topics in the various schools of thought..

Hopwood (1978) posits that the particular conception of reality under which a researcher operates often determines his manner of research. Indeed Hopwood prescribes a series of correspondences between research views and modes of study. Relating this notion to the realm of Kuhnian paradigm shifts, it would imply that between different paradigms, the various methods of research employed would be significantly different (Kuhn, 1970). As Kuhn states, a paradigm would consist of an “implicit body of intertwined theory and methodological belief” (Kuhn, 1962, pp. 16-17). The manifestation of this phenomenon

in the ARD schema would be the emergence of groups of papers, clustered around different paradigms, with each group of papers exhibiting different methodological characteristics, as portrayed by the methodological taxonomic categories of the ARD, namely, research method and mode of reasoning.

Thus, H2: There will be significant differences in the frequencies at which the different paradigms use the various research methods.

And H3: There will be significant differences in the frequencies at which the different paradigms use the various modes of reasoning.

Another ARD taxonomic category that would exhibit telltale differences between paradigms is the foundation discipline category. The foundation discipline taxon identifies a paper's intellectual basis from among several academic disciplines. Ostensibly a topical taxon, it also captures methodological characteristics as when it borrows techniques of data collection or analysis from one of these academic fields. Thus, for both sets of motivating reasons that apply to H1 through H3,

H4: There will be significant differences in the frequencies at which the different paradigms use the various foundation disciplines.

3.3 Research Questions

A further level of inquiry into the structure of accounting research paradigms is concerned with defining the roles of the various paradigms in distributing and collecting knowledge and insight among one another. This level of inquiry pertains to both descriptive-integrative and evaluative types of citation analyses. The descriptive-integrative focus deals with measuring the degree of specialization or openness that characterizes each paradigm, and the particular function of the paradigm as a storer or distributor of intellectual output. The evaluative focus measures the extent of intellectual influence each paradigm exerts on other paradigms.

The incorporation of citation data into this analysis involves investigation of another aspect of the paradigms of accounting research. Whereas the taxonomic data allow research into the identification, characterization, and differentiation of paradigms, the citation data will be more concerned with the interaction of these paradigms to one another.

Two important, if somewhat antithetical, concepts underpin the dynamics of paradigm interaction. These concepts are paradigm incommensurability and paradigm shifts. As mentioned earlier, paradigms are alternative views of the same reality, such that they necessarily exclude and deny the plausibility of other paradigms. This exclusive claim to truth makes competing paradigms incommensurable to one another. However, given the fact that paradigm shifts do occur, then it necessarily means that in order for one of

several competing ones to emerge dominant, other paradigms must “give way.” This “giving way” could be manifested in the incorporation of an external paradigm’s influence into the acceding paradigm, perhaps to the point of annihilation of the latter.

Bricker expresses the link between specialization and incommensurability saying: “fragmented disciplines experience incommensurability, the inability of scholars from constituent research areas to communicate. During periods of fragmentation, the various research schools compete for hegemony and this piecemeal approach to research detracts from its efficiency” (Bricker, p. 247, 1989). His research also “lends partial support to assertions that accounting research is fragmented” (Bricker, p. 261, 1989).

The citation data permit the investigation of both of these two paradigm phenomena, incommensurability and shifts. A paradigm’s incommensurability is closely related to the degree to which the paradigm is specialized. This phenomenon results from the fact that more specialized paradigms tend to develop topical foci and methodological techniques unique to that paradigm, and therefore less readily applicable to other paradigms. The result of this link between specialization and incommensurability implies that various citation metrics aimed at measuring specialization also act as proxy measures of incommensurability.

As explained in Ch. 4, the self-feeding ratio is the primary measure of specialization in the citation analysis methodology. Therefore, the computation of a paradigm’s self-feeding ratio would determine the extent of that paradigm’s incommensurability.

Thus, RQ1: To what extent are the various paradigms incommensurable to other paradigms?

Citation metrics are able to approximate the extent to which particular paradigms are able to effect a paradigm shift, and thus become dominant. These citation metrics are those that measure the extent and scope of paradigm influence. This approach “has gained... wide usage in... basic social science disciplines” (Hofstede, p.44, 1976). Also, Gamble, et al (1987) states that “citation analysis has proved a quite useful tool for evaluative purposes (p. 10)” and that the paper “demonstrated the use of citation analysis... profitably used by accounting historians to study the development of accounting thought (p.25).” Finally, Brown and Gardner (1985) used citation analysis to assess the overall impact of various studies on contemporary accounting research. In summary, there is a strong consensus that citation analysis is a good proxy for evaluating the influence of a paradigm, and its likelihood of gaining supremacy.

The following set of citation metrics are able to portray various aspects of a paradigm's influence, such as the actual extent of the influence, the potential for influence among other paradigms, and the diversity of the paradigm's influence.

The net send-receive ratio, as mentioned in Ch.4, is the fundamental measure of a paradigm's actual external influence on other paradigms. Hence, if a paradigm becomes the dominant paradigm in research network, its net send-receive ratio would be higher than all other competing paradigms that it dominates. Consequently, the computation of a

paradigm's net send-receive ratio would yield a measure of its influence, and the extent of its dominance over other paradigms.

If the net send-receive ratio expresses a paradigm's actual influence on other paradigms, the gross send-receive ratio portrays a paradigm's potential influence. This is because the gross send receive ratio measures the maturity of a paradigm, the degree to which a paradigm's concepts and findings have been developed and elaborated. The more mature a paradigm, the greater the store of citable material that could potentially be borrowed by other paradigms. Therefore, computation of a paradigm's gross send-receive ratio is a proxy of its potential influence.

The final aspect of paradigm influence that is quantifiable by citation metrics is the diversity of that influence. The diversity of a paradigm's influence corresponds to its ability to broadcast its ideas to a wide and varied group of other paradigms, rather than to a very narrow segment of the research network. It is a separate aspect of paradigm influence because it does not merely reflect if a paradigm is a net exporter of ideas, but also depicts the breadth of that paradigm's appeal among other paradigms. The primary measure of the diversity of a paradigm's influence is the Gini index, which was explained in Ch. 4. Because the Gini index measures diversity or concentration of distribution, it can be applied to citation analysis, to see if a paradigm is able to import its intellectual influence to a wide variety of other paradigms, or if its influence is constrained to a small subset of the research network.

Thus, RQ2: How influential are various paradigms?

Another issue that bears further exploration is the diversity of each individual paradigm. This research question would entail combining taxonomic analysis, to determine the actual diversity of a paradigm according to its topical and methodological characteristics, and citation analysis, to determine the effect of that diversity on the paradigm's viability as a research front.

Diversity of research outlets be they individual journals, paradigms, or entire academic research fields, is a characteristic that is viewed with both approval and apprehension.

Supporters of methodological and topical diversity marshal several arguments in its favor.

“Two basic arguments are provided in order to advocate methodological pluralism: different methods provide a different view on a certain phenomenon of interest and research (process) takes places in different phases which show substantially distinct characteristics which thus require the application of different research methods. Thus, claims can be found in recent literature stating that the analysis of a complex phenomenon, requires diverse research methods, no matter from which research paradigm or approach they originally are. As a result, a methodological pluralism is advocated which allows that every method is able to be combined with every other one.” (Niehaves, 2005)

“A diversity of research methods and paradigms within the discipline is a positive source of strength. This is primarily because diversity provides a wider range of knowledge traditions upon which to base research and theory, which is particularly important in a discipline like IS which deals with real-world complexities. . Different research methods (especially from different paradigms) focus on different aspects of reality and therefore a richer understanding of a research topic will be gained by combining several methods together in a single piece of research or research program...Different paradigms each focus attention on different aspects of the situation, and so multi-method research is necessary to deal effectively with the full richness of the real world...A research study is not usually a single, discrete event but a process that typically proceeds through a number of phases. These phases pose different tasks and problems for the researcher. However, research methods tend to be more useful in relation to some phases than others, so the prospect of combining them has immediate appeal. Even where methods do perform similar functions, combining a range of approaches may well yield a better result. ” (Mingers, 2001).

Those cautioning against research diversity make the following arguments.

“Other authors emphasize that this would be theoretically unsound due to a “paradigmatic incommensurability”, mainly taking into account epistemological and ontological assumptions... Cross-paradigmatic designs here are seen in terms of failure to recognize the intrinsic worth and nature of alternative methodologies... methodological pluralism and cross-paradigmatic research based on different ontologies and epistemologies is argued to be without sound foundation. Paradigm incommensurability would then, as a

consequence, lead to a corresponding incommensurability of research methods coined by different paradigms.” (Niehaves, 2005)

Therefore, the diversity of a paradigm’s methodologies and topical foci is not necessarily a desirable thing. On the one hand, multiplicity of methods and topics has many advantages. Plurality of topical emphases provides the ability to study a wide variety of phenomena related to the main focus of the paradigm. Multiple research methods result in the ability to capture different aspects of these phenomena. The employment of several types of statistical modes of reasoning is also desirable because of the added level of assurance these different methods provide when used together to verify and affirm research conclusions. A further justification for multiple methodologies results from the fact that different stages of research require different methodologies to be used.

Initially, papers are prepared with statistical methods that show mere association of variables, such as non-parametric statistics. Later, theoretical models utilizing non-empirical quantitative methods would be built in order to provide formal structure to the supposed relationship between variables. The next step would be the use of empirical statistical methods to formally establish the modeled causation between the variables. Perhaps a final step would be the preparation of qualitative, natural language papers meant to communicate the idea to interested parties beyond the academe.

On the other hand, the proliferation of methods and topics could be seen as symptomatic of an incipient dissolution of a paradigm. This is because the various constituencies within the paradigm that are producing these diverse artifacts of research may be seen as proto-

paradigms, which, upon reaching a crisis, could fragment the old paradigm into several different ones. It is important to note that prior to this break-up of the old paradigm, the different constituencies would experience incommensurability amongst themselves, such that there would be a decrease of citations between these research constituencies. This is what Kuhn would refer to as a “breakdown in communication.” This decrease in citations within the paradigm would show up as a decrease in paradigm self-citation. Thus, paradigm self-citation could be seen not only as a measure of specialization, but also as a diagnostic of paradigm health and viability.

What emerges from these two antithetical positions is the idea that the diversity of a paradigm is advantageous so long as it does not presage a breakdown in communication within the paradigm. That is, a paradigm benefits from the topical and methodological diversity of its constituencies, provided these constituencies are able to share their various findings, gleaned from different viewpoint, with one another.

Therefore, it is possible to come up with a metric that quantifies the optimality of diversity of methods and topics within a paradigm. This metric, which is unique to this dissertation, would be the product of the extent of a paradigm’s diversity multiplied by the extent of that paradigm’s self-citations.

As explained in Ch. 2, the Gini index is the premier statistical measure of concentration or diversity of any variable. The Gini index was used to determine the diversity of the dispersion of citation sources and destinations of the various paradigms. However, the Gini index will now be re-deployed to measure the diversity of dispersion of the methodologies used and topics studied for each paradigm.

The next problem is to take into account the fact that the raw diversity score, in itself, is not particularly informative because it fails to indicate if this diversity is beneficial or detrimental to the paradigm. As discussed above, diversity is beneficial only to the extent that it does not jeopardize the paradigm by fomenting dissent among the diverse constituencies of that paradigm, which would be depicted by a low frequency of self-citation within the paradigm. Thus, the solution to this is to bring in another term into the formula for diversity, which captures the extent of self-citation within the paradigm. This term would be the self-feed metric, which is explained in Ch.4.

The new diversity metric would be the product of the raw diversity metric and the self-feed ratio. This would produce a value that increases with increasing diversity within the paradigm, as well as with increased self-citation. This new diversity metric would be a measure of beneficial diversity because of its mathematical relationship to the self-citation metric, and is therefore called the optimal diversity metric

Thus, RQ 3: How diverse are the various paradigms?

And, RQ 4: How does this diversity affect the intellectual influence of the paradigms?

Chapter 4 Methodology

4.1 Overview

The ultimate objective of this research is the depiction of the paradigmatic structure of accounting literature. This objective entails the identification, characterization, and evaluation of various research paradigms within accounting academic literature, so as to define their topical emphases, methodological tools, and citation profiles. Because a research paradigm may be identified by its unique combination of topical and methodological characteristics, it is possible to infer the existence of such paradigms from the taxonomic morphology of research literature.

Thus, this research will employ taxonomic data to identify research paradigms by ferreting out significant differences in the topical and methodological characteristics of research papers. The specific sequence of actions to determine these differences involves structured data gathering, aggregation and summarization of topical and methodological characteristics, and graphical and quantitative analysis to determine significant differences among different journal groupings, whose significantly differentiated set of taxonomic characteristics proclaims it to be a research paradigm.

4.2 Data Gathering

Structured data gathering is the first phase in the methodology. As mentioned in Ch.1, the journals included in the analysis are the JAR, TAR, AOS, JAAF, JAE, AUD, CAR, AHJ, JAPP, and JIS. Taxonomic analysis is carried out on all papers in these journals from 1963 onwards, coinciding with the inception of JAR, a journal considered to be the most rigorous in the field. Only papers 5 pages and longer were classified. This criterion was established because the purpose of the taxonomic analysis was to characterize only substantive academic research. Thus, shorter papers, which tended to be practitioner articles, commentaries, or textbook reviews, were excluded.

Therefore, the scope of the ARD captures a wide variety of journal types, from those that deal with accounting in general, to those that deal with the interaction of accounting with other social phenomena, and finally, to those that specialize in particular accounting areas or schools of thought.

4.2.1 Taxonomic Classifications

Direct inspection of the ARD's constituent papers was carried out to determine their taxonomic attributes. All papers were read by faculty or graduate students of the Rutgers University Accounting department, and classified according to the ARD rubric. Throughout the process, continuing supervision of the inspection and classification was

maintained by one of the scholars who developed the ARD, thereby insuring accuracy and consistency.

The papers included in the ARD were analyzed according to several taxonomic classification schemata. These included (1) mode of reasoning, (2) research method, (3) school of thought, (4) information, (5) treatment, (6) area, (7) geography, (8) objective and (9) foundation discipline. A more detailed explanation of these various taxons and their constituent categories is included as an Appendix.

4.2.2 Identification of Journal Group Paradigms

The next necessary step is therefore to achieve a degree of aggregation in order to acquire a set of data points amenable to statistical differentiation. This aggregation is accomplished in two steps. The first step is to group individual research papers according to journal. This step is meaningful, as journals have been known to embody, by themselves, particular research paradigms, as was suggested by Brown, et al. The approach was employed by Brown, Gardner, and Vasarhelyi (1987), which identified and differentiated a distinct research paradigm comprised of the journal AOS. Brown, et al. conducted its paradigm differentiation by documenting the emergence of the paradigm by self-identification. Specifically this entailed scanning the editorial policy statements of the journal, and then establishing and confirming the morphology of the paradigm by taxonomic analysis.

To this end, the editorial statements of policy, aims, and scope of the various journals are scanned to glean an indication of any paradigm affiliation.

Of the several ARD journals, five distinct, self-identifying paradigms emerge. These are the socio-policy group (AOS, JAPP, and RAR), the audit group (AUD), the general purpose journal group (CAR, JAR, TAR), the econo-finance group (JAAF and JAE) and the information systems group (JIS).

AOS, JAPP, and RAR, which comprise the socio-policy journal group/ paradigm, have pursued international, regulatory, behavioral, social, legal and organizational research, as applied to accounting. The editorial policies of these journals bear this out. RAR focuses on accounting regulatory policy, which is comprised of institutional concerns such as “self-regulatory activities and training and accreditation of accounting bodies, legal matters such as case law and litigation, and regulatory activities regarding markets and disclosure.” JAPP publishes research papers that focus on the “impact of economics, political science, sociology, or law on accounting activity.” AOS is rather broader in its coverage and covers “social, behavioral, organizational, institutional, and political aspects of accounting and management.”

JAR, TAR, and CAR, comprising the general purpose journal group, could be categorized as broader-based accounting research outlets, with papers spanning a relatively wider range of topics than the other journals. Their editorial statements reveal this. For example JAR’s states that it “publishes original research using analytical,

empirical, experimental, and field study methods in accounting research.” Similarly, TAR “embraces any research methodology and any accounting-related subject.” Finally, CAR “is a multi-focus journal that accepts and publishes academic papers from any area of accounting, auditing, and tax research.”

The second paradigm is that comprised of the journal, AUD, the lone proponent of this paradigm. To quote from its editorial statement: “The purpose of this journal is to contribute to improving the practice and theory of auditing... the term auditing interpreted broadly and encompassing internal and external auditing, as well as other attestation activities or phenomena.” Hence this paradigm is expected to publish papers related to auditing and attestation, a focus unique to this paradigm.

JAAF and JAE, also focus on accounting in general, but with special emphasis on the interface of accounting on one hand, and finance and economics, on the other. This is apparent in their editorial statements, as well. JAE very explicitly proclaims itself “a forum for the publication of the highest quality manuscripts which employ economic analyses of accounting problems.” JAAF makes a point of saying “papers on accounting issues relating to developments in other fields such as finance, economics, and operations are also welcome.”

Like AUD, JIS is the sole proponent of its own research paradigm, information systems. Its editorial statement states “it publishes academic and educational research related to information systems and information technology.”

The second step is to group each journal's papers by year, which would enable analysis of both longitudinal and cross-sectional differences in taxonomic attributes. After aggregation, a process of standardization occurs. There is considerable variation between journals in the total volume of papers published within a particular year. Thus, in order to achieve inter-journal comparability, the average percentage of each journal's papers falling under a particular taxonomic category is calculated. Hence, the result of this phase of the methodology is a set of data points representing the proportion of a journal's commitment to a particular topic of study or dependence on a particular methodological technique, for a particular year of that journal's published life.

4.3 Statistical Analyses

The final phase in the methodology is the application of various statistical techniques to determine the existence and significance of difference between particular groups of research papers. These statistical techniques may be divided into two types: graphical based exploratory data analysis (EDA), and classical quantitative statistics.

4.3.1 Exploratory Data Analysis (EDA)

EDA is a distinct philosophical approach to data analysis. This approach mostly takes the form of, but is not limited to, graphical depictions of data. The main objective of the EDA approach is to "maximize insight into a data set, uncover underlying structure,

extract important variables, detect outliers and anomalies, test underlying assumptions, develop parsimonious models, and determine optimal factor settings. (<http://www.itl.nist.gov>)”

EDA was pioneered by statistician and computer scientist John Tukey, who identified a very useful nexus between the power of the computer, statistical analysis, and the natural cognitive inclinations of the human mind. He stated in 1964 that: “As the computer revolution finally penetrates into the technical tools of statistics, it will not change the essential characteristics of these tools, no matter how much it changes their appearance, scope, appositeness and economy. We can only look for... greater emphasis on parsimony of representation and inquiry, on the focusing, in each individual analysis, of most of our attention on relatively specific questions, usually in combination with a broader spreading of the remainder of our attention to the exploration of more diverse possibilities. (Tukey, J. , 1964).”

The emphasis on graphical techniques is direct result of EDA’s philosophical approach. This approach is not constrained by assumptions made about the data, such as its distribution or skewness. Rather, EDA seeks to dispense with these assumptions, postponing them for later classical quantitative statistics. Instead, EDA uses statistical graphics, which are not subject to the same constraints classical statistics are. Because the use of these graphical techniques is not subject to assumptions about the data, they can be used upon data sets that have never been subjected to any analysis or testing, in other

words, naïve data sets. This makes it the preferred analysis tool for open-minded, first-time exploration of data, hence the term “exploratory” in its name.

Furthermore, besides the fact that graphical techniques are free from the statistical constraints that otherwise would have biased or otherwise tainted non-graphical classical techniques, EDA’s extensive use of graphical analysis provides other advantages. These advantages are that “graphics gives the analysts unparalleled power to (explore), enticing the data to reveal its structural secrets, and being always ready to gain some new, often unsuspected, insight into the data. In combination with the natural pattern-recognition capabilities that we all possess, graphics provides, of course, unparalleled power to carry this out. (<http://www.itl.nist.gov>)” Hence, apart from freedom from constraints that certain statistical assumptions be true of a data set, EDA appears to capitalize on the natural cognitive processes of the human mind. These cognitive processes are such that humans are able to glean information very readily when this information is imbedded in graphical symbols and patterns.

A more detailed analysis of the differences and advantages of EDA over classical quantitative statistics reveals that these dissimilarities are found in the following specific characteristics: statistical models, techniques, rigor, data treatment, and assumptions (<http://www.itl.nist.gov>).

Modes of reasoning in classical quantitative statistics depend upon fitting data variables into probabilistic and deterministic models. In contrast, EDA does not require the imposition of models upon the data variables. Rather, the graphical patterns that result from the use of EDA may actually suggest trend and causation between data variables that may have gone unnoticed before. Because of this, the use of EDA may actually result in the development and refinement of classical statistical models for confirmatory analysis.

While it is generally accepted that the formal, structured, objective approach of classical quantitative techniques are an indispensable tool for the sciences, it is also true that the rigor required in using these techniques often limits their applicability. Also, while conclusions from results of EDA analysis may not be as authoritative or final as those of classical quantitative statistics, it is nevertheless true that experienced users of EDA often derive the same conclusions from the same graphical output, despite the subjectivity that accompanies interpretation. Furthermore, when classical statistics are used as accompanying confirmatory analysis, the conclusions are much stronger than if either class of techniques were used alone.

