

ATTRIBUTES OF ARTICLES IMPACTING CONTEMPORARY ACCOUNTING
LITERATURE

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A science which hesitates to forget its founders is lost.

-Merton [1968:1]

I. Introduction

In accounting, as in other disciplines in the social and natural sciences, journal literature represents the major research communication network. As knowledge regarding a discipline and related disciplines is accumulated, changes in a discipline's research are inevitable. The evolution of a discipline's research can be classified along a variety of attribute dimensions. As a discipline evolves, the underlying attributes of its research are altered. The accounting discipline has undergone a virtual revolution during the past two decades (Beaver [1981]). Thus, it would be informative to describe and analyze the attribute changes which have occurred recently in the accounting discipline. Such an analysis would not only enable us to gain an understanding of how the accounting discipline has evolved, it would provide us with some guidance to predict how the accounting discipline is likely to evolve in the near future.

The purpose of this paper is to describe and analyze the change in attribute dimensions of articles which have impacted contemporary accounting literature, and to predict how accounting literature is likely to evolve in the near future. More specifically, we define contemporary accounting literature (CAL) as major articles published in four leading accounting journals between 1976 and 1984, and we define an article's attributes along four dimensions: (1) area of research within the accounting discipline (i.e., financial, managerial, audit, or information systems); (2) research method employed (i.e., analytical, archival, empirical, or opinion); (3) school of thought (i.e., behavioural, statistical modeling, accounting theory, or institutional); and (4) nature of the issues addressed--whether they are U.S. or non-U.S. related. The method used to trace the evolution of these attributes in the accounting discipline is citation analysis.

The study proceeds as follows. Section II discusses those articles that have used citation analysis to describe a discipline's evolution. Section III discusses our data base and the four attribute dimensions. The impact of article attributes on CAL is presented in Section IV. Section V presents an immediacy index analysis in an attempt to predict how the accounting discipline is likely to evolve in the near future. A summary and critique of the paper is contained in Section VI.

II. Citation-Based Attribute Studies

The history of a discipline or its sub-area(s) can be evaluated by mapping the attributes of publications within the area(s) over time. Although such an analysis provides an excellent historical perspective of the discipline's (or sub-area's) evolution of thought, it generally does not provide an adequate measure of how the influence of particular article attributes has varied over time.

Garfield [1979] has demonstrated the usefulness of citation-based attribute studies by using the citation methodology to trace both the development and validation of DNA genetic coding theory. Comparing his results to Asimov's [1963] account of the history of DNA research, Garfield showed that citation analysis: (1) closely duplicated Asimov's

historical account; (2) identified the most important contribution noted by Asimov as the most highly cited event; (3) identified the researchers credited by Asimov for their contributions to be the most heavily cited; and (4) identified an additional important event overlooked by Asimov (but later verified by him). Garfield's results suggest that citation analysis is a more useful way to trace the impact of various attributes of a discipline over time than historical analysis.¹

In citation analysis, the measurement of an attribute's impact on a research area often has been done indirectly. By analyzing the proportion of citations to and from a set of journals, the impact of each journal upon other journals in the set has been examined. This "impact factor" has been used to estimate the importance or influence of a journal's specific attributes.

Various forms of this indirect approach to estimating an attribute's impact on research have appeared in the accounting literature. McRae [1974] used citation analysis to define the accounting information network of the flow of messages between the accounting knowledge system and other knowledge systems, and the flow of messages within the accounting knowledge system itself. Dyckman and Zeff [1984] used the technique as a way to assess the impact of the first 20 years of publication of the Journal of Accounting Research. Brown and Gardner [1985] applied citation analysis to measure the impact of four accounting journals, and to identify their most influential papers on accounting research. Brown, Gardner, and Vasarhelyi [1986] used the procedure to evaluate the contributions of the journal, Accounting, Organizations and Society. Similar studies in other disciplines include Hamelman and Mazze [1973] in marketing; Carpenter and Narin [1973] in physics, chemistry, and biology; Ellis, Hepburn, and Oppenheim [1978] in patents; and Murugesan and Moravcsik [1978] in theoretical physics.

