

## Communication clarity in strategic management data sources

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### **Abstract:**

Researchers often use organizational documents as source material without considering that measurements of organizational attributes might vary according to the document type used. We examine the communication clarity, described by sensitivity and specificity, of three document types used to score organizational strategy variables. We hypothesize that each type will have greater sensitivity or greater specificity, depending upon document objectives and rhetorical devices. Using a partial least squares analysis method, all except one hypothesis were supported: communication clarity does vary by document type. Shortcomings of each document type are discussed and possible ways for strategy researchers to overcome those shortcomings are suggested.

**Key words** • qualitative methods • statistical power • strategy • strategy research

### **Article:**

Strategies are frameworks for the 'procurement, production, synthesis, manipulation, and diffusion of information in such a way as to give meaning, purpose, and direction to the organization' (Westley, 1990: 337). Strategies are presented in a variety of different documents intended for different audiences. For example, organizational leaders write letters or memos to convey priorities for actions, corporate media offices issue reports to attract investors, and marketing departments develop materials to inform consumers. Just as telecommunication signal transmissions are constrained by signal strength, transmission links and receiver component failures, so each of these document types is constrained by its language conventions, distribution media and audiences' interpretations (Ring and Van de Ven, 1989). Because of attributes specific to each document type, different perspectives of an organization's strategy are often presented. These different perspectives can result in confused investors and other organizational stakeholders, 'searching for strategic generalities and the total picture so ... (that they) can make sense of the specific particular decisions that are passed along' (Westley, 1990: 343).

Management researchers use publicly available or other organizational documents to assess strategy because collecting primary data at its source is often difficult, costly and time-consuming. The unstated assumption in such research is that the document type used is not important so long as characteristics are accurately defined and consistently measured. For example, Abrahamson (1997: 507) totaled publicly available articles in which certain phrases were found, taking data from 'many sectors: academics, consultants, mass media, and practitioners'. Had the study accounted for variation due to document type, it might have found different relationships between rhetoric popularity and the long-term economic cycle than the reported findings. If the depiction of an organization's characteristics varies depending upon the document type, then variations must be noted in order to produce useful and generalizable explanations. Further, if document source variation does exist, researchers should know how different document types affect the variation and account for it in strategy research. In their study of institutional changes, Greenwood et al. (2002: 65) primarily used 'openly available' documents such as annual reports; they assumed 'that the wording of a document was deliberate and carefully constructed' (p. 66), sometimes with hidden meanings, to elicit certain reader responses. Even so, they were unable to systematically account for document variation.

The purpose of this study was to determine whether different document types give different pictures of organizations' strategic characteristics and further, to examine the nature of any systematic differences, using ideas drawn from both strategic management and the narrative analysis research streams. However, the problem dealt with here was distinct from that of standard content analysis. In this study, documents provided the raw data from which the variables were scored, but unlike content analysis, the raw data were assumed to reside in the organization, not in the documents. We were not concerned about subtle differences in meaning for readers or about classifying many words 'into fewer content categories' (Weber, 1985: 15), but about strong differences in information conveyed concerning the organization. The study contributes to strategy and organizational research by demonstrating the importance of variation due to source material and proposes ways to account for and overcome such variation.

The study grew from our interest in the configurations of characteristics found among strategically successful organizations. Configuration research develops organizational classifications based on strategic, organizational and environmental variables. Other strategic or organizational formulations or outcomes characteristics could have been used, but we chose to base this research on configurational variables for four reasons. First, using a holistic approach (Meyer et al., 1993), configuration theory seeks integration among and requires the identification and measurement of a variety of environmental, structural and strategy-making variables. Second, configuration theory is grounded in the more general literature of organization theory. Third, configuration theory enjoys a rich research tradition and continued recognition spanning more than two decades (Meyer et al., 1993; Bettis, 1996). Finally, many configurational studies have relied on single sources for data.

Appendix 1 shows 49 configurational studies. Seven of these are either theoretical and use no data or are meta-analyses using data from other studies. Of the remaining 42 studies, 21 articles or 50 percent used only one source of data and most used a single document type. Some of these are well known and often cited articles whose findings have influenced research far beyond the configuration segment. Their authors, especially in the earlier articles, struggled to delineate new constructs entirely without nefarious intent. Yet we wondered what differences might have been reported in these articles, and in articles citing them, had the authors accounted for variations in individual data sources. In total to date, the group of papers shown in Appendix 1 has been cited 1594 times. Articles using a single source for data accounted for 847 citations, or about 53 percent of the total citations. Clearly, these have been influential articles and to the extent that variations in data sources exist, contemporary strategy research may have been significantly affected.