Another point of dissimilarity between EDA and classical quantitative statistics lies in their treatment of data. For example, classical estimation techniques narrowly focus on certain data attributes one at a time, such as concentration, variation, location, spread and shape of data. On the other hand, EDA does not truncate the focus of analysis to one of

these characteristics at a time, but rather analyzes and depicts a number of them (or all of them) simultaneously with one particular technique.

Finally, conclusions reached by classical statistical mode of reasoning are contingent upon certain underlying assumptions being true of the data, such as normality or sample size. This limits the usefulness of such classical quantitative techniques when the status of these underlying assumptions is not known regarding a particular data set. Such limitations do not apply to EDA because its techniques, for the most part, do not require adherence to any assumptions about the data. Because of this, the validity of EDA findings is not contingent upon the validity of assumptions of the test data, making EDA techniques universally valid, and the logical preliminary step in analyzing data that has never been tested before.

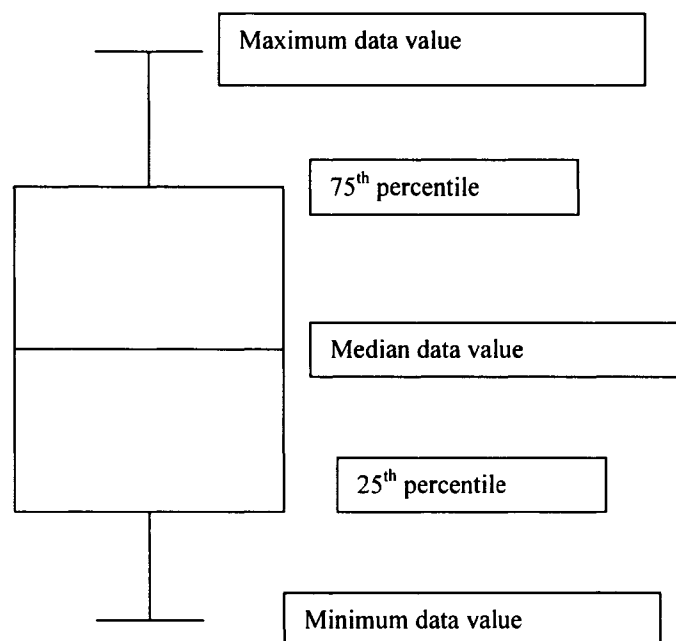
Therefore, in summary, EDA is a set of graphical techniques designed to give the users a quick, succinct, visual impression of the underlying structure of the data of interest. The techniques reveal the trends, the central tendencies, and the clusters that characterize the data. The inclusion of EDA in the methodology is important, because, even though there has been a significant amount of research in taxonomic classification of accounting research, yielding a number of relevant hypotheses, it is important to note that these past papers have never dealt with the full range of data that comprises the ARD. Also, although a previous taxonomic study (Vasarhelyi and Badua, 2004) using EDA exists, the data set of that paper was also limited. Nevertheless, EDA's contribution in suggesting testable assertions in that particular paper was considerable. Thus, the application of this

set of techniques to a naïve set of data is highly warranted, because of EDA's special ability to detect differentiated subsets within an apparently homogenous data population.

The specific EDA technique used in this dissertation is the box-plot. The box-plot technique was developed by Tukey himself (Tukey, 1977.) in order to simultaneously determine and depict the location and variation that exists in a data set.

The specific role of the box-plot in this dissertation is to find and depict location and variation differences between groups of data, these differentiated groups being the embodiment of underlying competing paradigms of the accounting research canon.

Figure 1: Boxplot



As depicted above in Figure 1: Boxplot, the box-plot (also known as a box and whisker plot) shows the minimum, maximum and median data values given a data set. These are depicted as the top edge of the top whisker, the bottom edge of the bottom whisker, and the middle line running across the box of the box-plot, respectively. It also shows the 75th and 25th percentile data values, depicted by the upper and lower edges of the box. The box itself contains the middle 50% of the data.

Hence, if several boxes of a box-plot were arrayed side-by-side, each corresponding to a different subset of data or group of data, these groups of data could be compared and contrasted. Groups depicted by taller boxes, and with longer whiskers would indicate data values that are more spread out or contain more extreme values (greater variation). Groups' medians could be compared to see if certain data sets have a higher typical data value than others (comparison of location).

The differences between groups of journals in their study of various topics and their use of different methods would be revealed by different box-plot box lengths, different whisker lengths, and most tellingly, different median lines across the boxes. These differences would be the basis for testing with classical quantitative analysis in order to finally determine paradigm distinctions.

4.3.2 Classical Quantitative Statistics

Despite the impact and insight that EDA lends to identifying differentiation in the accounting research literature, the significance of that differentiation is best determined by classical quantitative statistics. Because the objective of this research is finding significant differences between groups of research papers, the most appropriate statistical techniques are those that compare the central tendencies of data groupings, such as analysis of variance or nonparametric statistics. The specific choice of quantitative statistical test to be used is incumbent on considerations of data characteristics, particularly on the normality of the distributions of data. Hence, the first step in applying quantitative statistical techniques is to test the distributional characteristics of the data. To this end, Kolmogorov-Smirnov tests were carried out to test the normality of the various populations representing the amount proportions of papers classified under each taxonomic category. This measure could ensure that the correct classical quantitative technique would be chosen in comparing the various groups of papers according to each taxonomic category. Those taxonomic categories whose populations were found to be normally distributed under the Kolmogorov-Smirnov test would be appropriately tested with the analysis of variance technique, coupled with Tukey's test for post-hoc differences. On the other hand, taxonomic categories whose populations were found to be non-normal in distribution would be tested with the non-parametric Kruskal-Wallis and Median tests (KW and M).

Normality of distribution tests using the Kolmogorov-Smirnov technique were carried out on the various taxonomic category populations. These tests revealed that all but one of these populations were non-normal in distribution. The sole exception to this finding was the taxonomic category foundation—discipline = accounting. Thus, in finding differences between groups of research papers with regard to their use of accounting as a foundation discipline, the analysis of variance method, with Tukey post hoc test (ANOVA-Tukey), would be the appropriate classical quantitative statistic.

However, ANOVA-Tukey will not be completely dismissed for these non-normal populations. The reasons for this are that for large populations, ANOVA-Tukey is robust to deviation from normality of distribution. “Fortunately, even when the data are not normally distributed, the Central Limit Theorem (CLT) guarantees that the sample has a normal sampling distribution provided the sample size is large enough, typically $n \geq 30$ (Carlin, 2004).”

Thus, because the populations in question are large ($N > 30$), ANOVA-Tukey results may still be valid. Furthermore, ANOVA-Tukey has a further degree of sensitivity in differentiating the groups, because it not only establishes the significance of differences among all the groups as a whole (as do KW and M), but it also discerns the significance of differences between pairs of groups (post-hoc differences). Therefore, because of mitigating factors (large N) and the additional benefits of including it as a secondary classical quantitative statistical test, ANOVA-Tukey will be retained for use in testing the non-normal population, albeit, as an auxiliary to KW and M.

Because the KW test is based on a rank ordering technique (as is its post-hoc analogue, Mann-Whitney) this test may be confounded by populations containing tied observations. Because of this, an additional non-parametric test, one that does not include ordering is used. This test is the median test, which establishes differences among groups by counting how many observations per group lie above the population median, and also generates a significance for differences among the groups.

4.4 Citation Analysis Methodology

Having established the characteristics and differences between journal groups, thereby identifying a set of distinct research paradigms within accounting academic literature, the next stage in the analysis is to determine each paradigm's influence.

The development of citation analysis came about as a result of trying to find applications of the then new computer and largely untapped computer technology towards writing histories of science. This pioneering attempt was initiated by Eugene Garfield in 1964, with the express intention of developing a preliminary understanding of the basic procedures and problems involved in using computers to aid in the task of delineating the development of thought within a particular science. The specific project that embodied this preliminary attempt at citation analysis was the discovery of the DNA code. For this purpose, the resulting citation analysis outlined the sequence of scientific discoveries that led to the replication of natural DNA protein synthesis in a laboratory environment, and

traced the intellectual relationship between those discoveries with one another. (Garfield 1964)

Prior to the Garfield study, a number of small-scale attempts had been made in citation indexing in order to provide an orderly summary of readily retrievable references for future research. The most notable of these attempts had been in the chemistry field, wherein researchers prepared a citation index of papers on properties of nucleic acids. (Garfield, 1975). However, these early attempts were different from Garfield's seminal work in two ways. First, these early attempts preceded the computer, and so were unable to benefit from the availability of copious amounts of citation data generated and compiled by computers. Thus, the earlier work was inferior in scale. Second, whereas the earlier citation indices were mere research aids, meant to provide an easy reference for bibliographic reference, the Garfield project had a more ambitious objective, in that it had the express purpose of tracing the development of thought leading up to a major research breakthrough. Hence, the earlier work was also inferior in intent.

Garfield states this purpose as follows:

“Though this study was undertaken to investigate and test new methodologies for facilitating the writing of the history of science, we do not wish in any way to imply that the role of the scholar can be eliminated. The citation network technique does provide the scholar with a new *modus operandi* which, we believe, could and probably will significantly affect future historiography. With the accelerating pace and complexity of

scientific developments, the study of the history of science, research administration, and the sociology of science, now more than ever, can profitably employ new techniques for sifting and evaluating data. We believe the techniques described here can be of great utility for the administration of large-scale programs of research as well as for sociological and historical research. (p. ii, Garfield, 1964)”

Garfield also specifically cited computer technology’s role in the project:

“Writing the history of science has traditionally been a purely intellectual or cerebral pursuit of the scholar. A project is described herein which poses, and provides the first step toward the ultimate answer to the question "Can historical analysis be performed by a computer?" The more immediate goal was to test the initial hypothesis that citation indexes are useful heuristic tools for the historian. In this approach the history of science is regarded as a chronological sequence of events in which each new discovery is dependent upon earlier discoveries. (Garfield 1964, p. iii)”

The link between citation analysis in its role as a historical record of the development of thought of a particular scientific field and the Kuhnian ideas of paradigms and incommensurability is one of communication, or in the case of incommensurable, competing paradigms, lack thereof.

As Kuhn asserts:

“(There are) several reasons why the proponents of competing paradigms must fail to make complete contact with each other’s viewpoints... collectively these reasons have been described as the incommensurability of (competing) scientific traditions. In the first place, the proponents of competing paradigms will often disagree about the list of problems that any candidate for (dominant) paradigm must resolve. Their standards or their definitions of science are not the same.” (p. 148, Kuhn, 1970)

These different factors therefore contribute to a situation wherein “communication... is inevitably partial” (p.149, Kuhn, 1970) or in some cases, non-existent, such that it could be characterized as a “communications breakdown” (p.201, Kuhn, 1970).

What Kuhn describes here is thus a fragmentation of a scientific field into non-communicating factions of competing paradigms. These paradigms, because they choose to devote themselves to different topical foci, because their respective approaches to explaining real-world phenomena depend on different sets of concepts or measures (hence the term “incommensurability”), or perhaps because they choose to look at different aspects of real-world phenomena, will simply not communicate ideas to one another. Therefore, in such a situation, the various competing paradigms will have different sequences of breakthrough events in their independent and mutually exclusive developments of thought. Given the fact that these breakthrough events will have found their way to academic journals in the form of academic papers documenting, describing, and expounding upon these events, different paradigms will have for themselves a different set of papers upon which to base their research. Each competing paradigm will

have its own series of breakthrough events, each event being recognized and referenced only within the circle of the adherents of a particular paradigm.

Citation analysis would thus reveal the differences between paradigms because these paradigms would tend to avoid citing work produced according to and expounding upon the intellectual traditions of another paradigm. Hence, citation indices comprised of papers from different competing paradigms would produce mutually exclusive clusters of citation activity corresponding to each competing paradigm. Corollary to this, one could state that papers of the same paradigm would tend to cite each other, while papers of competing paradigms would tend not to cite one another.

Of course, it is entirely possible that papers from competing paradigms might cite one another, if only to criticize or otherwise disparage each others methods, findings, and conclusions. However, Garfield points out that the vast bulk of citations are referential and reverential ones, citations that are included in a citing paper in order to indicate agreement and dependence upon the cited paper.

Garfield expresses it thus: “It is concluded that citation patterns provide a valid and valuable means of investigating historical dependencies. (p. ii, Garfield, 1964)”

The operationalization of a paradigm’s influence and other paradigm’s influence on it is the paradigm’s citation profile.

The determination of a paradigm/ journal group's citation profile is carried out in two stages. The first stage is to accumulate citation data for the various paradigms. The second stage is to generate a set of citation metrics that reflects the extent, type, and scope of influence each paradigm has.

The first stage is accomplished by inspection of all the papers in the set of journals comprising the ARD. Each paper's bibliography is scanned, and each instance of it citing a paper from another one of the ARD journals is recorded. The population of ARD journals subjected to this analysis was those between 1998 and 2003. The citation counts for each journal are from aggregation according to journal groups.

Finally, a 6×6 matrix is constructed consisting of the various proportions at which each of the 6 journal groups cites another of the 6 groups (rows), and the various proportions at which each of the 6 journal groups is cited by one of the others (columns).

The second stage of this citation analysis is the calculation of certain citation metrics in order to measure and characterize the influence of each paradigm. The set of citation metrics includes the send-receive ratio, the self-feed ratio, and the Gini index, and a few others derived from these three.

The send-receive ratio is the citation metric that indicates to what extent a journal group is a net importer or exporter of ideas. In tracing the development of a research paradigm, the more mature a paradigm is, the greater its tendency towards being an exporter of

ideas. This statement is true, even when other paradigms are resistant to a paradigm's influence, as a mature paradigm would be able to generate self-citation. Thus, a paradigm's maturity would be indicated by the gross send-receive ratio, which includes self-citation, and a paradigm's influence or dominance would be reflected by its net send-receive ratio, excluding self-citations.

The send-receive ratio was developed by Eagly (Eagly, 1975) in his study of various economics journals. His research was aimed at describing the communication functions of the various journals, and the send-receive ratio was one of the metrics which were deployed in order to characterize the propensity of economics journals to broadcast their intellectual influence to others.

Eagly defines the send-receive ratio as “the ratio of the number or proportion of messages sent (the frequency with which the journal is cited by other journals) to the number or proportion of messages received (the frequency the journal cites other journals). High values (approaching or exceeding 1) of the send-receive ratio suggest that the journal is a feeder of network information, while lower values (approaching 0) suggest that the journal is a storer of network information. The high values may perhaps be interpreted as indicative of the journal's innovative role as a well-spring of seminal ideas in the discipline as well as an index of the journal's relative prestige. (p. 880, Eagly, 1975)”

The send-receive ratio is computed by the formula:

$$R_{SR} = (\sum_{j=1}^6 X_{i \Rightarrow j}) / (\sum_{j=1}^6 X_{j \Rightarrow i})$$

where

R_{SR} = the send - receive ratio fro any of the six journal group/paradigms

$X_{i \Rightarrow j}$ = the frequency at which paradgim i cites paradigm j

$X_{j \Rightarrow i}$ = the frequency at which paradigm j cites paradigm i

In the case of this dissertation, the frequency of citations is computed in terms of proportions, that is the quotient of the absolute number of times paradigm i cites paradigm j divided by the absolute number of times paradigm i cites any other paradigm besides paradigm j. This approach is consistent with Eagly's method, as stated above.

The self-feeding ratio is the citation measure that indicates the degree of specialization of a particular paradigm. Thus, this metric characterizes the type of influence a paradigm has, rather than its extent. The higher the self-feeding ratio, the greater is the degree of specialization.

The self-feeding ratio was also proposed in Eagly (1975). It was intended to capture a journal's propensity to cite itself. It is computed as the frequency that a journal self-cites, relative to the frequency it cites all other journals. Eagly posits the idea that this metric was a proxy for the extent of specialization of a journal, stating on p.882:

"... it would seem that higher than average values of the self-feeding ratio suggests that the journal traffics in a specialized segment of the research network's communication sphere... Thus journals having high self-feeding ratios in the neighborhood of .5... are deemed highly specialized."

The self-feeding ratio is therefore computed as

$$R_{SF} = (X_{i \rightarrow i}) / (\sum_{j=1}^6 X_{i \rightarrow j})$$

where

R_{SF} = the self - feeding ratio

$X_{i \rightarrow i}$ = the frequency at which paradigm i cites itself

$X_{i \rightarrow j}$ = the frequency at which paradigm i cites paradigm j

Another way to portray citation patterns of the accounting research network and compute various citation metrics is a 6 x 6 matrix .

The rows of the matrix give the frequency a particular paradigm cited any of the six paradigms of the accounting research network, including itself. The columns of the matrix give the frequency at which a particular paradigm was cited by all paradigms including those instances of paradigm self-citation. All instances of paradigm self-citation appear within a diagonal formed by the set of cells from the upper-left corner of the matrix to the lower-right corner

The matrix method has the advantage of graphical clarity and consistency. Because of the manner in which citation metrics are computed within the matrix, there exist readily recognizable patterns in which cell values appear. It is therefore easy to discern the underlying schema that determines the value of each cell in the matrix, and one is spared the tedium of deciphering mathematical notation.

Figure 1: Citation Matrix

	Cited Paradigm =1	Cited Paradigm =2	Cited Paradigm =3	Cited Paradigm =4	Cited Paradigm =5	Cited Paradigm =6
Citing Paradigm =1	=the number of paradigm 1 cites to paradigm 1/ the total number of paradigm 1 cites	=the number of paradigm 1 cites to paradigm 2/ the total number of paradigm 1 cites	=the number of paradigm 1 cites to paradigm 3/ the total number of paradigm 1 cites	=the number of paradigm 1 cites to paradigm 4/ the total number of paradigm 1 cites	=the number of paradigm 1 cites to paradigm 5/ the total number of paradigm 1 cites	=the number of paradigm 1 cites to paradigm 6/ the total number of paradigm 1 cites
Citing Paradigm =2	=the number of paradigm 2 cites to paradigm 1/ the total number of paradigm 2 cites	=the number of paradigm 2 cites to paradigm 2/ the total number of paradigm 2 cites	=the number of paradigm 2 cites to paradigm 3/ the total number of paradigm 2 cites	=the number of paradigm 2 cites to paradigm 4/ the total number of paradigm 2 cites	=the number of paradigm 2 cites to paradigm 5/ the total number of paradigm 2 cites	=the number of paradigm 2 cites to paradigm 6/ the total number of paradigm 2 cites
Citing Paradigm =3	=the number of paradigm 3 cites to paradigm 1/ the total number of paradigm 3 cites	=the number of paradigm 3 cites to paradigm 2/ the total number of paradigm 3 cites	=the number of paradigm 3 cites to paradigm 3/ the total number of paradigm 3 cites	=the number of paradigm 3 cites to paradigm 4/ the total number of paradigm 3 cites	=the number of paradigm 3 cites to paradigm 5/ the total number of paradigm 3 cites	=the number of paradigm 3 cites to paradigm 6/ the total number of paradigm 3 cites
Citing Paradigm =4	=the number of paradigm 4 cites to paradigm 1/ the total number of paradigm 4 cites	=the number of paradigm 4 cites to paradigm 2/ the total number of paradigm 4 cites	=the number of paradigm 4 cites to paradigm 3/ the total number of paradigm 4 cites	=the number of paradigm 4 cites to paradigm 4/ the total number of paradigm 4 cites	=the number of paradigm 4 cites to paradigm 5/ the total number of paradigm 4 cites	=the number of paradigm 4 cites to paradigm 6/ the total number of paradigm 4 cites
Citing Paradigm =5	=the number of paradigm 5 cites to paradigm 1/ the total number of paradigm 5 cites	=the number of paradigm 5 cites to paradigm 2/ the total number of paradigm 5 cites	=the number of paradigm 5 cites to paradigm 3/ the total number of paradigm 5 cites	=the number of paradigm 5 cites to paradigm 4/ the total number of paradigm 5 cites	=the number of paradigm 5 cites to paradigm 5/ the total number of paradigm 5 cites	=the number of paradigm 5 cites to paradigm 6/ the total number of paradigm 5 cites
Citing Paradigm =6	=the number of paradigm 6 cites to paradigm 1/ the total number of paradigm 6 cites	=the number of paradigm 6 cites to paradigm 2/ the total number of paradigm 6 cites	=the number of paradigm 6 cites to paradigm 3/ the total number of paradigm 6 cites	=the number of paradigm 6 cites to paradigm 4/ the total number of paradigm 6 cites	=the number of paradigm 6 cites to paradigm 5/ the total number of paradigm 6 cites	=the number of paradigm 6 cites to paradigm 6/ the total number of paradigm 6 cites

When the matrix is used, computation of the send-receive ratio would entail dividing the sum of all the cells in the column corresponding to the frequency a paradigm has been cited by the sum of all the cells in the row corresponding to the frequency a paradigm has cited other paradigms.

Finding the self-feeding ratio is even easier, as they have already been computed and appear as the cells arranged diagonally across the matrix, containing bold text.

The matrix containing the actual frequencies of paradigm citations appears in Ch. 5.

Another characteristic of paradigm captured by citation patterns is the diversity of a paradigm's influence and influences. The metric used to capture this diversity is the Gini index (Stigler, 1994). The Gini index is a measure borrowed from economics, where it also goes by the name, the Herfindahl index. When applied to a particular population, it measures the concentration or breadth of that population's set of inputs or outputs. The higher (lower) the Gini index, the more concentrated (broader) the population is in selecting its inputs and outputs.