A more direct measure of the impact of specific attributes can be accomplished by mapping citations using a citation coupling technique. Mapping the structure of a discipline or specialty using citation coupling involves pairing documents that have been cited by the same source, aggregating the pairs across sources, and clustering all pairs with at least one common document. A network of these clusters can be developed to track the structure of a discipline over time. Studies by Ellis, Hepburn, and Oppenheim [1978]; Griffith, Small, Stonehill, and Dey [1974]; Price [1965]; Small and Griffith [1974]; and Whitley [1969] have each contributed in various disciplines to this area of research.

This direct approach, which requires knowledge of both the citing and cited research articles, can be used to measure the impact that specific attributes used in research studies have had upon a particular discipline. The present study is a distinctly different form of specific attribute analysis that, as discussed below, only requires knowledge of the cited article's attributes. In addition, for both completeness and to serve as a basis of comparison, the present study also includes an historical analysis of article attributes.

III. Attribute Classifications and Citation Measures

To determine the impact of selected article attributes, the Brown and Gardner [1985;1985A] citation data base was merged with the Vasarhelyi and Berk [1984] attribute data base. The Brown/Gardner citation data base includes references by all major articles published in CAL to all major articles published in CAL.² CAL is defined for the purpose of this study as all main articles published between 1976 and 1984 in four journals: Accounting, Organizations and Society, The Accounting Review, Journal of Accounting and Economics, and the Journal of Accounting Research³. The Vasarhelyi/Berk attribute data base includes classifications of these same articles along a variety of dimensions.⁴ The merged data base consists of attributes of CAL articles that were cited by other CAL articles.⁵ The impact of any particular attribute is then measured using the number of citations to articles possessing that attribute.

The four attribute dimensions analyzed in this study include the areas of research within the accounting discipline, the research methods employed, the schools of thought in which the research is based, and the nature of the issues addressed (i.e., whether they are U.S. or non-U.S. related).⁶

More specifically, articles were classified according to their accounting discipline into one of six areas: financial, managerial, auditing, information systems, tax, and mixed. Due to the limited sample sizes of the last two classifications, only the first four were retained. Similarly, each article was classified into one of four research methodologies: (1) analytical--internal logic and simulation; (2) archival--primary (e.g., CRSP; COMPUSTAT) and secondary (e.g., literature reviews); (3) empirical--case, field, and lab; and (4) survey--opinion. Articles were also classified into one of six school of thought categories, of which the first four were retained for the purposes of this study: behavioural, statistical modeling, accounting theory, institutional, accounting history, and other. Behavioral and statistical modeling were further classified as follows: behavioural--human information processing and other behavioural; statistical modeling--capital markets, time series/econometrics, information economics/agency, math programming, and other. Finally, each article was classified as to the nature of the issues it addressed--whether the primary issue it addressed was U.S. or non-U.S. related.

IV. Measuring the Impact of Article Attributes on CAL

A. Methodology

Impact factors can be used to measure the relative influence of a particular attribute. These factors adjust for the size of the individual attribute's research area by measuring an attribute's influence on a per article basis. The proportion of each attribute's impact factor to the sum of the impact factors of all the attributes under consideration provides a relative measure of each attribute's impact upon CAL. This relative impact factor (RIF) can be expressed as:

$$RIF_{it} = \frac{c_{it}/\sum_{j=1}^m n_{ij}}{[\sum_{i=1}^m (c_{it}/\sum_{j=1}^m n_{ij})]}$$

where the relative impact factor of attribute i in year t equals year t citations to articles published between 1976 and year t with attribute i (c_{it}), divided by the sum of all articles with attribute i published between 1976 ($j=1$) and year t , ($\sum_{j=1}^m n_{ij}$). This

$$\sum_{j=1}^m$$

number is then divided by the sum of all (m) impact factors for the particular attribute dimension to provide a relative impact measure between attributes.⁷ In this way, the relative impact factors of all categories of a particular attribute dimension sum to 100 percent.

A measure of the relative publications of the attributes in each attribute classification was also derived. This metric is calculated as:

$$RP_{it} = \frac{n_{it}}{\sum_{k=1}^m n_{kt}}$$

where the relative publications of articles with attribute i in period t (RP_{it}) equals the number of year t publications with attribute i (n_{it}), divided by the sum of all articles published in year t possessing the particular attribute (e.g., $m=4$ for school of thought because there are four classifications of this attribute).

B. Accounting Area

Figure 1 displays the per year relative publications for articles classified by accounting area. The figure reveals that financial accounting has been the most dominant area of publication in CAL (approximately 50 percent); that managerial accounting and auditing constitute approximately the same percentage of the literature (20 to 25 percent); and that information systems has consistently been the accounting area that has published the fewest number of articles (less than 10 percent of the total).

Figure 1

Figure 1A displays the relative impact per article on CAL by articles in each accounting area. In contrast to the scenario depicted by the relative publications (Figure 1), financial accounting has not consistently had the greatest impact per article on CAL. In fact its impact was the largest in only two of the nine years (1978 and 1979). Also, the relative impact per article between accounting areas has become much more stable in recent years compared to relative publications. More specifically, the range between the highest and lowest relative impact factors has gone from 63.3 percent in 1976 to 12.3 percent in 1984, while the relative publications differential has remained fairly constant (49.9 percent in 1976 versus 54.4 percent in 1984). This suggests that each accounting area has drawn upon its previous research rather consistently across areas in recent years. It also implies that no one area is disproportionately impacted by literature outside of CAL.⁸

With regards to individual attributes, the following is evident from Figure 1A. The auditing literature had a very large impact in 1976 (63.3 percent of the total); it dropped off to 8.6 percent in 1977; and it has since risen to 25.3 percent of the total. Information systems, on the other hand, had no impact in 1976 or 1977; it reached a peak of 41.9 percent in 1980, and it has leveled off at approximately 30 percent of the total in 1983 and 1984. Both financial and managerial accounting have lost some of their impact relative to other accounting areas. More specifically: (1) financial accounting was the most influential area in 1978 and 1979, but it is second to information systems in 1983 and 1984; (2) managerial accounting was the most influential area in 1977, but it was the least influential area in 1984.

Figure 1A

C. Research Method

Relative publication measures of the research methods employed are displayed in Figure 2. Unlike the findings for accounting area, no one research method has dominated CAL during the nine year examination period. Nevertheless, the archival and analytical research methods have been used considerably more often than the empirical and especially the opinion methodologies. Since 1981, however, archival research has become the most popular method, reaching 47.4 percent of total publications in 1984. The other three methods have nearly converged in their popularity; ranging in 1984 from 21.9 percent for analytical to 11.4 percent for opinion/survey.

Figure 2

Figure 2A presents the relative impact factors for each research method. Unlike accounting area, where the relative impact of papers in each area has apparently stabilized, the relative impact of different research methods has varied and continues to vary widely (i.e., the percentage variation has a range of 31.2 percent in 1984). Archival research was not especially influential in 1976 or 1977, but beginning in 1978, it has been the most influential research method in every year but one (1982).⁹ This result is consistent with the popularity of both market-based research and COMPUSTAT generated data analysis in the CAL literature in recent years, and with the publication evidence in Figure 2.¹⁰ The impact of analytical research has stabilized at about 20 percent since 1978, a finding consistent with its historical publication popularity (ranging from a high of 45.4 percent in 1979 to a low of 21.9 percent in 1984). The relative impact of empirical research has been highly variable, ranging from approximately 45 percent in 1977 and 1982 to approximately 25 percent in 1978-80 and 1983-84. In contrast, the percentage of empirical publications has been comparatively stable, ranging between approximately 15 and 25 percent of total publications over the nine years. Opinion/survey research was the most influential research method in 1976 (approximately 47 percent of the total); it fell off dramatically in the next year (i.e., approximately 22 percent of the total); and it has stabilized in the 10-15 percent range since 1981. The relative impact of opinion/survey research, however, has been consistently higher than the proportion of opinion/survey articles published.