The Gini index evolved from the work of the Italian statistician and economist Corrado Gini, who pioneered the development of this statistical measure in a series of papers in the early part of the twentieth-century. This statistical measure was originally conceived as a general index of dispersion or diversity. That is, it was meant to capture the degree to which subsets of a population were equal or un-equal in their sharing of any particular quantifiable variable. This versatility has led to the application of the Gini index to measure the equity all sorts of distributions, whether it be income, consumption, wealth, market share, etc. (Kuan, 2004)

However, over the last century, the most common application of the Gini index has been in development economics, as a measure of the degree of socio-economic equity or inequity in a particular society. This specific application of the Gini index came about as a result of economists' desire for a measure of dispersion that took into account changes in the distribution of wealth. It was found that alone among several alternative measures of socio-economic equity, only the Gini index would decrease in proportion to the redistribution of wealth to produce reduce socio-economic inequity, a characteristic of statistical measures of dispersion known as "the principle of transfers." (Dalton, 1920)

However, a very useful feature of the Gini index that is often overlooked is that, besides being a measure of equity, it also serves as a measure of diversity. That is, the Gini index not only indicates whether subsets of a population are sharing a particular resource equally, but also indicates the degree of dispersion of that resource among those subsets.

Because of this, the Gini index is not only appropriate to measure socio-economic equity, but also to measure other phenomena where diversity is the characteristic of interest. For example, the Gini index could be used to measure how evenly and diversely a portfolio is divided among various alternative investments. Another application, in macro-economics, would be to measure the dependence of a nation on its various trading partners. The Gini index would indicate the extent to which a nation concentrates its exports on any subset of other nations that could possibly be a trading partner. The index would also measure the degree to which a nation diversifies its sources of imports from

among any subset of nations that possesses resources that nation requires, but cannot have independently.

Mathematically, the Gini index can be computed in a number of alternative and equivalent ways.

“The Gini index has many different formulations and interesting interpretations. It can be expressed as a ratio of two regions defined by a 45 degree line and a Lorenz curve in a unit box, or a function of Gini’s mean difference, or a covariance between incomes and their ranks, or a matrix form of a special kind. Each formulation has its own appeal in a specific context. However, in every case, the Gini index was proposed as a summary statistics of dispersion of a distribution.” (Kuan, 2004)

The most generally accepted formula for computing the Gini index, however, and the formula adopted for use in this dissertation, is as follows:

$$G = 100 \times \sum_{i \text{ to } j} (i/t)^2$$

where

G = the Gini index expressed on the scale from 1 to 100

i to j = subsets of a population that share proportions of variable t

t = a variable that is distributed among subsets i and j , e.g. total wealth, market share, etc. that is, the shared variable.

In other words, the Gini index is calculated as 100 times the sum-square of the ratio of each subset’s share of total t . (Stigler, 1994)

The Gini index is such that more equitable distributions of t among i and j results in lower value for the Gini index. Furthermore, the more subsets there are that share in the distribution of t , the lower the value of the index, as well. Therefore, the more evenly distributed t is, and the more subsets i and j are able to share in t , the lower the value of the Gini index.

Rules of thumb in interpreting the value of the Gini index are as follows:

Table 1: Interpreting the value of the Gini index

Gini index calculated	Interpretation
Approaches 0	The distribution of the shared variable, such as wealth, is perfectly equitable and is spread out among a large number of subsets of the population
10-20	Considerably equitable and diverse distribution
20-30	The sort of wealth distribution typical among developed nations
30-40	The sort of wealth distribution typical among developing nations
40 and above	Serious inequity of distribution, typical of nations experiencing socio-economic crisis
Approaches 100	The distribution of the shared variable (e.g. wealth) is perfectly inequitable, completely concentrated in one sub-set of the population.

The Gini index is deployed in order to provide a statistical measure to characterize and qualify paradigm influence on other paradigms. The proportion of citations it provides to other paradigms quantifies paradigm influence. That is, the greater the proportion of citations from a cited paradigm in the aggregate list of references of any citing paradigm, then the greater the influence of the cited paradigm on the citing paradigm.

However, the application of the Gini index to this problem is necessitated by the desire to determine how wide spread the influence of a paradigm is. Recall that if a shared variable is evenly distributed among a large number of subsets of a population, then the lower the Gini index will be, approaching 0. In the case of paradigms and citations, if a paradigm is universally accepted as a valuable source of citations by other paradigms, then the Gini index calculated from the proportion of its citations in citing paradigms to its total citations will be lower than that of a paradigm whose influence is more limited.

Therefore, in summary, the Gini index is calculated as the square of the fraction representing proportion of citations a journal group references from other journal groups (inputs) or exports to other journal groups (outputs). Thus, the former would measure the diversity of a journal group/ paradigm's influences, from among the different paradigms, while the latter would measure the breadth of its appeal to that same variety of paradigm.

4.5 Optimal Diversity Methodology

As discussed in Ch. 3, a new optimal diversity metric has been developed in this study. This metric measures the beneficial effects of a paradigm's diversity by multiplying the Gini index-derived score of diversity with the extent to which that paradigm is able to maintain allegiance and cohesion among its constituents, as measured by its self-feed ratio.

The Gini index runs from a 0 to 100 scale, wherein the most diverse distribution produces a score approaching 0, and the least diverse or most concentrated approaches 100. Since the diversity score is meant to capture the magnitude of diversity, it should increase in value as the variable of interest increases in diversity. Hence, the diversity score will be 100 minus the computed Gini index score.

Thus the formula for this raw diversity metric will be:

$$D_R = 100 - 100 \times \sum_{i \text{ to } j} (i/t)^2$$

where

D_R = the absolute or raw amount of topical or methodological diversity of a paradigm

G = the Gini index expressed on the scale of 1 to 100

i and j = the proportions which various topical and methodological categories take up within each paradigm's population of papers

t = a variable that is distributed among subsets i and j , in this case total paper output for each paradigm

The next problem is to take into account the fact that the raw diversity score, in itself, is not particularly informative because it fails to indicate if this diversity is beneficial or detrimental to the paradigm. As discussed above, diversity is beneficial only to the extent that it does not jeopardize the paradigm by fomenting dissent among the diverse constituencies of that paradigm, which would be depicted by a low frequency of self-citation within the paradigm. Thus, the solution to this is to bring in another term into the formula for diversity, which captures the extent of self-citation within the paradigm. This term would be the self-feed metric.

The new diversity metric would be the product of the raw diversity metric and the self-feed ratio. This would produce a value that increases with increasing diversity within the paradigm, as well as with increased self-citation. This new diversity metric would be a measure of beneficial diversity because of its mathematical relationship to the self-citation metric, and is therefore called the optimal diversity metric

It is computed as follows:

$$D^* = D_R / R_{SF}$$

where

D^* = the value of the optimal diversity metric of a paradigm

D_R = the absolute or raw extent of the diversity of the paradigm

R_{SF} = the paradigm's self - feed ratio

The computation of the optimal diversity scores for each paradigm provides an objective means by which taxonomic characteristics and citation profiles of each paradigm may be used to create an objective measure of a paradigm's contribution to the accounting literature. This metric takes into account the breadth of a paradigm's focus, the increased levels of validation accorded by multiple research methodologies and modes of reasoning, and the degree to which each paradigm is able to generate and synthesize discussion within its intellectual frontiers.

A final step in the methodology would be to correlate the optimal diversity metric to various citation measures in order to determine if accounting researchers recognize a paradigm's contribution, and also to identify which particular type of diversity, topical or methodological, accounting researchers find most appealing or authoritative.

Chapter 5: Results

5.1 Overview

This chapter relates the results of the various techniques used to analyze the data in order to find the extent and significance of differentiation among journal groups. The emergence of significant differences in taxonomically depicted attributes provides evidence of the existence of distinct component paradigms in the accounting research literature. These findings also serve to characterize and distinguish each paradigm by specifying the topical emphases or research methodologies that are predominantly used by scholars in that paradigm.

Furthermore, this chapter describes the patterns that emerge from citation analyses of intellectual links between paradigms. These results serve to define the roles each paradigm plays in the accounting research network. The citation analysis results also evaluate each paradigm's intellectual impact in terms of both its total influence on accounting research, and the spread and diversity of its influence among other paradigms.

This chapter also presents the results of tests performed on the optimal diversity metric, relating this measure of a paradigm's intellectual contribution to the extent to which the paradigm is cited by other paradigms.

5.2 EDA Results

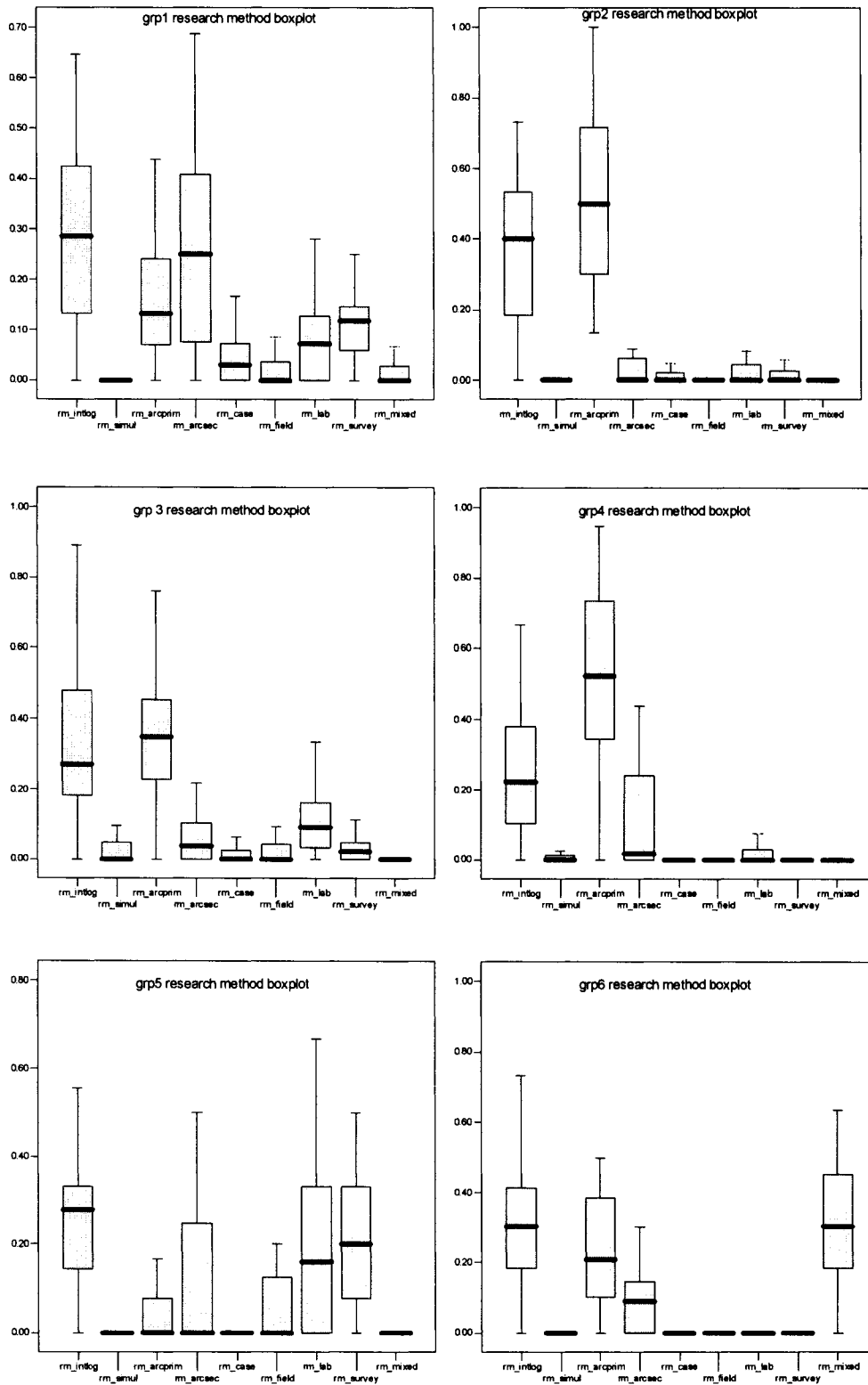
The first part will deal with the EDA boxplot results that serve as a basis for forming a general impression of the subtle differences between journal groups. These boxplots compare the medians (middle bar in box), interquartile range (length of box), and outliers (lines).

5.2.1 EDA of Research Method

The first group of boxplots depicts use of various research methods by the journal groups (Figure 3).

The boxplots of the various groups' research method usage quickly points out the much greater emphasis the audit and econo-finance journals (Group 2 and 4) give to archival primary research. These two groups are the only ones whose median usage is close to 50%, while other groups usage is below 40%, as indicated by the middle bar in each rectangular box. The information systems journals also distinguish themselves in their frequent use of behavioral research methods such as laboratory and survey studies (median close to 20%), while other journals hardly use these methods.

Figure 2: Research Method Boxplots

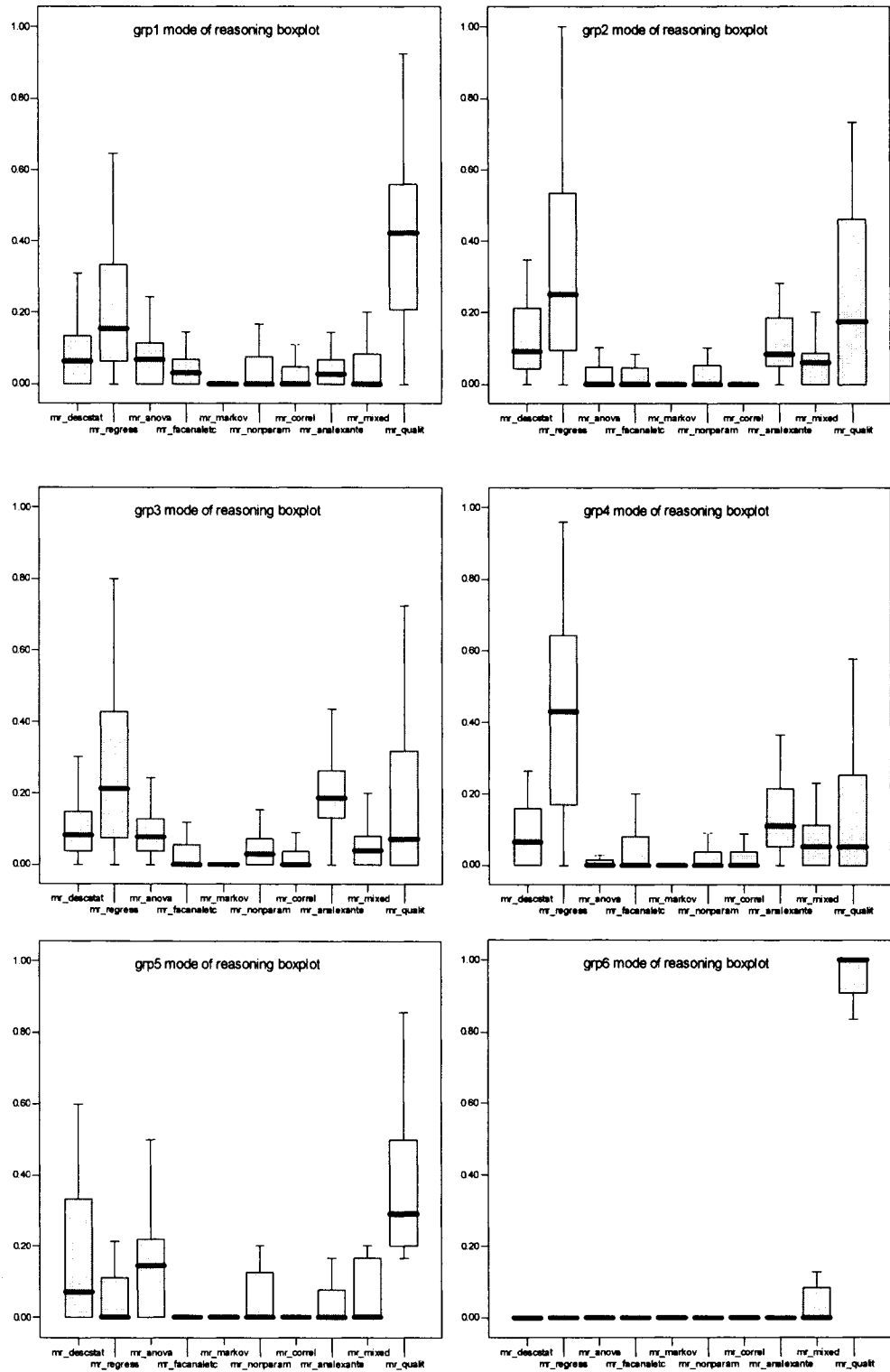


5.2.2 EDA of Mode of Reasoning

These boxplots portray use of different modes of reasoning by the journal groups (Figure 4).

The boxplots of groups' use of various modes of reasoning shows the econo-finance journals (Group 4) to be uniquely heavy users of regression statistics (median about 40% vs. other groups below 20%). The information systems journal (Group 5) is also distinct in its heavy use of ANOVA (median close to 20%, with all other groups well below). The Group 3 generalist journals reveal a singularly theoretical bent in that it overshadows all other journal groups in analytical ex ante reasoning (median 20%). Lastly, the history journal is unique in its almost totally qualitative reasoning.

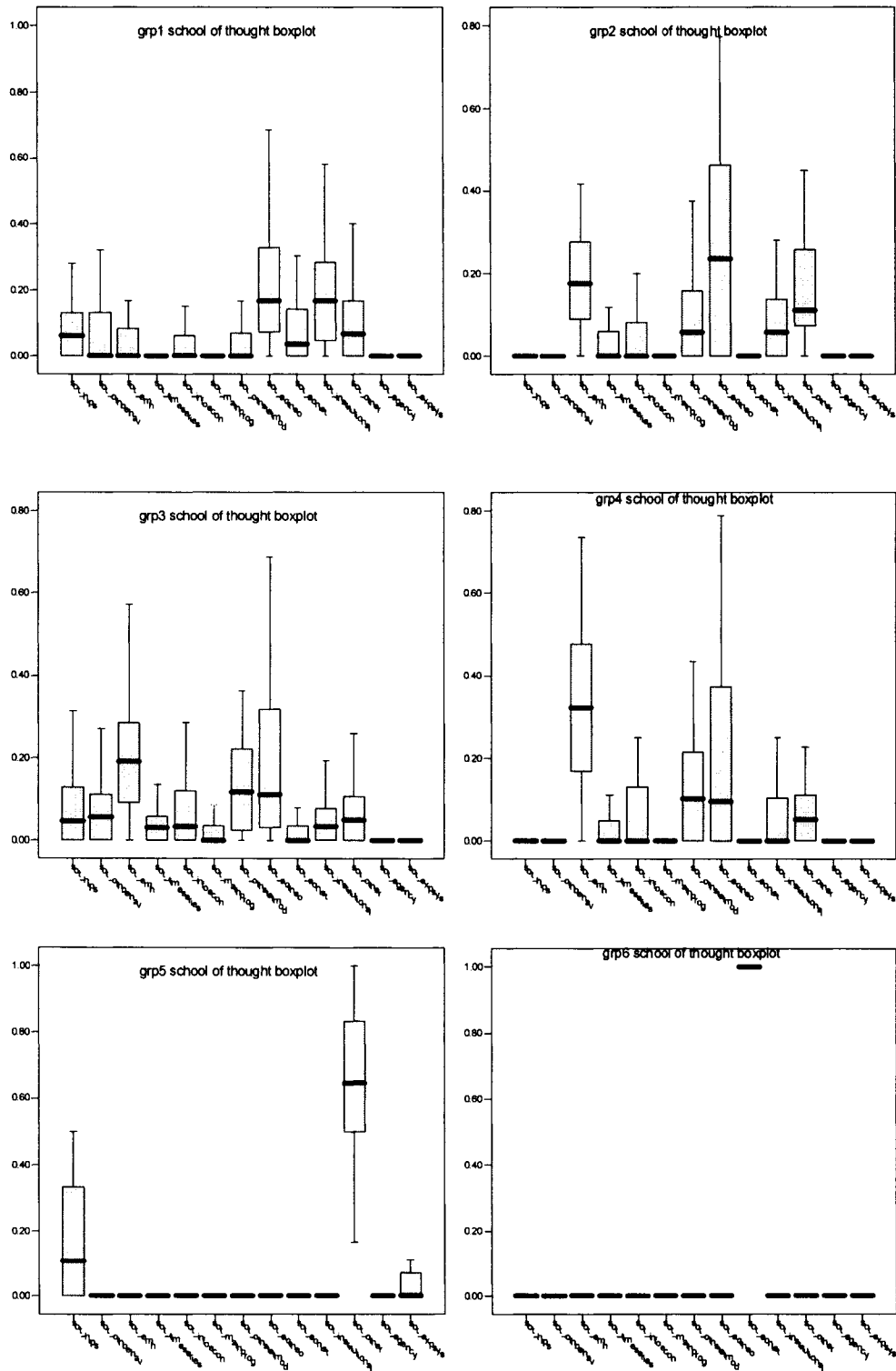
Figure 3: Boxplots of Mode of Reasoning



5.2.3 EDA of School of Thought

The next group of boxplots (Figure 5) shows the study of various schools of thought by the different journals. The boxplots of the schools of thought reveal the striking result that the information systems and history journals have vastly different topical interests than the other journal groups. These are shown in the very high median value for the other topics school of thought (60% for the information systems journal), accounting history school of thought (100% for the history journal) for these two journals. Another finding is that the EMH school of thought seems to be a separating characteristic between the journal groups. Certain journal groups such as the Group 4 econo-finance journals (median about 35%), and the Group 2 audit and Group 3 generalist journals (median about 15%) have a strong focus on this topic. Other journals such as the Group 1 policy journals and the information systems and history journals (Groups 5 and 6 respectively), hardly study this topic.

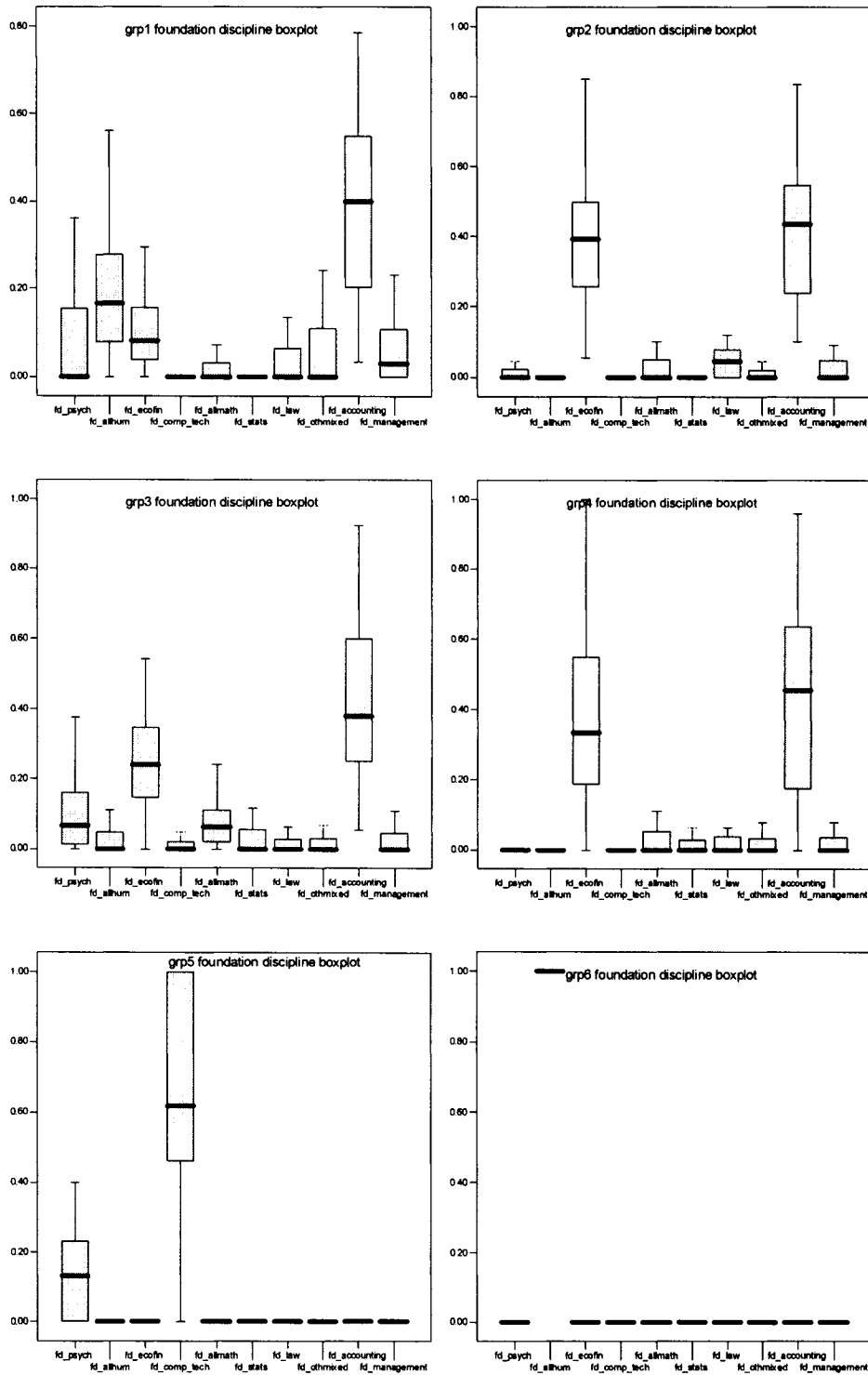
Figure 4: Boxplots of School of Thought



5.2.4 EDA of Foundation Discipline

The boxplots of the foundation disciplines (Figure 6) point out the stark contrast between some specialist journals and the rest of the journal set. This is true of the information systems journal and the history journal that both base almost all their research on allied technology and allied humanities, respectively. These two journals almost never base their research on accounting as a foundation discipline. One other aspect is the strong reliance of the information systems journal on psychology (median about 15%, with all other journals no more than 10%).

Figure 5: Boxplots of Foundation Discipline



5.3 Classical Quantitative Statistical Results

The second part of this chapter will deal with the results of classical quantitative statistics. These are used to confirm the initial findings of the EDA boxplots and to measure the statistical significance of these findings.

Research papers grouped according to journal type revealed the following patterns of differentiation. With regard to the taxonomic category populations research method = internal logic, mode of reasoning = markov, and mode of reasoning = mixed, no significant differences were found to exist.

As for other taxonomic categories, the nature of differentiation is described as follows.

5.3.1 Classical Quantitative Statistics for Research Method

Research Method=Simulation

The median and KW tests both reveal significant differences (sig.= .000) among journal groups with regard to their use of simulation as a research method. Both tests reveal that usage of the simulation technique is greatest in the general purpose journal group, followed in descending order of usage by the economics and finance journal group, audit journal, information systems journal, and policy journal group. Also, the ANOVA-Tukey test reveals the policy journal group has a significantly greater usage of simulation than the history journal group on a post-hoc basis.

Table 2: Research Method= Simulation

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
3	173.3	3	0.45	5	0.0296
4	147.06	4	0.25	3	0.0276
2	141.33	2	0.22	4	0.0165
5	129.61	1	0.12	2	0.0129
1	128.14	5	0.11	1	0.0102
6	109.5	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 3>6(.012) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Research Method=Archival Primary

Both the median test and KW test reveal significant differences (sig. = .000) in the use of the archival primary research method among the journal groups. Both tests rank the various journal groups in the following order, from most to least frequent user: economics and finance journal group, audit journal, general purpose journal group, history journal group, policy journal group and information systems journal group. Additionally, the ANOVA-Tukey test shows the economics and finance journal group and audit journal to be significantly greater users of archival primary research than each of the other journals, on a post-hoc basis; but not significantly different from each other.

Table 3: Research Method=Archival Primary

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
4	210.76	4	0.83	4	0.5238
2	208.37	2	0.74	2	0.5154
3	165.41	3	0.65	3	0.3535
6	123.1	6	0.37	6	0.2488
1	87.72	1	0.13	1	0.1629
5	32.44	5	0	5	0.0409
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 4>1,3,5,6(.000) 2>3(.004),1,5,6(.000) 3>1,5(.000) 6>5(.005) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Research Method=Archival Secondary

The KW and median tests agree that significant differences (sig. = .000) exist among the journal groups in their usage of the archival secondary research method. Both tests rank usage by journals groups in descending order as follows: the policy journal group, history journal, the economics and finance journal group, the information systems journal, the general purpose journal group, and the audit journal. Furthermore, the ANOVA-Tukey test confirms the policy journal group as leading all other significantly, on a post-hoc basis, except for the information systems journal.

Table 4: Research Method= Archival Secondary

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
1	205.57	1	0.76	1	0.262
6	150.6	6	0.7	5	0.1486
4	134.02	4	0.44	4	0.1224
5	133.89	5	0.44	6	0.1092
3	127.38	3	0.36	3	0.0847
2	91.93	2	0.26	2	0.0403
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 1>2,3,4,6(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Research Method= Case Study

Both the KW and median tests uncover significant differences (sig. = .000) in the use of the case study research method by the different journal groups. Although they do not agree in the ranking of the other journal groups, both tests place the policy journal group

as the leading user of the case study research method. The ANOVA-Tukey confirms this, revealing the policy journals as significantly different in their use of case studies from all others on a post-hoc basis.

Table 5: Research Method= Case Studies

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
1	187.16	1	0.54	1	0.0448
3	144.95	3	0.35	5	0.0411
5	142.89	5	0.22	2	0.0143
2	140.24	4	0.17	3	0.0128
4	127.13	2	0.06	4	0.0088
6	101.5	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 1>2(.011),3,4,6(.000) 5>3(.041),4(.023),6(.004) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Research Method= Field Study

The KW and median tests discover significant differences (sig. = .000) among the journal groups in their usage of the field study research method. The two tests identify the information systems journal as the leading user, followed in descending order by the general purpose journal group, the policy journal group, the economics and finance journal group, and the audit journal. Moreover, the ANOVA-Tukey test confirms the information systems journal as the leading user, revealing it to be significantly different from all other journal groupings on a post-hoc basis, except for the second place policy journal group.

Table 6: Research Method= Field Study

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
5	175.67	5	0.39	5	0.0536
3	159.26	3	0.36	1	0.0281
1	155.99	1	0.31	3	0.0222
4	129.37	4	0.15	2	0.0082
2	127.72	2	0.13	4	0.0075
6	108.5	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 5>2(.003),3(.020),4,6(.000) 1>4(.048) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Research Method= Lab Studies

The KW and median tests show significant differences (sig. = .000) in the use of the laboratory studies research method by the various journal groups. According to the two tests, the information systems journal and generalist journal group were the leading users. The ANOVA-Tukey test agreed with this finding, revealing the information systems journal to be significantly different from all other journal groupings on a post-hoc basis, and the generalist journals to be significantly different from all other journal groupings, except for the policy journal group, which is the third leading user.

Table 7: Research Method= Lab Studies

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
5	196.25	3	0.72	5	0.1918
3	186.92	5	0.67	3	0.1118
1	163.14	1	0.63	1	0.0835
2	103.24	2	0.35	2	0.02
4	93.55	4	0.21	4	0.014
6	67	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 5>1,2,4,6(.000) 3>2,4,6(.000) 1>2(.048),4,6(.001) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Research Method= Survey

Both the median and KW tests find significant differences (sig. = .000) in the use of surveys by the various journal groups. They identify the information systems journal and the policy journal group to be the leading surveyors. Furthermore, the ANOVA-Tukey test finds that on a post-hoc basis, the information systems journal is a significantly greater surveyor than all other journal groupings including the second place policy journal group, which itself, differs significantly from all other journal groupings.

Table 8: Research Method= Survey

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
5	230.19	1	0.79	5	0.2162
1	209.47	5	0.78	1	0.1127
3	142.47	3	0.58	3	0.0316
2	114.26	2	0.26	2	0.0247
4	96.61	4	0.15	4	0.0121
6	80.57	6	0.03	6	0.0024
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 5>1,2,3,4,6(.000) 1>2,3,4,6(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Research Method= Mixed

The KW and median tests found significant differences (sig. = .000) in the use of mixed research methods by the various journal groups. Mixed research methods were primarily employed by the history journal, which was picked out as the leading user by both tests. Additionally, the ANOVA-Tukey test found significant post hoc differences between the history journal and all other journal groupings.

Table 9: Research Method=Mixed

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
6	251	6	0.83	6	0.305
1	149.57	1	0.27	1	0.0207
2	136.22	2	0.17	5	0.0128
4	131.16	4	0.13	4	0.0107
3	128.23	3	0.12	2	0.0103
5	121.89	5	0.06	3	0.0065
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 6>1,2,3,4,5(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

5.3.2 Classical Quantitative Statistics for Mode of reasoning

Mode of Reasoning= Descriptive Statistics

Significant differences (sig. = .000) were found among the journal groups' usage of descriptive statistics as a mode of reasoning, according to the median and KW tests. The audit journal emerged as the leading user of descriptive statistics, and the history journal used the technique least. Moreover, the ANOVA-Tukey test determined that the history journal's differences with all other journal groupings were significant on a post-hoc basis.

Table 10: Mode of Reasoning= Descriptive Statistics

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
2	176.83	2	0.65	5	0.1633
3	165.06	3	0.62	2	0.1246
5	156.97	5	0.5	3	0.1037
4	146.6	4	0.46	4	0.09
1	145.41	1	0.45	1	0.0814
6	56.12	6	0.07	6	0.0052
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 5>1(.017),6(.000) 2>6(.000),3>6(.000) 4>6(.002),1>6(.004)				
	Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Mode of Reasoning= Regression

Both the KW and median tests find significant differences (sig. = .000) in regression usage among the journal groups. The two tests determined that the economics and finance journals use regression as a mode of reasoning the most. Further testing with the ANOVA-Tukey test reveals that the economics and finance journal group is indeed a significantly greater user than all other journal groupings, with the exception of the second-place audit journal, where the difference is not significant, on a post-hoc basis.

Table 11: Mode of Reasoning= Regression

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
4	197.4	4	0.75	4	0.4147
2	177.28	3	0.6	2	0.3483
3	163.31	2	0.57	3	0.2746
1	142.25	1	0.45	1	0.2141
5	68.19	5	0.17	5	0.0593
6	34	6	0	6	0
Sig.	KW sig.=.000, M sig.=.000				
Legend	ANOVA-Tukey post hoc tests: 4>1,5,6(.000),3(.002) 2>5,6(.000) 3>5(.002),6(.000) 1>6(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Mode of Reasoning= ANOVA

Significant differences (sig. = .000) exist in the various journal groupings' use of ANOVA as a mode of reasoning, according to the KW and median tests. The two tests agree that the information systems journal and the general purpose journal group are the leading users, followed in descending order by the policy journal group, the audit journal, the economics and finance journal group, and the history journal. Also, the ANOVA-

Tukey test found significant post-hoc differences in ANOVA usage between the information systems journal and all other journal groupings, and between the second place generalist journals and all others, except for the third place policy journals.

Table 12: Mode of Reasoning= ANOVA

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
5	198.19	3	0.71	5	0.1569
3	181.37	5	0.67	3	0.0863
1	167.49	1	0.64	1	0.0755
2	103.59	2	0.3	2	0.0208
4	98.01	4	0.21	4	0.0191
6	67	6	0	6	0
Comments	KW sig. = .000, M sig. = .000 ANOVA-Tukey post hoc tests: 5>1,2,4,6(.000),3(.002) 3>2(.001),4,6(.000) 1>2(.022),4,6(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Mode of Reasoning= Factor Analysis

Both the KW and median test found significant differences (sig. = .000) among the journal groups in their use of factor analysis as a mode of reasoning. Factor analysis was employed mostly by the policy journal group, followed by the econo-finance group, generalist group, audit journal, information systems journal, and the history journal. Additionally, the ANOVA-Tukey test revealed significant differences between the last place history journal and the policy group and econo-finance groups, which were in first and second place, respectively.

Table 13: Mode of Reasoning= Factor Analysis

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
1	165.81	1	0.52	1	0.0487
4	160.78	4	0.46	4	0.0483
3	149.36	3	0.45	3	0.0295
2	137.33	2	0.35	2	0.0264
5	126.39	5	0.22	5	0.0229
6	88	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 1>6(.001) 4>6(.001) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Mode of Reasoning= Non-parametrics

Significant differences (sig. = .000) were identified by the KW and median tests in the use of nonparametric statistics by the journal groups as a mode of reasoning. The two tests pointed to the generalist journal group as the leading user of non-parametrics, while the ANOVA-Tukey test identified the information systems journal as the leader. The ANOVA-Tukey test also indicated significant differences between the last place history journal, and the generalist journal group, policy journal group, and the information systems journal.

Table 14: Mode of Reasoning= Non-parametrics

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
3	166.3	3	0.58	5	0.0509
1	158.54	1	0.46	1	0.0466
5	148.33	2	0.35	3	0.0431
2	136.11	5	0.33	4	0.0267
4	130.43	4	0.29	2	0.0249
6	87	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 5>6(.017) 1>6(.001) 3>6(.002) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Mode of Reasoning= Correlation

Both the KW and median tests find significant differences (sig. = .000) among the journal groupings concerning their use of the correlation mode of reasoning. The policy journal group consistently emerges as a leading user, with the ANOVA-Tukey and KW tests placing it first, and the median test placing it second, behind the policy journal group. The ANOVA-Tukey test finds the policy journals and the history journal to be significantly different from one another on a post-hoc basis.

Table 15: Mode of Reasoning= Correlation

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
1	163.13	3	0.42	1	0.0299
3	158.75	1	0.4	5	0.0278
4	144.5	4	0.27	4	0.0213
2	133.89	2	0.22	3	0.0195
5	112.08	5	0.06	2	0.0114
6	101.5	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 1>6(.029) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Mode of Reasoning= Analytical ex Ante

The KW and median tests find significantly different use (sig. = .000) of the analytical ex ante mode of reasoning by the various journal groups. The general purpose journal group emerges as the leading user in both tests and the ANOVA-Tukey test finds it to be significantly different from all others on a post-hoc basis.

Table 16: Mode of Reasoning= Analytical Ex Ante

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
3	206.95	3	0.85	3	0.1983
4	166.24	4	0.62	4	0.1431
2	155.54	2	0.43	2	0.1202
1	96.8	5	0.22	1	0.051
5	88.69	1	0.15	5	0.0481
6	45.5	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 3>2(.008),4(.013),1,5,6(.000) 4>5(.006),6(.000) 2>6(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Mode of Reasoning= Qualitative

Significant differences (sig. = .000) were uncovered in the use of the qualitative mode of reasoning, by the median and KW tests. Both tests converge upon the history journal as the leading user. Additionally, the ANOVA-Tukey test confirms that the history journal is significantly different from each of the others on a post-hoc basis.

Table 17: Mode of Reasoning= Qualitative

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
6	275.53	6	1	6	0.9381
1	179.58	1	0.72	1	0.4013
5	178.53	5	0.67	5	0.3742
2	126.57	2	0.43	2	0.241
3	108.49	3	0.3	3	0.1784
4	101.73	4	0.29	4	0.1558
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 6>1,2,3,4,5(.000) 1>2(.024),3,4(.000) 5>3(.005),4(.003) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

5.3.3 Classical Quantitative Statistics for School of Thought

School of Thought= Human Information Processing

Both the KW and median tests show significant differences (sig. = .000) among the journal groupings study of human information processing (HIPS). HIPS's leading proponent appears to be the information systems journal, with the KW and ANOVA-Tukey tests placing it first, and the median test rating it a strong third place. The ANOVA-Tukey test reveals that the information systems journal is significantly different from all others on a post-hoc basis.

Table 18: School of Thought= Human Information Processing

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
5	186.36	3	0.67	5	0.1627
3	175.69	1	0.61	1	0.0874
1	174.68	5	0.56	3	0.077
2	98.67	2	0.17	2	0.0085
4	98.38	4	0.17	4	0.008
6	80.5	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 5>1(.013),3(.001),2,4,6(.000) 1>2(.002),4,6(.000) 3>2(.008),4,6(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

School of Thought= Other Behavioral

The KW and median tests both register significant differences (sig. = .000) among journal groupings' focus on other behavioral research. The leading journal groupings are the general purpose journal group and the policy journal group. Furthermore, the

ANOVA-Tukey test identifies significant post hoc difference between the two leading journal groupings and all others.

Table 19: School of Thought= Other Behavioral

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
3	186.8	3	0.7	1	0.0889
1	160.66	1	0.43	3	0.0696
5	120.33	2	0.22	5	0.053
2	114.39	5	0.17	2	0.0124
4	105.63	4	0.13	4	0.0099
6	89	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 1>2(.003),4,6(.000) 3>2(.046),4(.001),6(.002) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

School of Thought= Efficient Markets Hypothesis

Significant differences (sig. = .000) were found by the KW and median tests among the journal groups' research into the EMH school of thought. The KW and median tests confirm the economics and finance journal group to be the leading devotee to this topic. Somewhat surprising is the finding that the audit journal concerns itself with EMH as well, which is revealed by the KW test and the median tests' results, which place it in second place, and by the ANOVA-Tukey result which places it a strong third. Moreover, the ANOVA-Tukey test does not show the audit journal to be significantly different from the general purpose journal group, on a post-hoc basis, so that both may reasonably be stated to share second place behind the economics and finance journal group. These three leading journal groups are significantly different from the others, on a post-hoc basis.

Table 20: School of Thought= Efficient Markets Hypothesis

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
4	217.53	4	0.79	4	0.3324
2	177.7	2	0.74	3	0.2051
3	175.48	3	0.7	2	0.1925
1	102.34	1	0.24	1	0.0753
5	54.78	6	0.03	6	0.0056
6	54.6	5	0	5	0.004
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 4>2(.002),1,3,5,6(.000) 3>1,5,6(.000) 2>1(.012),5(.001),6(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

School of Thought= Information Economics

Both the KW and the median tests reveal significant differences (sig. = .000) among the journal groupings study of the information economics school of thought. These tests rank their involvement in this topic in descending order as follows: the general purpose journal group, the economics and finance journal group, the audit journal, the information systems journal, and the history journal. The ANOVA-Tukey test reveals that the first two journal groups are significantly different from the last two journal groupings, confirming the non-parametric tests.

Table 21: School of Thought= Information Economics

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
3	173.68	3	0.64	4	0.0906
4	160.99	4	0.48	3	0.0789
2	141.24	2	0.39	1	0.0592
1	139.74	1	0.36	2	0.0439
5	85	5	0	5	0
6	85	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 4>5(.02),6 (.002) 3>5(.04),6(.004) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

School of Thought= Mathematical Programming

The KW and median tests find significant differences (sig. = .000) in the journal groups' research into mathematical programming. Both tests place the general purpose journal group and the audit journal as the leading proponents of this topic. Confirming this finding, the ANOVA-Tukey test shows that the general purpose journal group is significantly different from all other journal groupings, except for the second place audit journal.