Figure 2A

D. School of Thought

Figure 3 presents the relative publications of articles in the four classifications of school of thought. Prior to 1980, a large variation existed between the publications in attribute classifications due to the dominance of statistical research in 1978 and 1979 (approximately 58 percent of the total publications). Since 1980 the proportion of publications in each area has stabilized, with statistical modeling and behavioural research evidencing more popularity in CAL than theoretical and institutional research. It is also evident that theoretical research is the only school of thought to have exhibited a consistent decline in popularity over the nine year period.

Figure 3

Figure 3A provides the relative impact patterns of the four schools of thought. Consistent with their relative publication measures, the relative impact of statistical modeling and behavioural research have stabilized at one level, while accounting theory and institutional research have stabilized at another, albeit lower, level. More specifically, since 1980, behavioural and statistical modeling generally have been in the 30-40 percent range, while accounting theory and institutional research generally have been in the 10-15 percent range. However, unlike the relative publications evidence, wherein the amount of behavioural research is always less than that of statistical research, the impact of behavioural research exceeded that of statistical research in one year, 1982. Also, institutional research has exerted a proportionately greater impact on CAL (15 to 20 percent in recent years) than would be expected by the amount of its relative publications (consistently below 10 percent of total publications).

Figure 3A

E. Geographical Focus

Figure 4 presents the relative publications for the geographical focus of the article; that is, is the main issue(s) addressed predominantly U.S. or non-U.S. related.¹¹ The figure reveals that U.S.-related literature has dominated CAL, ranging from 91.5 percent of publications in 1976 to 80 percent of publications in 1983. However, the per article impact of U.S.-related research, as displayed in Figure 4A, has varied greatly, ranging from 100 percent in 1976 and 1977 to 55.6 percent in 1979. Since 1981, the relative impact of U.S.-based research has stabilized at approximately 75 percent, an amount significantly less than its relative publication measure.

Figures 4 and 4A

V. Immediacy Index Analysis

A. Methodology

The rapidity with which articles (or their attributes) are cited shortly after their publication portends the near-term direction of subsequent research. An immediacy index methodology can be used to estimate the rapidity with which articles (or their attributes) are cited shortly after their publication. The theory behind the immediacy index approach is based on the finding from the citation literature that the pattern of citation, on average, is quite stable. More specifically, citation rates peak approximately three years after an article's publication, and drop off exponentially thereafter.¹² Thus, the number of citations (i.e., the height of the curve) differs by article, but the pattern (i.e., curve) of citation is similar across articles.

An immediacy index applied to attribute areas may be useful in predicting the level of publications in an attribute area. That is, a high (low) immediacy index portends a higher (lower) future citation level, which suggests a greater (smaller) number of future publications possessing the particular attribute.

We define an immediacy index as:

$$IM_{it} = c_{it} / n_{it}$$

where the immediacy index (IM_{it}) equals citations in year t to articles with attribute i that were published in year t (c_{it}), divided by the number of articles with attribute i published in year t (n_{it}).