Table 22: School of Thought= Math Programming

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
3	175.79	3	0.37	3	0.0229
2	141.37	2	0.13	2	0.0062
1	132.14	1	0.06	1	0.0049
4	131.51	4	0.06	4	0.0035
5	123	5	0	5	0
6	123	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 3>1,4,6(.001), 5(.02) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

School of Thought= Other Statistical Models

Significant differences (sig. = .000) were found to exist in the journal groups' study of other statistical models, according to the KW and median tests. These non-parametric tests agree that this school of thought gets the most attention from the general purpose journal group, followed by the economics and finance journal group, the audit journal, the policy journal group, the information systems journal, and the history journal. The ANOVA-Tukey test further reveals that the first three journal groupings are significantly different from the last three.

Table 23: School of Thought= Other Statistical Models

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
3	182.91	3	0.73	3	0.1305
4	170.93	4	0.65	4	0.1249
2	159.67	2	0.61	2	0.1098
1	123.1	1	0.36	1	0.0558
5	69	5	0	5	0
6	69	6	0	6	0
Comments	KW sig. = .000, M sig. = .000 ANOVA-Tukey post hoc tests: 3>1,5,6(.000) 4>5,6(.000),1(.003) 2>5(.008),6(.001) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

School of Thought= Accounting Theory

The accounting theory school of thought was the only taxonomic-category population that was normally distributed. Hence, it was tested primarily with the ANOVA-Tukey method, which revealed that the information systems journal and history journal significantly lagged behind all other journal groupings in participation in this topic on a post hoc basis. Nonparametric tests confirmed that the journal groups differed significantly (sig. = .000).

Table 24: School of Thought= Accounting Theory

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
1	178.57	1	0.67	2	0.2684
2	173.28	2	0.65	1	0.2388
3	161.28	3	0.54	3	0.2009
4	145.59	4	0.5	4	0.1923
5	67.61	5	0.11	5	0.0204
6	53	6	0	6	0
Comments	KW sig. = .000, M sig. = .000 ANOVA-Tukey post hoc tests: 2>5(.002),6(.000) 1>5(.001),6(.000) 3>5(.007),6(.000) 4>5(.024),6(.001) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

School of Thought= Accounting History

Both the KW and median tests reveal the differences among journal groupings in their study of accounting history to be significant (sig. =.000). These tests show the history journal clearly dominates all others, with the policy journal group, general purpose journal group, the audit journal, the economics and finance journal group, and the information systems journal following in descending order. Moreover, the ANOVA-Tukey test reveals the history journal as significantly different from all others on a post hoc basis. The second place policy journal group also differs significantly from the rest.

Table 25: School of Thought= Accounting History

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
6	277.47	6	1	6	0.9706
1	169.63	1	0.54	1	0.0754
3	133.97	3	0.37	3	0.0206
2	105.37	2	0.13	2	0.0063
4	100.79	4	0.1	5	0.0043
5	97.75	5	0.06	4	0.004
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 6>1,2,3,4,5(.000) 1>2,3,4(.000),5(.001) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

School of Thought= Institutional

The KW and median tests found significant differences (sig. =.000) in the study of the institutional school of thought by the various journal groups. The policy journal group and the general purpose journal group appear to be the leading devotees of this topic. Furthermore, the ANOVA-Tukey test reveals significant post hoc differences between

the leader, the policy journal group, and all other journal groupings, except for the second place general purpose journal group.

Table 26: School of Thought= Institutional

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
1	204.4	1	0.78	1	0.1855
2	163.8	2	0.65	2	0.1114
3	138.99	3	0.5	4	0.0781
4	136.76	4	0.44	3	0.0587
5	95.61	5	0.17	5	0.0314
6	76.88	6	0.07	6	0.0099
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 1>3,4,5,6(.000) 2>6(.032) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

School of Thought= Other Topics

Significant differences (sig. =.000) were found by the KW and median tests in journal group coverage of the school of thought other topics, which are comprised of those areas of study so infrequently encountered in or tangentially related to accounting research. Both non-parametric tests point to the information systems journal as the leader in this field, followed by the audit journal, policy journal group, economics and finance journal group, the general purpose journal group, and the history journal. The ANOVA-Tukey test further finds that the information systems journal is significantly different from all other journal groupings on a post hoc basis.

Table 27: School of Thought= Other Topics

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
5	275.81	5	1	5	0.6692
2	196.83	2	0.87	2	0.194
1	149.32	1	0.54	1	0.1194
4	140.96	3	0.48	4	0.1065
3	139.19	4	0.44	3	0.0802
6	58.5	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 5>1,2,3,4,6(.000) 2>3(.010),6(.000) 1>6(.003) 4>6(.020) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

School of Thought= Agency Theory

Both the KW test (sig. = .030) and median (sig. = .023) test found significant differences among the groupings' study of agency theory. Devotion to this topic is ranked as follows, in descending order: general journal group, econo-finance journal group, policy journal group, information systems journal, audit journal, and history journal.

Table 28: School of Thought= Agency Theory

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
3	158.16	3	0.21	3	0.0132
4	145.78	4	0.12	4	0.013
1	143.82	1	0.1	1	0.0063
5	136.94	5	0.06	5	0.0043
2	135.17	2	0.04	2	0.0035
6	128.5	6	0	6	0
Comments	KW sig.=.030, M sig.=.023 ANOVA-Tukey: no sig. Post hoc dif. Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

School of Thought= Expert Systems

Significant differences were found to exist in the focus of the various journal groups to the expert systems school of thought, according to the KW and median tests (sig. = .004 and .007, respectively). These tests show the information systems journal as dedicating itself to this topic the most, out of all the journal groupings. The ANOVA-Tukey test confirms this, revealing that the information systems journal differs significantly from all other journals groupings on a post hoc basis.

Table 29 School of Thought= Expert Systems

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
5	179.69	5	0.28	5	0.0509
3	145.8	3	0.06	2	0.0036
2	144.02	1	0.04	6	0.0027
1	143.93	2	0.04	4	0.0024
4	143.12	4	0.04	1	0.0022
6	142.45	6	0.03	3	0.0019
Comments	KW sig.=.004, M sig.=.007 ANOVA-Tukey post hoc tests: 5>2,3,4,6(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

5.3.4 Classical Quantitative Statistics for Foundation Discipline

Foundation Discipline= Psychology

Both the KW and median tests find significant differences (sig. = .000) in the use of psychology as a foundation discipline by the various journal groups. Both tests agree that the information systems journal is the leading user, followed by the general purpose journal group, and policy journal group. The ANOVA-Tukey test concurs with this

finding, revealing that the information systems journal is significantly different from all other journal groupings, and that the general purpose and policy journal groups are significantly different from the rest of the journal groups.

Table 30: Foundation Discipline= Psychology

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
5	188.89	3	0.75	5	0.1814
3	185.17	5	0.61	3	0.0958
1	158.53	1	0.49	1	0.09
2	104.83	2	0.26	2	0.0124
4	98.71	4	0.21	4	0.0092
6	77.5	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 5>1(.013),3(.017),2,4,6(.000) 3>2(.007),4,6(.000) 1>2(.025),4(.000),6(.001) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Foundation Discipline= Allied Humanities

The KW and median tests find significant differences (sig. =.000) in the extent the journal groups ground their research in the allied humanities. This foundation discipline finds its chief adherent in the history journal, and to a lesser extent, the policy journals, which both tests proclaim as the leading users among all journal groupings. The ANOVA-Tukey test confirms this in the finding that both of them are significantly different from the others on a post hoc basis.

Table 31: Foundation Discipline= Allied Humanities

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
6	277.5	6	1	6	1
1	205.13	1	0.85	1	0.2052
3	120.77	3	0.43	5	0.0347
2	96.37	2	0.22	3	0.0304
5	95.44	5	0.17	2	0.0163
4	85.69	4	0.13	4	0.0097
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 6>1,2,3,4,5(.000) 1>2,3,4,5(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Foundation Discipline= Economics and Finance

Significant differences (sig. = .000) were found by the median and KW tests in the manner the various journal groups used the economics and finance foundation discipline. This foundation discipline perhaps unexpectedly finds its chief affiliate in the audit journal, and less surprisingly, with the economics and finance journal group. Both non-parametric tests place them in first and second place, respectively, and the ANOVA-Tukey test shows significant differences between each of them and all other journal groupings, on a post hoc basis. The general purpose journals make a are in third place, with the ANOVA-Tukey test showing it to be significantly different from the two last place journal groupings, the policy journals and the information systems journal.

Table 32: Foundation Discipline= Economics and Finance

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
2	218.91	2	0.83	2	0.4093
4	208.75	4	0.81	4	0.3946
3	177.99	3	0.69	3	0.268
1	103.28	1	0.21	1	0.1071
5	53.25	5	0.06	5	0.0373
6	28.5	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 2>3(.004),1,5,6 (.000) 4>1,3,5,6(.000) 3>1,5,6(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Foundation Discipline= Allied Technology

Both the KW and median tests find significant differences (sig. = .000) in the use the journal groups make of the allied technology field as a foundation discipline. As expected, the allied technology foundation discipline is used most often as a research basis by the information systems journal. The ANOVA-Tukey test further finds that it differs from all others significantly on a post hoc basis.

Table 33: Foundation Discipline= Allied Technology

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
5	274.67	5	0.94	5	0.6413
3	152.92	3	0.27	1	0.0123
1	141.67	1	0.18	3	0.0115
4	124.06	4	0.06	4	0.0035
2	122.3	2	0.04	2	0.0024
6	116	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 5>1,2,3,4,6(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Foundation Discipline= Allied Mathematics

The KW and median tests find significant differences (sig. = .000) in the use of the allied mathematics as a foundation discipline by the various journal groupings. The allied mathematics appears to be used as an intellectual basis most frequently by the general purpose journal group, with all three tests placing it first.

Table 34: Foundation Discipline= Allied Mathematics

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
3	193.99	3	0.75	3	0.0741
2	139.07	2	0.39	5	0.0524
4	136.33	4	0.37	4	0.0406
5	124.19	1	0.27	2	0.0329
1	119.08	5	0.22	1	0.0199
6	83	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 3>4(.044), 1,6(.000) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Foundation Discipline= Statistics

Significant differences (sig. = .000) exist in the way the journal groups employ statistics as a foundation discipline, according to the KW and median tests. Both tests agree that the general purpose journals exceed all others in usage. The ANOVA-Tukey test, furthermore, confirms this finding, revealing significant differences between the first place generalist journals and the last place history journal.

Table 35: Foundation Discipline= Statistics

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
3	178.22	3	0.49	3	0.0338
4	149.13	4	0.27	2	0.0246
2	143.65	2	0.22	4	0.0236
1	122.18	1	0.1	5	0.0062
5	117.5	5	0.06	1	0.005
6	108	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 3>1(.000),6(.001) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Foundation Discipline= Law

Both the KW and median tests record significant differences (sig. = .000) in the frequency the journal groups make reference to law as a foundation discipline. According to both tests, the audit journal appears to be the journal grouping that is most legally grounded, appearing as the top adherent of this.

Table 36: Foundation Discipline= Law

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
2	186.22	2	0.52	2	0.0494
1	168.9	1	0.42	1	0.0464
4	145.06	3	0.28	4	0.0275
3	143.1	4	0.27	3	0.0186
5	105	5	0	5	0
6	105	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 2>6(.034) 1>3(.037),5(.041),6(.006) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Foundation Discipline= Mixed

The KW and median tests found significant differences (sig. = .000) in the use by various journal groups of mixed foundation disciplines. The policy journal group was found by both tests to have used mixed foundation disciplines the most among all groupings. Confirming this, significant post hoc differences were found between the policy group and the history journal, which used mixed foundation disciplines least.

Table 37: Foundation Discipline= Mixed

jr grp	KW mean rank	jr grp	Median >%	jr grp	Mean
1	176.56	1	0.45	1	0.0549
3	145.32	3	0.29	4	0.0302
4	143.56	4	0.27	3	0.0203
2	141.54	2	0.26	2	0.0188
5	124.47	5	0.11	5	0.0162
6	105.5	6	0	6	0
Comments	KW sig.=.000, M sig.=.000 ANOVA-Tukey post hoc tests: 1>3(.006),6(.001) Jr grp 1=policy (AOS, JAPP, RAR), 2=audit (AUD), 3=generalist (JAR, CAR, TAR) 4= econ-finance (JAAF, JAE), 5= information systems (JIS), 6=history				

Foundation Discipline= Accounting

Significant differences (sig. =.000) were found by the KW and median tests among the journal groups in the extent of their grounding in accounting as a foundation discipline. According to these tests, the history journal and information systems journal lagged all others in this respect. Furthermore, the ANOVA-Tukey test found both journals differed significantly from all other journal groupings, on a post hoc basis.

5.4 Summary of Taxonomic Analysis Results

The various tests show that the journal groups are significantly different, and thus may be considered distinct paradigms. Indeed, the levels of significance are extremely high, and may warrant further investigation to ascertain the nature of this strong effect.

Having identified the various differences among journal groups according to several characteristics as reflected by taxonomic-categories, it is now possible to create a descriptive taxonomic profile for each journal group. This is accomplished by selecting those taxonomic-categories wherein the journal group was shown by the various statistical tests to have been a significantly greater user or adherent than other journals as a salient characteristic of that journal group.

5.4.1 Socio-Policy Journal Group

The socio-policy journal group can be characterized as having a small sample oriented methodology, and an organizational behavioral orientation, apparent in its topical foci and intellectual influences.

This is borne out by the fact that all three statistical tests used (ANOVA, KW, and median test) consistently rank the policy journal group as a heavy user of such small sample methodologies as case and survey studies, which may be related to its behavioral emphasis. Tests also show it uses secondary archival sources more than other journal groups.

Group 1	Rank per KW Test	Rank per Median Test	Rank per ANOVA
Research method-archival secondary	1	1	1
Research method-case	1	1	1
Research method-survey	2	1	2

The policy journal group is also revealed to have a strong preference for qualitative reasoning, which is a characteristic that goes hand in hand with the use of secondary archival sources. Thus, one finds that it is unanimously shown by all three tests to be the most qualitative among all journal groupings, with the exception of the history journal. Other favored modes of reasoning, correlation and factor analysis, probably stem from its management and institutional slant.

Group 1	Rank per KW Test	Rank per Median Test	Rank per ANOVA
Mode of reasoning-factor analysis	1	1	1
Mode of reasoning-correlation	1	2	1

The topics it studies seem to focus on organizational behavior, such that it leads other journal groupings in schools of thought institutional and other behavioral. Accounting theory is also a favored topic.

Group 1	Rank per KW Test	Rank per Median Test	Rank per ANOVA
School of thought-other behavioral	2	2	1
School of thought-accounting theory	1	1	2
School of thought-institutional	1	1	1

Finally, the organizational behavior bent of the policy journal group's intellectual influence is reflected in the foundation discipline wherein it dominates other journal groups, management.

Group 1	Rank per KW Test	Rank per Median Test	Rank per ANOVA
Foundation discipline-othmixed	1	1	1
Foundation discipline-management	1	1	1

5.4.2 Audit Journal Group

The audit journal, surprisingly, has a very strong affiliation with economics and finance topics and methodologies, along with a rather more predictable association with institutional and legal topics and bases.

Its choice of the archival primary research method is an indication of its heavy usage of econometric databases, such as CRSP and Compustat.

Group 2	Rank per KW Test	Rank per Median Test	Rank per ANOVA
Research method-archival primary	2	2	2

Further manifestation of its economics and finance focus is its use of the regression mode of reasoning, the standard test of market model studies, and its population of research endeavor in the EMH school of thought. In line with the previous findings is the revelation that the audit journal's favored foundation discipline is economics and finance.

Group 2	Rank per KW Test	Rank per Median Test	Rank per ANOVA
Mode of reasoning-regression	2	2	2
School of thought-emh	2	2	2
Foundation discipline-ecofin	1	1	1

Of topics and influences more specifically germane to the auditing field, these are represented by strong leanings towards the accounting theory school of thought. Mixed modes of reasoning and descriptive statistics are also favored.

Group 2	Rank Test	per	KW	Rank Test	per	Median	Rank ANOVA	per
Mode of reasoning-descriptive statistics	1			1			2	
Mode of reasoning-mixed	2			1			2	
School of thought-accounting theory	2			2			1	

5.4.3 General Purpose Journal Group

The general purpose journal group, as might be anticipated, has the most diverse topical and methodological foci. The taxonomic categories wherein it dominates other journal groups spans tools and topics relevant to a variety of research areas.

For example, consistent with a behavior oriented research outlet, the general purpose journal group is a strong proponent of laboratory studies. It uses nonparametrics and the ANOVA method, commonly used for differentiating behavioral categories, and espouses psychology as a foundation for a large proportion of its papers chose. Schools of thought chosen also

Group 3	Rank per KW Test	Rank per Median Test	Rank per ANOVA
Research method-laboratory studies	2	1	2
Mode of reasoning-anova	2	1	2
Mode of reasoning –non-parametrics	1	1	2
School of thought-HIP	2	1	3
School of thought –other behavioral	1	1	2
Foundation discipline-psychology	2	1	2

On the other hand, its reliance on simulation, devotion to time series and other statistical models topics, and reliance on statistics as a foundation, could also be consistent with an econometric type of journal.

Group 3	Rank per KW Test	Rank per Median Test	Rank per ANOVA
School of thought-time series	1	1	1
School of thought – other statistical models	1	1	1
Foundation discipline-statistics	1	1	1

Perhaps the most meaningful characteristic of the general purpose journal group is the fact that it appears to be the journal group that generalizes the most new ideas. The most telling evidence for this is the fact that it dominates all other groups in its use of the analytical ex ante mode of reasoning, which is the method preferred in seminal de novo research.

Further proof of this is its devotion to information economics, agency and math programming schools of thought, and to the allied mathematics as a foundation discipline. These taxonomic preferences strengthen a research program that is common with the creation of viable theoretical models prescribed in mathematical foundation.

Group 3	Rank Test	per	KW	Rank Test	per	Median	Rank ANOVA	per
Mode of reasoning-analytical ex ante	1			1			1	
School of thought-math programming	1			1			1	
School of thought -agency	1			1			1	
Foundation discipline-allied math	1			1			1	
School of thought –information economics	1			1			2	

5.4.4 The Economics and Finance Journal Group

The economics and finance journal group indeed fulfills its purported role in the accounting research canon: its methodology (archival primary research method and regression modes of reasoning), topical emphases (schools of thought EMH, information economics), and intellectual orientation (foundation discipline economics and finance), are consistently aligned with an economic-finance research program.

Group 4	Rank per KW Test	Rank per Median Test	Rank per ANOVA
Research method-archival primary	1	1	1
Mode of reasoning-regression	1	1	1
School of thought-EMH	1	1	1
School of thought –information economics	2	2	1
Foundation discipline-economics and finance	2	2	2

5.4.5 The Information Systems Journal Group

The most obvious and expected taxonomic characteristic is that it would be dominated by the simulation research method, the expert systems school of thought and by the allied technology foundation discipline more than all other journal groups, as is the case.

	Rank Test	per	KW	Rank Test	per	Median	Rank ANOVA	per
Group 5 Research method- simulation School of thought- expert systems	2			2			1	
Foundation discipline- allied technology	1			1			1	
	1			1			1	

An unexpected finding is that this journal group bears a very strong behavioral stamp, actually dominating other journal groups. This is true even for such journal groups as the policy journals and audit journal, where the behavior of accountants and firm agents or groups would tend to be the main focus. Manifestations of this behavioral bent are seen in the information systems journal's choice of research method (field, lab, survey), mode of reasoning (ANOVA), and foundation discipline (psychology, besides allied technology).

The choice of HIPS as the school of thought makes this behavioral tendency more plausible.

	Rank Test	per	KW	Rank Test	per	Median	Rank ANOVA	per
Group 5 Research method -field	1			1			1	
Research method - laboratory	1			2			1	
Research method - survey	1			2			1	
Mode of reasoning- anova	1			2			1	
School of thought-HIP	1			3			1	
Foundation discipline- psychology	1			2			1	

These results indicate that the information systems journal appears to be an exponent of studies relating to the behavioral aspects of the interaction between humans and systems.

5.4.6 History Journal Group

The history journal is uniquely characterized by its reliance on mixed research methods, qualitative reasoning, devotion to accounting history, and grounding in the allied humanities.

Group 6	Rank per KW Test	Rank per Median Test	Rank per ANOVA
Research method=mixed	1	1	1
Mode of reasoning=qualitative	1	1	1
School of thought-accounting history	1	1	1
Foundation discipline-allied humanities	1	1	1

5.5 Summary of Citation Analysis Results

Turning now to citation analysis, the 6×6 matrix constructed consisting of the various proportions at which each of the 6 journal groups cites another of the 6 groups (rows), and the various proportions at which each of the 6 journal groups is cited by one of the others (columns) results in the following table. Note that underlined percentages are for self-cites.

Table 40: Citation Matrix

	Cited Group					
Citing Group	1	2	3	4	5	6
1	<u>45%</u>	2%	42%	10%	1%	0%
2	7%	<u>29%</u>	56%	8%	0%	0%
3	4%	4%	<u>67%</u>	25%	0%	0%
4	2%	2%	57%	<u>38%</u>	0%	0%
5	8%	19%	52%	2%	<u>18%</u>	0%
6	41%	0%	26%	2%	0%	<u>31%</u>

The results of the computations of the various citation metrics are as follows.

With regard to gross send-receive ratios, the various journal groups had the following results:

Table 41: Gross Send-Receive Ratio

Group	send-receive ratio gross
1	107%
2	56%
3	301%
4	85%
5	19%
6	31%

According to these results the general purpose journal group has the greatest gross send-receive ratio. The policy-oriented paradigm has the second highest and the economics and finance, audit, history, and information systems paradigms have the 3rd, 4th, 5th, and 6th highest respectively. The implication of these ratios is that the general-purpose journals represent the most mature paradigm in the accounting field. Of the specialized paradigms, the policy and economics and finance sectors are the most mature, and the information systems the least with the history- and audit-oriented paradigms in the middle.

The net send receive ratios, which measure paradigm's influence well computed as follows:

Table 42: Net Send-Receive Ratio

Group	send-receive ratio net
1	62%
2	27%
3	234%
4	47%
5	1%
6	0%

Apparently, the degree of maturity of a paradigm correlates positively with its influence, such that the ordering of the paradigm in terms of influence is almost identical to the ordering in terms of maturity. The exception here is the history paradigm, which is more mature than the information systems journal, but less influential. The answer to this paradox is that much of the influence that the maturity of the history paradigm should generate is actually exerted within the paradigm. This becomes apparent when computing the next citation metric, the self-feeding ratio.

Computing the self-feeding ratio yields the following:

Table 43: Self-Feeding Ratio

Group	self-feeding ratio
1	45%
2	29%
3	67%
4	38%
5	18%
6	31%

Here, it is apparent that the history journal is 1.7 times more likely to cite itself than the information systems journal, hence, confirming that its influence is largely felt within its own intellectual frontiers. Also, one notes that besides the general- purpose journal group, the paradigm that has the greatest self-feeding ratio among all the other, more specialized paradigms, is that represented by the policy-oriented journal group. Indeed, if one were to compute the ratio of the self-feeding and net send-receive ratio, as below:

Table 44: Self-Feed Ratio Scaled by Send-Receive Ratio

Group	ratio of self-feed to net send-receive
1	1.13
2	.38
3	7.16
4	.76
5	.01
6	0

The results would point out that the history and the information systems paradigms are highly specialized, being several times more likely to self-cite than to be cited by journals of other paradigms.

Thus, one concludes that the history- oriented and information systems paradigms are the most specialized, meta-centric paradigms.

The Gini indices reveal the following about the diversity of sources of intellectual imports (other paradigms cited) for each paradigm.

Table 45: Gini Index Diversity of Sources Cited

Group	Gini index- diversity of imports
1	39.45
2	41.08
3	51.77
4	47.81
5	34.44
6	33.22

It shows that the general purpose and economics and finance have the most diverse (least concentrated) set of intellectual influences, such that they may be the paradigms most susceptible to charge. It should be noted that the rankings for this metric are identical to those of the net send-receive ratio, indicating that the variety of intellectual influences may be indirectly passed on to other paradigms.

Finally, computation of the Gini index over the diversity of destinations (other paradigms referring to it) for each paradigm is as follows:

Table 46: Gini Index Diversity of Citing Groups

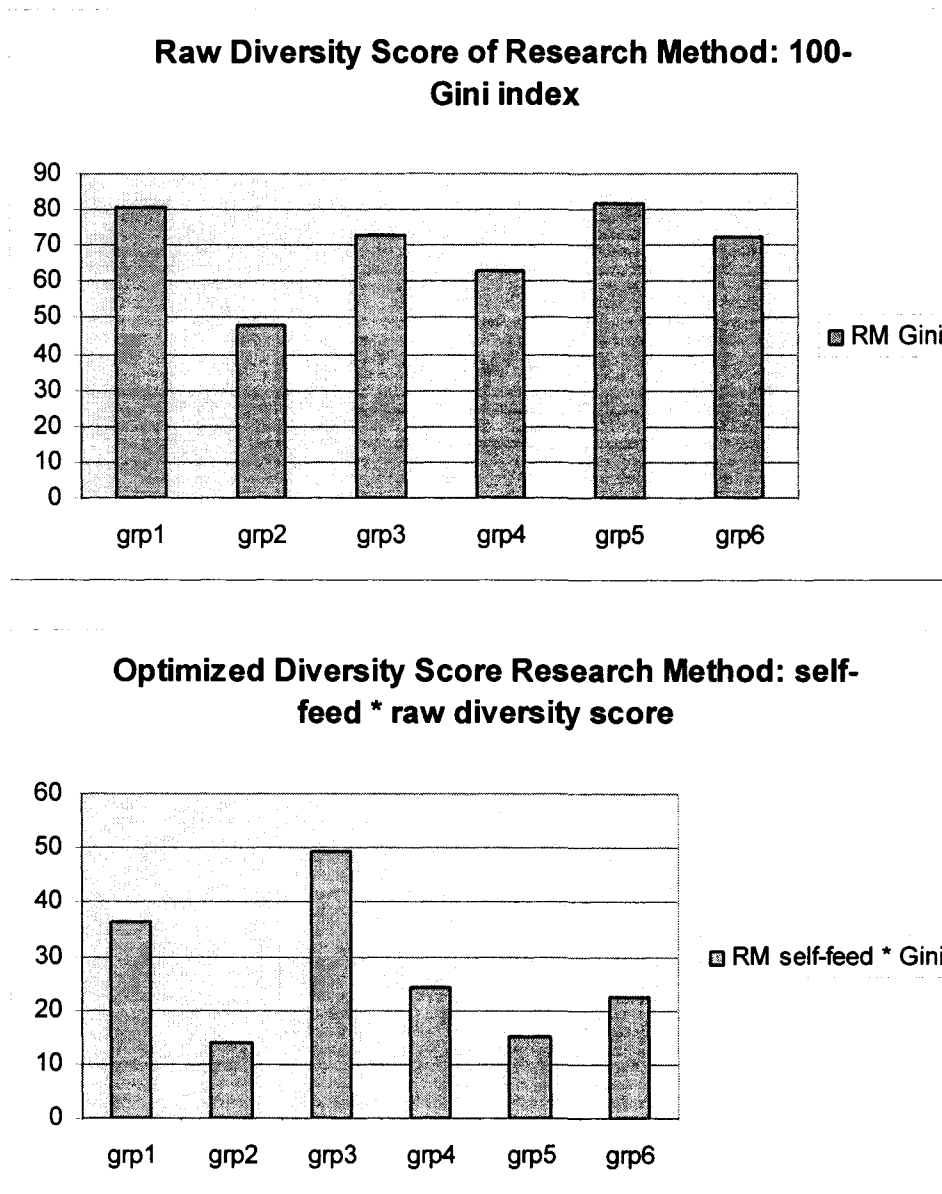
Group	Gini index- diversity of exports
1	47.15
2	53.55
3	21.23
4	35.63
5	50.25
6	100

Again, the paradigms comprised of the general purpose journal group and the policy journal group are identified as having the broadest appeal among other paradigms, with the history oriented and information systems journal groups appearing to have the most narrow market, and hence the most specialized appeal.

In summary, the citation patterns between the various paradigms reflect a very strongly established mainstream of general purpose journals. Of the more specialized paradigms, the paradigm that appears to have the strongest and most diverse appeal is that represented by the policy and economics and finance journals. There, also appears to be a high degree of specialization among other paradigms, particularly the history- and information systems- oriented paradigms.

Computation of the raw diversity metric revealed that the paradigm with the most diverse set of research methods was the information systems paradigm (group 5). However, the optimal diversity metric revealed that the paradigm with the greatest amount of beneficial diversity in its set of research methods was the generalist paradigm (group 3). This means that the generalist paradigm is able to use a wide variety of data-gathering methods, but its constituents are still willing to communicate and share their findings to one another in spite of their divergent views on this aspect of methodology, and the paradigm is in no danger of fragmenting. Also, the different types of information gleaned from these various forms of research appear to be shared and appreciated throughout the paradigm, as compared to other paradigms.

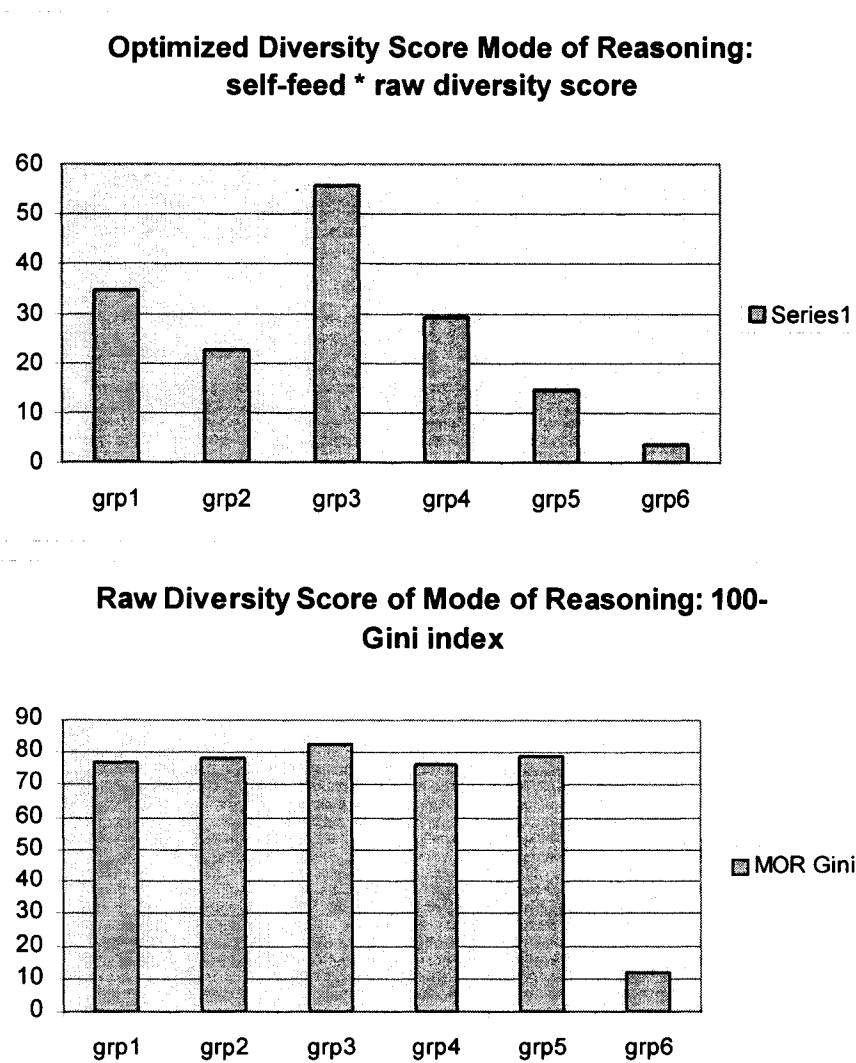
Figure 6: Raw Diversity and Optimal Diversity Scores of Research Method



Calculation of the raw diversity metric for the mode of reasoning taxon showed that the generalist paradigm (group 3) used the widest variety of modes of reasoning among all the paradigms. The calculation of the optimal diversity metric uncovered that the generalist paradigm was also the paradigm that had the greatest extent of beneficial

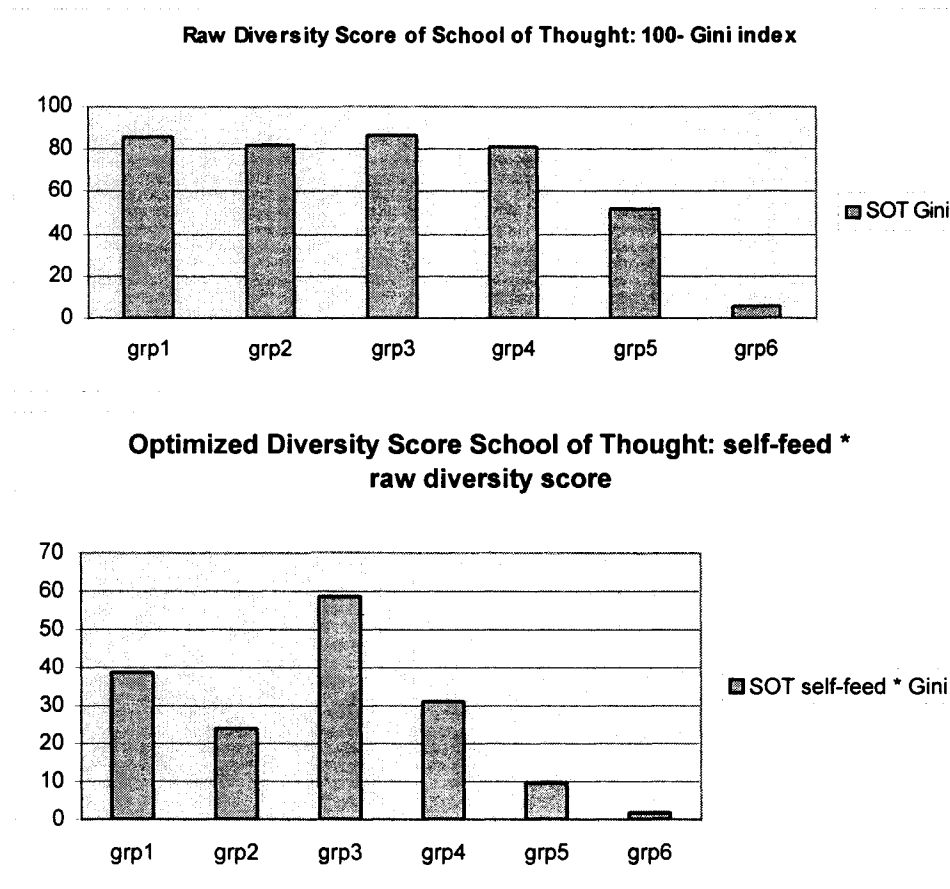
diversity in its use of modes of reasoning. This finding implies that in spite of differing views on the correct manner of arguing or confirming the results of empirical analyses, the researchers who hold these antithetical views are still able to share their research with one another. This also implies that the generalist paradigm benefits more than any other paradigm from having multiple methods of data analysis brought to bear on the problems it chooses to research.

Figure 8: Raw and Optimal Diversity Scores for Mode of Reasoning



The raw diversity metric calculated over the school of thought taxonomic categories shows that the policy journals (group 1) and the generalist journals (group 3) are the most diverse in their topical coverage. However, computation of the optimal diversity index for school of thought reveals a vast difference between these two paradigms. Whereas the generalist journals have an optimal diversity score of 69, the highest among all paradigms, the optimal diversity score for the policy journals is much lower, at 39. This indicates that although both paradigms have the approximately the same degree of absolute diversity, the generalist paradigm has a much greater amount of beneficial diversity than the policy paradigm. This means that researchers in the generalist paradigm, although interested in a wide range of topics, do not fail to share their findings about diverse phenomena, and integrate it within their paradigm. On the other hand, the policy paradigm researchers, though also interested in a broad set of phenomena, do not benefit from this topical diversity because they fail to communicate it among themselves and integrate their findings into the policy paradigm.

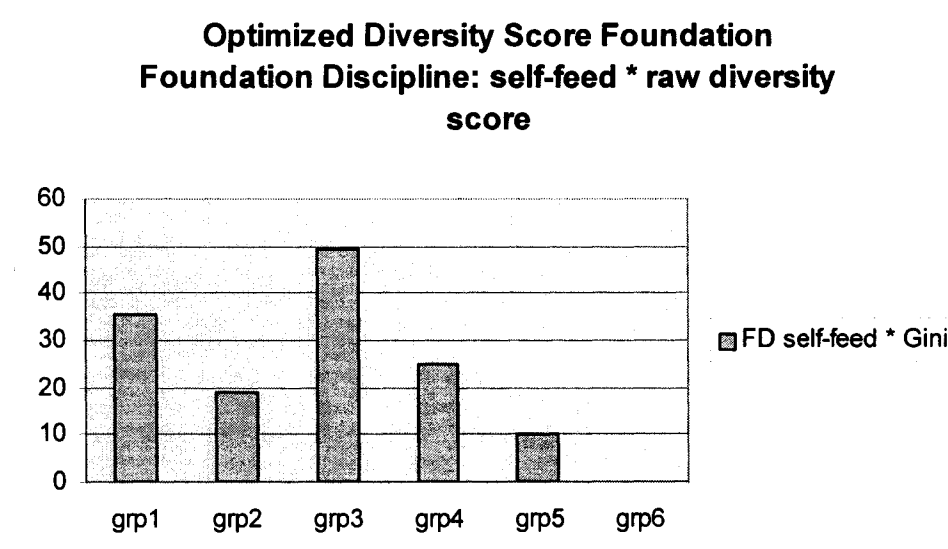
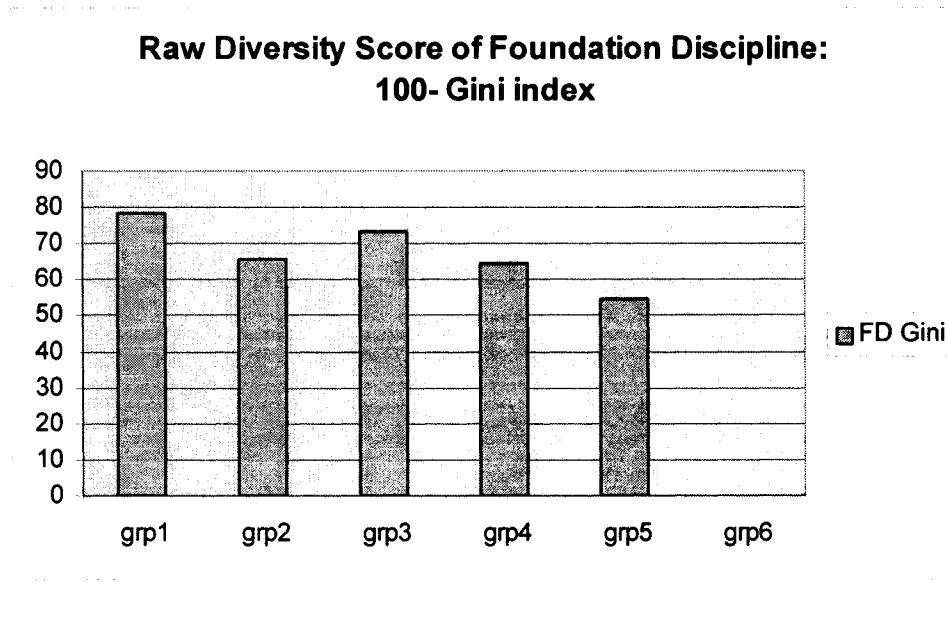
Figure 9: Raw Diversity and Optimal diversity Scores of School of Thought



Calculation of the raw diversity metric for the foundation discipline taxonomic categories generates results similar to those found for the other topical taxon, school of thought. Once again, the policy paradigm and the generalist paradigm are shown to have the greatest amounts of absolute diversity in their choice of academic disciplines upon which to base their research (diversity index scores of 78 and 73, respectively). However, the generalist paradigm once again takes the lead over the policy paradigm in terms of beneficial diversity, with optimal diversity scores of 49 and 35, respectively. This finding suggests that though both paradigms undertake to use a wide variety of theoretical

perspectives from various academic disciplines, the generalist paradigm is better than the policy paradigm at incorporating and integrating these diverse perspectives.

Figure 10: Raw Diversity and Optimal Diversity Scores of foundation Discipline



The extent of beneficial diversity that each paradigm possesses implies the extent to which the paradigm is able to benefit from viewing the phenomena of interest from multiple angles, using multiple data gathering methods, and multiple data analysis

techniques. To the degree that other paradigms appreciate the value of this broad array of viewpoints and techniques and the wealth of information they provide, the optimal diversity metric ought to correlate positively with the influence of the paradigm.

The optimal diversities were computed for the taxonomic categories of research method, mode of reasoning, school of thought, and foundation discipline, and each optimal diversity score was correlated with both the send-receive ratio and the raw counts of citations for each paradigm.

Correlating optimal diversity for various taxonomic categories generated the following findings.

In general, the various optimal diversities correlate positively with the send-receive ratio and with the raw count of citations. The correlations with the send-receive ratio is stronger, and are significant at the .05 level. The correlations with the raw counts of citations are also positive, but none of them are statistically significant. Later correlations of interactions of the various optimal diversities with the raw counts also produced positive, but insignificant results.

The significant correlations all resulted from bivariate analysis of the send-receive ratio and the various individual optimal diversities. These are summarized in the table below:

Table 47: Correlation Matrix of Optimal Diversity and Individual Optimal Diversity Scores

	optimal diversity metric research method	optimal diversity metric mode of reasoning	optimal diversity metric school of thought	optimal diversity metric foundation discipline
Correlation coefficient	0.87	0.871	0.84	0.822
Significance	0.024	0.024	0.036	0.044

The highest correlation was found to exist between the optimal diversity of mode of reasoning and the send-receive ratio. The correlation was positive and significant at the .05 level (coefficient =.871, sig. =.024).

The second highest correlation achieved was that between the optimal diversity of research method and the send-receive ratio. The correlation was positive and significant at the .05 level (coefficient =.87, sig. =.024).

The third highest correlation was that of the optimal diversity of school of thought and the send-receive ratio. Once again, the correlation was positive and significant at the .05 level (coefficient =.84, sig. =.036), but the difference between the coefficient in this relation and the coefficients of the other two correlations was somewhat larger. That is, while the first two correlations (diversity of mode of reasoning and research method vs. send receive ratio) clustered together at .871 and .87, the correlation between diversity of school of thought and send-receive ratio, at .84, a full three percent lower.

The lowest correlation, that which was computed between the optimal diversity of foundation discipline and produced even more dramatically different results. Although the correlation was still positive and significant at the .05 level (coefficient =.822, sig. =.044), the coefficient was five percent lower, and was just barely significant at the .05 level.