B. Findings

We begin our analysis by relating immediacy indices to subsequently observed publication counts. In this way, we can determine approximately how many years immediacy indices lead publications by. Once we determine the relationship between immediacy indices and publications, we can estimate which attributes are likely to impact upon subsequent near-term research, and when the impact is likely to take place. Table 1 provides the results of simple regressions of various publication levels on the immediacy indices calculated for all attribute classifications over the nine year period. Column 1 of the table presents results in which publications in year $t+1$ are regressed on the immediacy index in year t ; column 2 of the table presents results in which publications in years $t+1$ plus $t+2$ are regressed on the immediacy index in year t ; column 3 of the table presents results in which publications in years $t+1$ through $t+3$ are regressed on the immediacy index in year t .

Significant positive relationships (10 percent level or better) between the immediacy indices and future publications exist in accounting area with financial accounting; in research method with archival and empirical; in school of thought with statistical; and in

geography with U.S.¹³ The negative relationship observed with analytical research is contrary to expectations. However, given its marginal level of significance and its comparatively low R^2 measure, we ignore it in the analysis to follow. Any inferences drawn from the observed significant relationships must be scrutinized in light of the small number of observations on which the analysis is based.

Table 1

Table 2 contains immediacy indices of those attributes which exhibited a significant positive relationship with subsequent publication in Table 1. By examining the trend in immediacy indices, one can predict what the likely direction of future publication in the area is likely to be. More specifically, the immediacy index for the financial accounting area exhibits its most significant relationship with publications one year in the future (Table 1). Table 2 reveals that the immediacy index for financial accounting is much lower in 1984 than in 1983 (.09 versus .59). The combination of the Table 1 and Table 2 findings suggests that the expected level of publications in financial research is lower in 1985 than in 1984.

Under research method, the archival immediacy index bears a significant relationship to the sum of publications in the area one and two years in the future. As the archival immediacy index is substantially lower in 1984 than in 1982 and 1983, fewer articles using archival-based methodologies are expected to be published in 1985 and 1986 than in 1984. The immediacy index for empirical research leads publications in the area by one and two years. As the immediacy index for empirical research was much less in 1985 than in 1983 and 1984, this suggests that fewer empirical research papers will be published in 1985 and 1986 than in 1984.

In school of thought, a significant relationship is evidenced between the immediacy index and publications during the next three years for statistical-based studies. As the trend in the immediacy index is downward from 1982 to 1984, this suggests that fewer statistical-based studies will be published over the years 1985 to 1987 than in 1983 and 1984. Finally, a significant relationship exists for geography for all three lags. This, combined with the downward trend in U.S.-related issues revealed in Table 2, suggests that more papers dealing with non-U.S. related issues will be published over the 1985 to 1987 period than were published in 1984.

Table 2

VI. Summary

This paper describes and analyzes the change in four attribute dimensions of articles that have impacted contemporary accounting literature (CAL) and attempts to predict changes in publication levels of articles with attributes classified along these dimensions. Citation analysis is used as a basis for measuring the impact of the various attributes over time. For purposes of comparison, we also present the results of a publications analysis.

Under accounting area, which includes financial, managerial, auditing, and information systems, the relative impact of each area has converged in recent years, implying a consistent reliance of each attribute classification on its previously published research in CAL. Under research method, which includes analytical, archival, empirical, and opinion/survey, relative impact has varied widely and it continues to do so. In recent years, with the exception of empirical research in 1982, the impact of archival research has dominated the other three methods. In school of thought, which consists of behavioural, statistical modeling, accounting theory, and institutional, the relative impact of behavioural and statistical modeling has been consistently greater than that of accounting theory and institutional. Finally in geography, the relative impact of articles published which pertain to U.S. issues has been consistently greater than the impact of articles published on non-U.S. issues.

An attempt to predict trends of research publications within the various attribute classifications was also provided. However, given the small number of observations, definitive conclusions using this technique cannot be drawn. All the significant positive relationships between attribute classifications and various lagged measures of publications suggest reductions in publication levels in the attribute areas. More specifically, we expect declines in publications between 1985 and 1987 in the financial accounting area, in articles that use archival and empirical research, those that use statistical modelling, and those that focus on U.S.-related issues.