The implications of these results imply that accounting researchers appear to value diversity in methodological technique more than they value diversity of topical focus or theoretical viewpoint. This further implies that accounting researchers tend to be empirically focused, as they seem to value research rich in a variety data gathering and data analysis methods. However, though accounting researchers also regard the breadth of topical focus or theoretical perspective positively, these types of diversity are less valued than methodological diversity.

If the individual optimal diversity scores correlate positively and significantly with the send-receive ratio, this suggests that the interactions of these individual optimal diversities would possibly yield stronger and more significant correlations with the send-receive ratio. This, in fact, proved to be the case. The bivariate analyses of various interactions between the optimal diversities and the send-receive ratio produce the correlation results below.

As might be expected, the interaction of all four optimal diversities, research method, mode of reasoning, school of thought, and foundation discipline, produced the highest

correlation with the send-receive ratio. This correlation was positive and significant (coefficient=.996, sig. = .000). This finding suggests that accounting researchers are extremely respectful of a paradigm that are able to incorporate diverse topics and theoretical bases, as well as a variety of data gathering and data analysis methods in its research.

The correlations of the send-receive ratio to the various combinations of three diversity metrics is summarized in the table below:

Table 48: Correlation Matrix of Send-receive Ratio vs. Interactions of Three Optimal Diversities

	school of thought*mode of reasoning*foundation discipline	research method*mode of reasoning*school of thought	research method*mode of reasoning*foundation discipline	research method*school of thought*foundation discipline
Correlation Coefficient	0.991	0.989	0.984	0.98
Significance	.000	.000	.000	.000

Of the interactions of three optimal diversities, the highest and most significant correlation was with the interaction produced by mode of reasoning, school of thought, and foundation discipline (coefficient =.991, sig. =.000). A very close second (coefficient =.989, sig. =.000) was that resulting from the combined optimal diversities of research method, mode of reasoning, and school of thought. The correlation of the combined optimal diversities of research method, mode of reasoning, and foundation discipline came third (coefficient =.984, sig. =.000). The weakest, least significant of the four correlations, was that produced by the combination of research method, school of thought, and foundation discipline (coefficient =.98, sig. =.001). The most noticeable

regularity in these results is that the strongest, most significant correlations result when the optimal diversity of mode of reasoning is one of the interaction terms. This finding is echoed in the results of interactions between two optimal diversities.

Of the interactions of two optimal diversities, the strongest and most significant was that of the product of the optimal diversities of mode of reasoning and school of thought (coefficient =.965, sig. =.002). Not surprisingly, the second and third strongest correlations were produced by pairings of the optimal diversity of mode of reasoning and other optimal diversities. These correlations were coefficient =.959, sig. =.002 for the pairing of mode of reasoning and research method optimal diversities, and coefficient =.959, sig. =.003, for the pairing of mode of reasoning and foundation discipline. The weakest and least significant correlations were those between the send-receive ratio and the interaction pairs of school of thought and foundation discipline (coefficient =.949, sig. =.004), research method and school of thought (coefficient =.947, sig. =.004), and research method and foundation discipline (coefficient =.934, sig. =.006). Again, the strongest and most significant correlations were those that involved the optimal diversity of mode of reasoning as an interaction term.

Therefore, in summary, the correlation results indicate that the diversity of a paradigm is strongly associated with the influence of that paradigm among other paradigms. In particular, the diversity of a paradigm's modes of reasoning seems to be the strongest and most significant correlate of the paradigm's ability to export its ideas to other paradigms.

5.6 Table of Findings by Hypothesis or Research Question

The following table presents the findings in terms of hypotheses and research questions established in Ch.3.

Table 49: Table of Findings

	Hypothesis or Research Question	Finding
Hypothesis 1	Significant differences exist between paradigms in school of thought	supported
Hypothesis 2	Significant differences exist between paradigms in research method	supported
Hypothesis 3	Significant differences exist between paradigms in mode of reasoning	supported
Hypothesis 4	Significant differences exist between paradigms in foundation discipline	supported
Research Question 1	Extent of incommensurability / specialization of paradigms	most specialized are the information systems and history oriented paradigms
Research Question 2	Extent of paradigm influence	most influential is the generalist paradigm
Research Question 3	Diversity of paradigms	most diverse is the generalist paradigm
Research Question 4:	Diversity of paradigms and influence	Paradigm diversity and paradigm influence are positively correlated

Chapter 6 Summary and Discussion

6.1 Overview

This chapter summarizes the findings that characterize the paradigmatic structure of accounting research literature, specifying the various paradigms of the research network, and the unique topical and methodological characteristics revealed by taxonomic analyses about each paradigm. The findings of various citation analyses are also summarized, detailing the specific function played by the paradigms in disseminating knowledge within the accounting research network, and also measuring the influence of each paradigm. The optimal diversity metric, which measures the intellectual contribution of each paradigm, and correlates with citation influence, is also discussed. Finally, the future research ramifications of this project are proposed.

6.2 Paradigm Structure and Morphology

The results of the various tests performed in the previous chapter indicate that the paradigmatic structure of accounting research literature is comprised of several significantly different paradigms. Each paradigm is embodied by groups of journals devoted to a unique set of related topics, and each of these topical emphases reflect a particular aspect of an accountant's reality. Furthermore, consistent with various theories of philosophy of science, such as Kuhn's theory of paradigms, these paradigms are distinguished by their unique combination of methodological characteristics, which necessarily correspond to their topical emphases.

The paradigm structure of accounting literature is comprised of six distinct topical areas and attendant methodologies, there emerge, with groups of journals clustered about them. These topical clusters embody the paradigms of accounting research. These paradigms and their constituent journals are the socio-policy paradigm (AOS, JAPP, and RAR), the audit paradigm (AUD), the generalist paradigm (JAR, CAR, and TAR), the econo-finance paradigm (JAAF and JAE), the information systems paradigm (JIS), and the history paradigm (AHJ).

Besides confirming largely their apparent topical devotions as given by their journal titles, editorial statements, and paradigm affiliation, taxonomic analysis uncovered some unexpected additional information about a number of these paradigms.

The audit paradigm reveals that it bears a very strong affiliation to the econo-finance paradigm, with topical and methodological characteristics that strongly resemble those of that latter journal group. This is startling because a priori ideas of auditing and attestation research would perhaps portray it as being more akin to the policy journals or even the generalist journals, with their behaviorist slant. This finding is particularly important because it begs some very important questions about the very nature of auditing. First, it seems to portray auditing as a mere appendage of financial accounting, even though such a narrow definition of auditing flies in the face of recent AICPA efforts to expand the scope of the auditor's attest function to beyond the financial statements. This AICPA initiative was voiced in the recommendations of the Elliott Committee, which identified

over a hundred new assurance areas, apart from the financial statement audit. Certain specific areas were emphasized, namely: risk assessment, business performance measurement, information systems reliability, electronic commerce, health care, and elder care. Clearly, given the new thrust of the audit profession, a far different research agenda would be appropriate, perhaps reflected in taxonomically measurable increases in foundation disciplines such as management, allied technology, and the allied humanities, and in the behavioral schools of thought. A second question arises about the nature of measuring audit outcomes, as it appears that in the minds of many researchers, audit success or quality is quantified solely by the securities price reaction. Of course, this mind set excludes other valid measures that would have had taxonomically apparent effects in behavioral schools of thought (e.g. HIP) and foundation disciplines (e.g. psychology, allied humanities, and management).

Another surprising finding is that the taxonomic attributes of the generalist paradigm are consistent with those of a theory generating research front. This is confirmed by citation analysis which depicts the generalist paradigm as an influential source in terms of both the extent that it is referenced by other paradigms (net send receive ratio), but also in the diversity of the type of paradigms that cite it (Gini index). Thus it appears that these generalist journals are the theory-generating engine to which other accounting paradigms refer for models and conceptual bases and frameworks. This is startling because one would expect that a field as taxonomically variegated as accounting, would generate its theoretical ideas on the periphery, with all paradigms of whatever topical bent possessing both empirical and theoretical apparatus (Kuhn, 1970). Instead, accounting generates

these new ideas in the center, with the more specialized paradigms doing almost exclusively empirical research, and the generalist journals incorporating them through more theoretical research into the accounting research mainstream. Nevertheless, taxonomic and citation analysis reveals a centrally oriented system of theoretical reference, where specialist paradigms take their cue from the mainstream, rather than being independent generators of new theories. The discussion of the optimal diversity metric later in this chapter will reveal possible cause of this apparent anomaly.

The information systems paradigm yields the last surprise result. Its taxonomic morphology identifies it as having a significantly behaviorist orientation. Thus, it would seem that the role of this paradigm is less that of an outlet for research in the development of theories or the technological underpinning of accounting information systems as they are a forum for the study of the human user interface.

6.3 Paradigm Function and Influence

Citation patterns in the accounting research canon reveal that, as alluded to earlier, there is a well-established, frequently and universally referenced core of generalist journals, whose taxonomic attributes characterize them as in large part, if not wholly, theoretical engines.

However, a degree of specialization and fragmentation exists. Citation measures of specialization (self- feed ratio, ratio of self- feeding to net send- receive) reveal that the

history journal group, though a mature paradigm, does not communicate its ideas much beyond its own intellectual frontier. Thus, it embodies a vibrant, yet un-integrated fraction of the accounting research arena.

Another paradigm that appears to be under-integrated is the information systems paradigm. While its gross send-receive ratio indicates that it has some distance to go before it achieves the level of paradigm maturity that the policy paradigm possesses, it already exhibits traits of extreme specialization, such that its ratio of self-feed to net send-receive is far higher than any other paradigms.

6.4 Optimal Diversity Metric

The optimal diversity findings offer a clue as to why the generalist paradigm excites such a wide appeal among other paradigms. The findings suggest that the reason why the generalist paradigm is the most widely cited and influential among all the paradigms of the accounting research network is because it possesses the optimal combination of diversity in topical coverage and methodological techniques, on the one hand, and the propensity to integrate the diverse findings and influences derived from such a great breadth of focus. That is, other paradigms recognize the fact that the generalist paradigm is able to incorporate a wide-ranging research agenda, using a variety of techniques to reach conclusions about these varied phenomena, and, just as importantly, communicate and synthesize these diverse artifacts of research within the general accounting paradigm.

The results find that diversity in a paradigm's methodological characteristics correlate strongly and significantly with the extent to which the paradigm is cited.

There are several reasons why paradigms would reference the work of other paradigms.

One reason is that many paradigms share “theoretical foundations, formal methods, and research modes,” such that if these “good tools already existed, they could be adapted to research,” then there would be “little reason to reinvent the wheel.” (Benbasat-Weber, 1996)

Another reason is that paradigms are status-conscious and believe that “if they lack legitimacy as a discipline, they might use reference disciplines to show research contemporaries that methods and standards were no different” and that “acceptance and stability would come from compliance with culture and research norms” of other paradigms. (Benbasat-Weber, 1996)

“The tasks of developing, implementing, maintaining, operating, and managing information systems (such as accounting), are too multi-faceted... in this light, it would be foolhardy to discontinue reliance on external reference disciplines for the insights they provide in explaining and predicting the wide range of phenomena that we will surely encounter as we undertake these tasks.” (Benbasat-Weber, 1996)

Therefore, because many useful research techniques and theoretical bases occur outside a paradigm, because intra-paradigm communication requires some measure of common methodology and intellectual foundation, and because different aspects of one reality require a multiple paradigm view, diversity of referenced sources is desirable.

The diversity not only of specific techniques and theories, but also of entire referenced paradigms may be incrementally valuable.

The accumulation of knowledge from studies performed under different paradigms is more desirable than studies performed according to the modes of a single paradigm. Even when: “the results of two such studies cannot be directly compared more practical knowledge is created by adding the findings together than by considering either single study alone.” In single paradigms: “knowledge claims are more closely aligned because research findings built directly upon one another.” However, “the accumulated knowledge is vulnerable to basic challenges from scholars outside the paradigm, who would dismiss such insights as lacking relevance or validity. (Robey, 1996)

Paradigms can also attract high quality researchers from other paradigms by being open to dialogue with them. “Whereas unified fields are eager to restrict the influx of new people and new ideas, (diverse) fields are enriched by new entrants” and remain relevant through infusion of new people with new ideas from a variety of disciplines.”

Furthermore, “diverse fields are far more creative because incongruous and conflicting ideas are more frequently voiced and the resulting tensions generate the energy that drives creative resolutions.” (Robey, 1996)

Various methods exist by which researchers of one paradigm harness other paradigms for study of their own paradigms. These external paradigms may be useful in all phases of research from theory building, to providing models for empirical research, to summarizing findings and conclusions.

External paradigms may be used as theoretical bases by paradigm bracketing and paradigm bridging. In paradigm bracketing “theorists bracket the assumptions of other paradigms to become familiar with and apply the traditions, language, and methods of a specific paradigm. Such brackets enable theorists to ignore certain aspects of complex phenomena and focus on facets and issues of particular interest. In multi-paradigm inquiry, paradigm bracketing makes differing assumptions explicit, thereby delineating paradigm distinctions and aiding awareness, use, and critique of alternative perspectives.” On the other hand, scholars who perform paradigm bridging operate from the assumption that “boundaries between paradigms are fuzzy and potentially permeable” such that they are able to “integrate paradigmatic insights and emphasize paradigm similarities” and to foster “communication across paradigms to help theorists comprehend how the phenomena in question can legitimately be subject to various research strategies, while yet remaining a related class of phenomena.” (Lewis, 1999)

Empirical studies also benefit from multi-paradigm approaches. Two general types of multi-paradigm empirical research exist, parallel studies and sequential studies. “Conducting parallel or sequential studies, theorists use multiple paradigms (their respective methods and foci) to collect and analyze data and to cultivate varied representations of a complex phenomenon.” The difference lies in the fact that parallel studies “preserve theoretical conflicts” by depicting diverse aspects of the same phenomenon by applying methods from different paradigms all at the same time. What emerges is a tapestry of different specific findings that together provide the total research result about a particular unit of study. On the other hand, sequential studies achieve their findings by “applying lenses in succession within the empirical phase of research, so that researchers grasp their disparate yet complementary focal points.” That is, within the empirical phase of data gathering and analysis, research is broken down further into different stages, such that each succeeding stage is more complete or conclusive than the previous one. Often, these stages of research serve to confirm previous stages’ findings, or provide bases for succeeding stages’ methodologies. Modes of research and analysis may vary from stage to stage, such that each stage of research might be thought of as belonging to are being rooted in different paradigms than the others. (Lewis, 1999)

Finally, in synthesis of findings based on various theoretical bases and by data gathered and analyzed under the methodologies of various paradigms, researchers “manage their bounded rationality and, thereby, accommodate opposing views within a meta-paradigm perspective. Meta-paradigm denotes a higher level of abstraction, from which accommodation does not imply unification or synthesis but, instead, the ability to

comprehend paradigmatic differences, similarities, and interrelationships. The goal is a more rich, holistic, and contextualized purview. Meta-theorizing techniques help theorists explore patterns that span conflicting understandings. In exemplars researchers assume paradigms offer partial truths, often rooted in differing space and.” (Lewis, 1999)

Multi-paradigm strategies may also be deployed to a research project as a whole rather than at various phases of the research. This multi-paradigm approach, which integrates some of the aforementioned multi-paradigm approaches into a research rationale is called “paradigm interplay... wherein the researcher moves back and forth between paradigms so that multiple views are held in tension. Thus, interplay allows for cross-fertilization without demanding integration, which suggests a criterion for selecting between various paradigm crossing strategies: If one wants to take advantage of cross-fertilization between the ever-growing number of paradigms, while maintaining diversity, then interplay is the preferred strategy for paradigm crossing. However, there may be situations in which cross-fertilization is not desired, in which case one of the other strategies could be more useful. For instance, when a researcher first develops or explores a new paradigm, the parallel strategy offers the advantage of complete separation, which minimizes the chances of confusion between paradigms by offering a point of differentiation with respect to other paradigms. If maintaining diversity is not an issue, then the sequential strategy may be a less demanding route to crossing paradigms.” (Schultz and Hatch, 1996)

The philosophical underpinning of multi-paradigm research is called structurationist theory. Structurationists deny that paradigms are necessarily incommensurable to one another. Because paradigm incommensurability precludes the ability of paradigm adherents from “meaningful communication... it is prima-facie difficult to see how cross- or multi-paradigm inquiry could even be possible... thus any form of multi-paradigm inquiry that assumes incommensurability is risking self-stultification.” This arises from the fact that “there are no common measures among paradigms of inquiry, so that representatives of different paradigms live in different worlds, hold mutually exclusive beliefs, and use different vocabularies.” However, structurationist theory posits that “while knowledge implies rhetorical consensus... differences in vocabularies might only reflect the paradigmatic exigencies of different groups of inquirers, although the vocabularies are different, the languages are nonetheless comprehensible, reflecting in part what is common to scholarly cultures.” (Weaver and Gioia, 1994)

Therefore, structurationist theory facilitates multi-paradigm research. Because paradigms are not completely incommensurable, their scholarly adherents are capable of “communicating about and comprehending, though not necessarily accepting, the arguments and views of representatives of various theoretical, meta-theoretical, and methodological commitments.” Specifically, “structurationist theory, taken as a meta-theoretical perspective, enables us to see how scholars can differ in their goals, emphases, and methods even while, in some sense, engaged in a common task... it offers, in essence, a means for revising meta-theoretical assumptions in a way that explains and legitimizes the actual diversity of practice in studies and supplies the grounds for

achieving a more comprehensive view.” In this manner, “a structurationist analysis enables us to let go of the idea of monolithic, impermeable, and imperialistic paradigms, while yet maintaining distinctive and alternative perspectives within scholarly inquiry.” (Weaver and Gioia, 1994)

6.5 Summary: A Counter-Kuhnian Colloquy

Overall, the findings regarding the paradigmatic structure and citation relationships embodied by the various paradigms of accounting research literature contradict much of the received Kuhnian doctrine.

Recall that Kuhn posits a stark dichotomy between research fields with a single dominant paradigm, and research fields undergoing a crisis of paradigm competition. In the first case, a single, uniform set of related topics comprise the entire research output of that field. Also, this uniform set of topics is studied using an unvarying array of methodological tools, such as techniques of data gathering and result validation. In stark contrast, the second case features a research field composed of various competing paradigms, significantly dissimilar in topical emphasis and methodological technique. These competing paradigms would experience a “breakdown in communication,” as Kuhn says, such that cross-paradigm citation and multi-paradigm research projects would be impossible. This breakdown would be the natural result of divergent topical foci and incommensurable methodologies, as neo-Kuhnian structurationist philosophy asserts.

In other words, Kuhn would have us choose between a soliloquy and a cacophony.

However, the findings of this project point neither to an accounting research soliloquy nor a cacophony. Indeed, if one were to characterize accounting research, it would be difficult to say if it is in the throes of one of those periodic intellectual cataclysms, Kuhnian paradigm shifts, or if, rather, it is secure in a single dominant paradigm.

Taxonomic analysis reveals a variegated accounting literature. There co-exist several accounting research paradigms, all significantly different from one another in their devotion to specific topical concentrations, and their dependence on particular research methodologies. Apparently, this ménage of different paradigms sets the stage for a discordant cacophony of voices, with each competing paradigm conducting research within its own individual vacuum, unwilling and unable to share and integrate findings across paradigm boundaries.

Yet, citation analysis reveals that there is a great deal of communication between these various paradigms. There is a central core of general-purpose journals that is universally referenced by all other paradigms. A further finding is that accounting researchers actually value references that provide as wide a research view as possible, such that the diversity of a particular research reference's set of topical emphases and methodological techniques, correlates significantly with the propensity to which other researchers cite that reference. This breadth of topics and techniques is true of cross-paradigm research. Taken together, both these findings imply that the paradigms of accounting literature, while very different from one another, do not hesitate to consult references in other paradigms.

Therefore, the unforeseen result is that while accounting research consists of different paradigms, there is substantial cross-paradigm communication, and an absence of a breakdown in communication that Kuhn predicted.

Thus, accounting research is neither a lonely soliloquy, nor a discordant cacophony, but a symbiotic and informative colloquy.

An alternative characterization is that accounting, as a whole, is a mature paradigm of business research. It has all the hallmarks thereof, such as a topical focus on accounting in general, a self-contained research structure with both theoretical, model-building units on the one hand, and empirical, model-testing ones on the other, albeit embodied in different journals, and established theories and methodologies, (market model, earnings-response coefficient) to carry out distinctive accounting research. However, what we may be witnessing is the next step in the life cycle of this paradigm, the spawning of new, more, specialized paradigms that focus on specific aspects of accounting, such as auditing, information systems, history, etc. These new paradigms, although they already have distinct topical foci, and a distinct set of literature, have not as yet developed independent theoretical functionalities, and are thus dependent on the generalist core of the accounting research network for theoretical models. The presence of cross-paradigm communication, however, indicates that this characterization is unlikely to be accurate.

6.6 Future Research

Implications for future research arising out of these findings would be of two types, ameliorative, and investigative.

6.6.1 Ameliorative Research

The ameliorative type of research would involve rectification of deficiencies or inconsistencies in the research agenda of certain accounting paradigms.

The findings point to the need for ameliorative research in the audit paradigm, whose current research program seems to focus too narrowly on financial aspects of accounting to the exclusion of other aspects of accounting more germane to auditing, as determined by its nature, or as mandated by the AICPA.

Various proposals by the Elliott Committee could provide specific avenues by which the present audit paradigm research agenda could be broadened, and these new research efforts would fit existing schools of thought. Research efforts in the areas of risk assessment and business performance measurement, would fall under the management school of thought, because many of the variables involved would not be traditional accounting and finance concepts, but rather, could take the form of events and entities not portrayed in monetary or debit-credit terms. Efforts to further knowledge about assurance in the digital world, such as research in information systems reliability and electronic commerce assurance would be included in the allied technology school of thought, because of the nexus between these phenomena and the computer and

telecommunications environment. Finally, research into health care and elder care issues would be reflected in increases in research in the behavioral schools of thought, such as HIPS and other behavioral research.

The role of taxonomic research in these ameliorative efforts would be to act as a diagnostic tool. This is because increases in the extent of research in the aforementioned schools of thought would indicate improvement in the research agenda, to be more compliant with the general thrust of the AICPA Assurance Services Committee recommendations.

Another ramification of this dissertation in the direction of ameliorative research is supplied by the development of the optimal diversity measurement. The optimal diversity metric computes the extent to which paradigms approach an ideal condition of a wide-ranging agenda, multiplicity of techniques, without suffering from paradigm incommensurability, communication break-down, and consequent fragmentation. Therefore, it provides a basis for structuring the research agenda of the community of scholars that embody each paradigm. Paradigm communities whose paradigms are characterized by narrowly focused topics and limited techniques may wish to expand their horizons, to investigate how a larger body of phenomena impact their area of research, and to incorporate a wider variety of data gathering and analysis methods to test their insights. On the other hand, some other paradigm communities whose diverse foci and methods threaten their paradigm with incommensurability may wish to make

conscious efforts to increase the communication and integration of their diverse views within the paradigm.

6.6.2 Investigative Research

In contrast to ameliorative research, which is research conducted in order to satisfy the demands of a recommended research agenda, investigative research is carried out purely for the sake of elucidating issues of interest whose explication has not necessarily been the object of authoritative mandate.

One aspect of investigative future research would involve tracking the newer, specialized paradigms, to see how they mature into independent, self-contained research areas with theory-building functionalities. The expected stages in the evolution of these specialized paradigms into independent competing paradigms would be traceable by both taxonomic and citation analysis. Taxonomic analysis would identify increases in the extent of research output originating in these specialized paradigms. Further paradigm maturation would be identified by decreases in the extent of cross-paradigm citations, signaling the loss of communication between competing paradigms.

The optimal diversity index also suggests a new dimension of investigative research. To the extent that the optimal diversity metric represents the ideal of a wide-ranging and yet closely collaborative and integrated paradigm, it would provide an objective measure to judge how all paradigms are doing in their research efforts. The academic communities affiliated with each paradigm might make periodic assessments of their paradigm's

research, in order to gauge the extent and characterize the quality of that paradigm's diversity.

An even more intriguing possibility is an assessment of the entire accounting research network itself, using the optimal diversity index. This would entail the comparison of the accounting research canon with those of other business-related academic fields. This proposed research is quite feasible by the development of paradigm identification and optimal diversity quantification techniques developed in this dissertation.

Paradigm identification within other business-related academic disciplines would follow the same procedure as paradigm identification within accounting. This procedure would involve selecting the top academic research journals from the business field, then reviewing their editorial policies or mission statements to determine each journal's particular topical focus. As was the experience with accounting, these topical foci would probably correspond to paradigms within that business field.

A cursory glance at a list of research journals in management, for example, yielded four distinct candidate paradigms. These four candidate paradigms and the journals that embody them are: the management decision-making (*Decision Sciences*), management education (*Business Education Forum*), human resource research (*Human Resource Management*), labor-management interaction (*Industrial and Labor Relations Review*), management ethics (*Journal of Business Ethics*), and logistics (*Journal of Supply Chain Management*).

A similar review of marketing journals also reveals four candidate paradigms: a generalist paradigm (*Journal of Marketing*), advertising (*Journal of Advertising Research*), consumer relations (*Journal of Consumer Research*), and business communications (*Journal of Business Communications*).

The recording of citations between these journals, though tedious, would be trivial. The only difference between the citation data –gathering in the proposed research and that carried out for this dissertation would be that cross-disciplinary citations would be recorded, in order to compute the proportions at which each business discipline, accounting, management, marketing, etc., tends to cite itself, or tends to cite papers from other business fields.

Perhaps the greatest challenge, should this type of research be undertaken, would be the creation of taxonomic classifications similar to those in the ARD. However, even this task is not impossible. Methodological taxonomic categories would probably be very similar, as accounting, and other business-related fields, draw from the same basic set of data-gathering techniques and statistical methods developed in the social sciences and statistics and mathematics, respectively. Topical taxonomic categories would possibly be generated through EDA. EDA, as has already been explained at length in this dissertation, is readily deployed to find subtle distinctions between underlying categories in seemingly homogeneous data sets.

Of course, validation of these EDA generated topical taxonomic categories should probably be incorporated into this proposed research. Some level of collaboration with non-accounting researchers may be required.

6.7 Concluding Caveats

The conclusions and insights revealed by this research, important and substantiated as they are, must necessarily be subject to certain caveats. These concerns arise from the nature of the data, the limitations of methodology, and the idiosyncrasies of existing theory.

First, this research purports to offer up an evaluation and characterization of accounting research. However, the conclusions reached in this research are only valid to the extent that the data population, the ARD, is representative of accounting research. Indeed, it is entirely possible that other journals not included in the ARD would, when included in this research, yield an entirely different paradigmatic structure than the one depicted. However, it must be remembered that the ARD has been used as a proxy for the entire accounting research network in other research, for example by Bricker (1989). This would imply that it is generally regarded as being a sufficient, if not perfect, approximation of the complete accounting research canon.

Another concern arises in the extremely high significance of the various statistical tests of differences between paradigms. Such results, though supportive of the hypotheses proffered in this project, are quite unusual. Nevertheless, it must be remembered that the

number of data points yielded by the ARD, a database with some 6,000 entries, is bound to produce highly significant results. Furthermore, as has been seen above, the results were achieved using three different classical quantitative statistical tests, all confirming one another.

A final concern is the fact that other theories about the development of thought, apart from classical Kuhnian philosophy of science may better fit the accounting research network. Indeed, this research identifies a number of points of divergence between what Kuhn would have expected of accounting's paradigm structure, and what that structure actually is revealed to be. However, Kuhn's ideas have historically been the most accepted and well known. Thus, this research invokes his theories, even if they serve merely as a point of departure, and are in contrast with much of what the results actually reveal.

In summary, concerns about the findings based upon the ARD, and their extrapolation to the entire accounting research canon, while valid, are largely allayed by scholarly consensus on the great extent to which the data set actually proxies for accounting research in general. Secondly, the unusually high significance of differences is entirely consistent with very large data sets, and has been confirmed with different modes of statistical analysis. Finally, this research acknowledges that there may exist other models of the development of science that better fit the accounting research network, besides that of Kuhn, and it is hoped that these findings lead to further discussion and elaboration of those theories.

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Appendix: The Accounting Research Directory

This appendix is intended as a comprehensive guide to the ARD taxons and their constituent categories. The ARD taxons categorize papers according to mode of reasoning, research method, school of thought, information, treatment, area, geography, objective, and foundation discipline

Taxonomic classification according to mode of reasoning is intended to identify which type of quantitative or qualitative analysis technique was used to formally arrive at the conclusions of the article. These various techniques include descriptive statistics, regression, analysis of variance, factor analysis, non-parametric statistics, correlations and qualitative analyses.

Taxonomic classification according to research method analyzes which type of study underlies the research paper. Three broad areas of research method exist: analytical, archival, and empirical. Analytical studies may use internal logic or simulations. Archival studies use either primary records or secondary, aggregated database type sources. Finally, empirical studies may take the form of case studies, field studies, laboratory experiments, or surveys.

The school of thought taxon identifies to which major area of accounting research the article contributes. These areas include human information processing, efficient market hypothesis, time series, mathematical programming, information economics, agency theory, institutional studies, expert systems, and accounting history.

The information taxonomic classification identifies the phenomenon of interest in the study. This phenomenon is that particular financial statement account, financial ratio, security market movement, manager decision, auditor behavior, or any other type of accounting phenomenon, for which the study is attempting to build or place into some descriptive rubric or normative model. Commonly, if the research paper in question was an empirical study using a regression, the information taxon would likely be the response variable (Y variable) in the regression model.

Closely related to the information taxon is the treatment taxon. This taxon identifies which major factor or other phenomenon is seen to cause, be associated with, or otherwise contextualize the phenomenon identified in the information taxon. To use the previous example, if the research paper in question was an empirical study using a regression, the treatment taxon would be the main predictor variable (X variable) in the regression model.

The area taxon identifies to which major accounting field the paper belongs. These fields include: tax, financial accounting, managerial accounting, auditing, information systems, and any combination of the preceding.

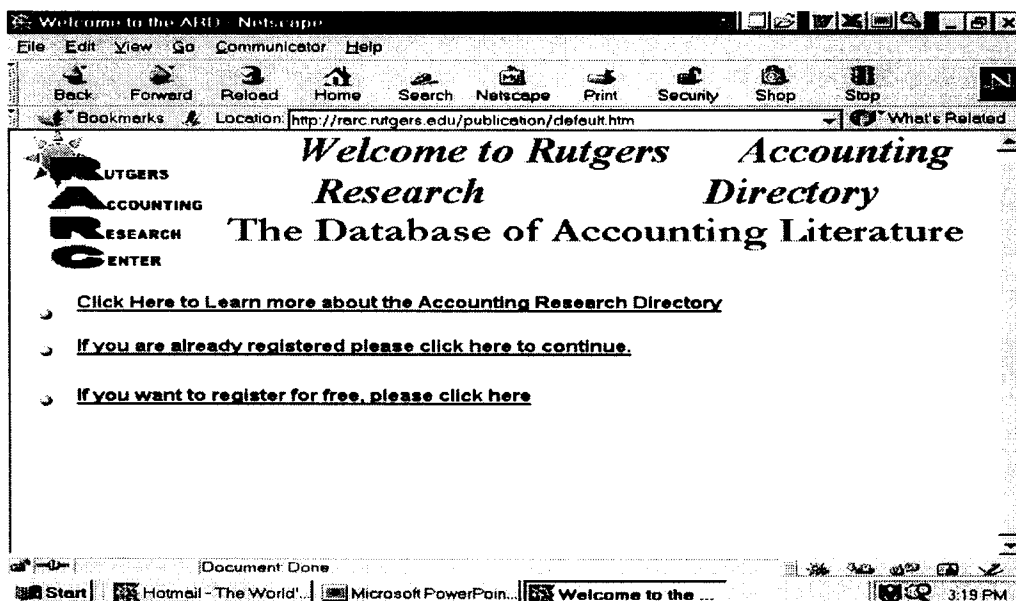
The objective taxon classifies the type of business entity studied in the article according to its orientation, as profit, not-for-profit, regulated, or all of the above.

The geography taxon indicates whether the geographic context is US, non-US, or both.

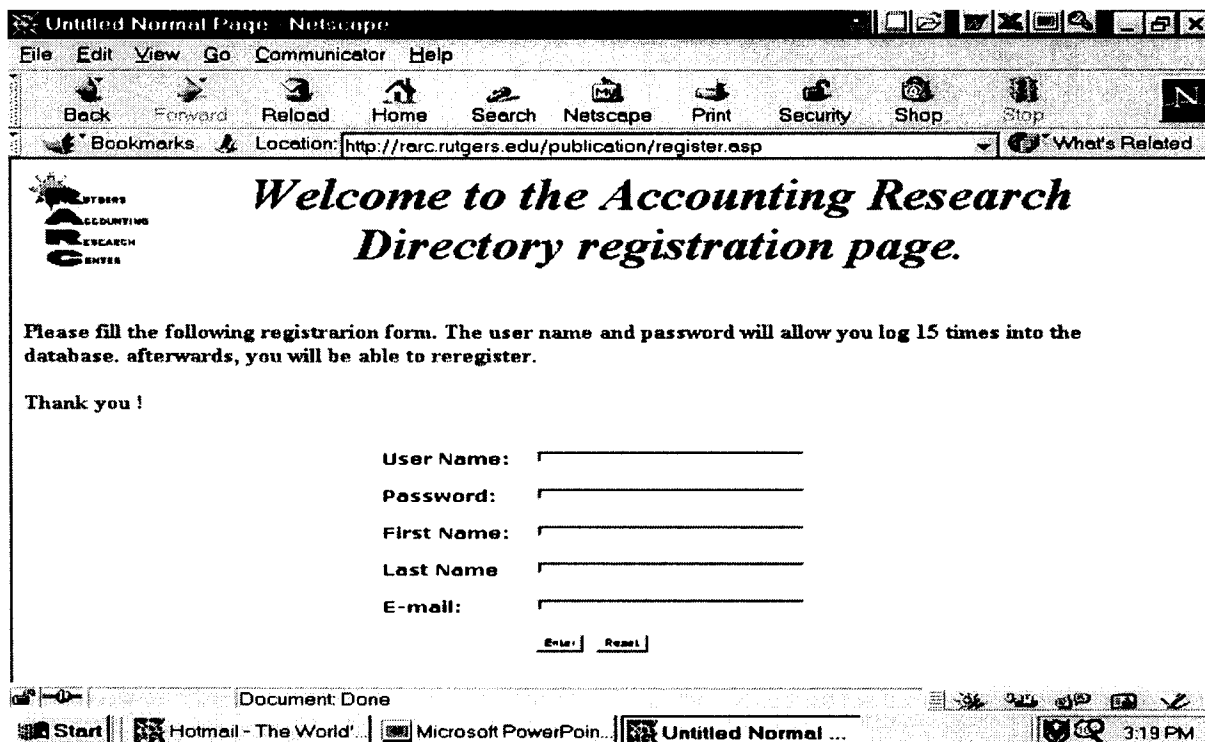
Finally, the foundation discipline taxon identifies which academic area informs the paper, and includes psychology, sociology, political science, history, philosophy, economics and finance, engineering, communication, computer science, mathematics, decision theory, game theory, statistics, law, accounting and management.

In order for graphical and statistical methods to identify the significant differences that exist between research paradigms, a degree of aggregation and standardization of the data is necessary. The data as gleaned from the first phase of the methodology yields information about individual research papers' characteristics.

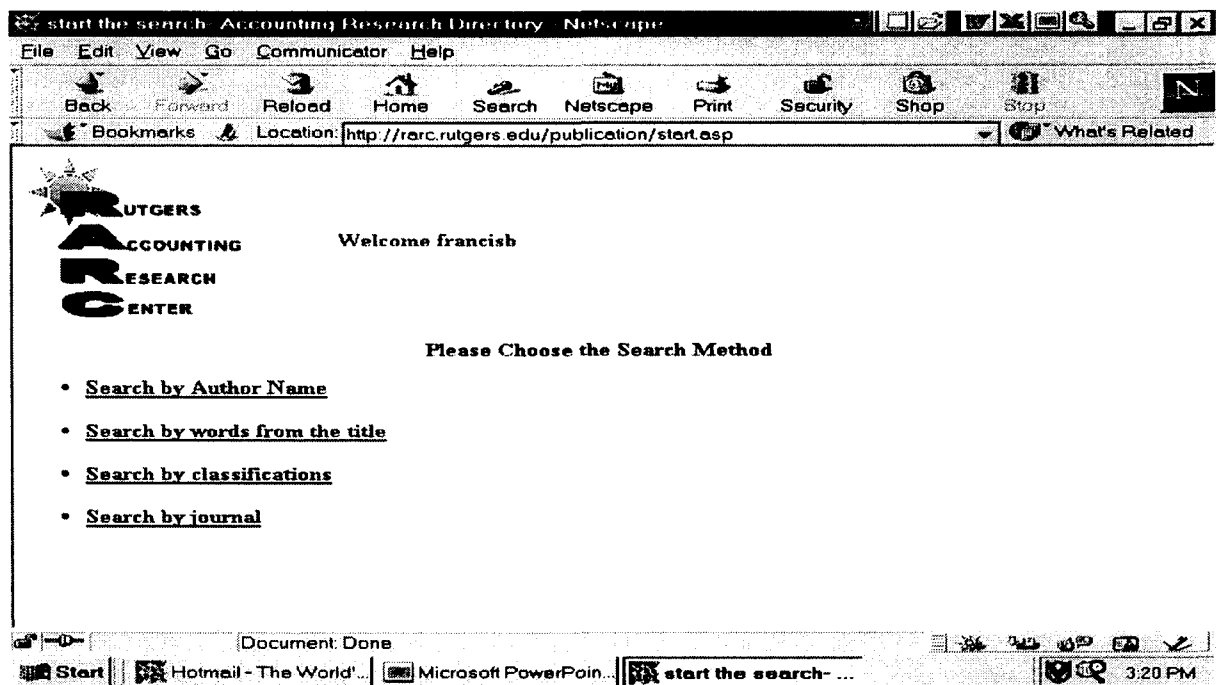
The ARD is available as hardcopy or online. The online version of the ARD is accessible at <http://rarc.rutgers.edu/publication/default.htm>. The most recently published hardcopy version of the ARD appeared as the third edition in 1994. The various functionalities of the online ARD are discussed below.



Registering for online access to the ARD free of charge. After entering some identifying information such as first name, last name, and email address, all one need do is specify a user name and corresponding password to enter. This access pair is valid for 15 sessions, after which one may re-register at no cost. Originally, this registration process would have given any user access to the entire database. However, it was decided in 2004 that this unlimited access undesirable because of proprietary and server capacity concerns. Thus, while the ARD is still accessible for free online, only two pages of data are available to each user per login session.



The search functionalities of the ARD were designed with the diverse needs of researchers in mind. The ARD online allows the user to search for relevant papers in a variety of ways, including searching by author name, by key words in the title, by journal title, and by taxonomic classification. Searching by author name or by journal title is straightforward. These search methods are most useful if the user has limited knowledge of the bibliographic data of the desired paper.

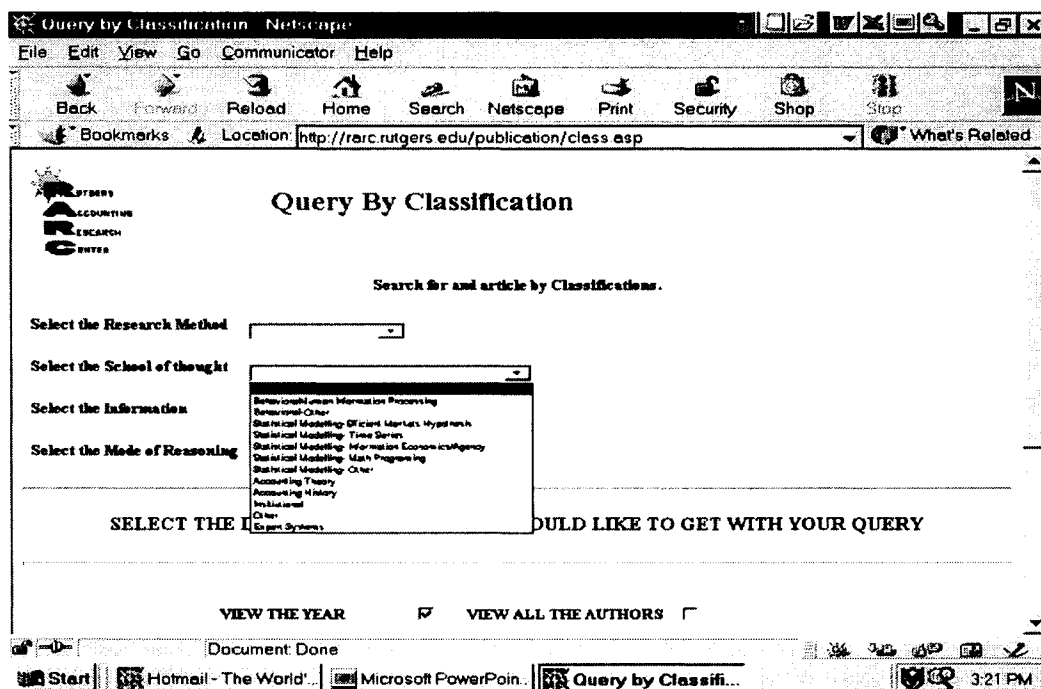


Users with more specific knowledge of the paper being sought would have recourse to searching by words from the title or word pertaining to the paper's subject matter. The search by words from the title combines two search methods common to many academic databases, search by key word or search by title. This search method would be useful if the user knows only a few key words in the title, or cunningly chooses to include only a few key words so that the ARD might yield a variety of matches on the topic of interest. However, if a person is interested in a specific paper, one could include the complete title in the name search to access the desired paper.

Users with a broad interest in a particular accounting research topic would perhaps be most intrigued by the information yielded by the ARD search by classification. This sort of query may be unique among academic research databases in that the ARD allows the

user to search explicitly by research methodology, school of thought, information topic, and mode of reasoning.

A useful functionality resulting from this search methodology is that the user might systematically structure searches to yield specific papers at various stages of the development of a particular accounting concept.



Perhaps one might start with the topic of interest selected from the information field, under the appropriate school of thought. Initially, the user might seek to read papers with statistical methods that show a mere association of variables, such as non-parametric statistics. As a second step, one might query for theoretical works that would provide the formal framework of the relationship between these variables by searching under the internal logic mode of reasoning rubric. As a final step, the user might review formal

tests of causation between the variables of interest by searching for papers written with the regression technique as its main mode of reasoning. Thus, the user might very deliberately trace the development of academic thinking on a particular accounting topic. The user would thereby be able to identify gaps, inconsistencies, omissions, or any other deficiencies in the research trail that would provide a research opportunity.