Exploration continues on the number and specification of characteristics that would provide the greatest explanation of organizational performance (Kotha and Vadlamani, 1995), because configuration studies (Ferguson and Ketchen, 1999) and other strategy research (Boyd, 1991) have been criticized for their inability to consistently predict differences in performance. Ironically, researchers might not have needed to redefine or re-specify characteristics already identified had they understood the possible variations inherent in their data sources more completely. To illustrate with a hypothetical example, organizations may innovate in product development, processes improvement, or in both. When one organization speaks of being highly innovative it may be referring to new products. Another organization that views itself as highly innovative may be referring to manufacturing process improvements. Both may write and distribute press releases or web documents saying they are highly innovative organizations whose financial success is directly attributable to those innovations. Using those documents as source material, both organizations would be included among those with a high degree of innovation in a study of the relationship between innovation and strategic success.

An alternative version of the same study might use Securities and Exchange Commission (SEC) reports as its source. In its annual report to the SEC the new product innovation organization discloses that it spent X dollars on product innovation and expects to increase market share by Y percent as a result. The process improvement organization's SEC reports contain references to capital improvements to increase efficiency without any mention of innovation. In yet a third version, a strategy researcher studying corporate entrepreneurship conducts two case studies of the same two organizations and defines innovation as an organization's attempts to make fundamental change in the market structure of its business. Neither hypothetical organization meets this

criterion. The example shows how the same story told in different document types, composed for different purposes and intended for audiences with different ends would pose problems for the strategy researcher using the documents as source materials.

Studying documents, narrative analysts have found that differences exist among types with regard to intent, development and linguistic devices (Bal, 1997; Barry and Elmes, 1997; Brown, 1998). Organizations convey their strategies in many different kinds of documents. We contend that descriptions of the same strategic attributes will vary depending upon the document in which the description is found. Specifically, we hypothesize that because of differences in the documents' objectives and linguistic devices, document types vary in sensitivity and specificity with regard to scoring the characteristics contributing to an organization's strategic configuration.

We first review relationships between statistical parameters in strategy research and discuss the characteristics of documents used in organizational research and in this study. Then we theoretically frame and empirically test the sensitivity,  $(1 - \alpha)$ , and specificity,  $(1 - \beta)$ , of various documents using a conditional probability statistical approach. Finally, results, discussion and conclusions are provided.

### **Statistical parameters in strategy research**

Researchers should account for four statistical parameters in a study: significance criterion or  $\alpha$ , power or specificity  $(1 - \beta)$ , effect size and sample size (Cohen, 1988). (Power is the usual word found in statistics, while specificity is the word more commonly found in epidemiology.) This study deals with the first two,  $\alpha$  and  $(1 - \beta)$ , and the complementary fractions of those two,  $(1 - \alpha)$  and  $\beta$ , respectively. Henceforth, we will refer to  $(1 - \alpha)$  as sensitivity, to  $(1 - \beta)$  as specificity, and to  $\alpha$  as significance.

Significance, or  $\alpha$ , is the probability of making a Type I error, that is, of rejecting the null hypothesis when it is true. To use the innovation example above, a Type I error would be the probability that an organization, which gives a clear innovation description in its document, is actually a bureaucratic plodder. A Type II error, also called  $\beta$ , is the probability of accepting the alternate hypothesis when it should be rejected. Again using the innovation example, a Type II error would be the probability that, given an unclear description, the organization is actually innovative.

Sensitivity  $(1 - \alpha)$  is the probability that given a clear innovation description the organization actually is innovative. Sensitive documents will be written (or spoken) in a way such that raters can consistently score an organization in a pattern representative of a certain group, in the example the innovative group, when the organization is an actual member of that group. If significance ( $\alpha$ ) is established at less than or equal to 5 percent,  $p \leq .05$ , as is conventional in social science research, the implied sensitivity is 95 percent.

Specificity is  $1 - \beta$  or  $1 -$  the probability of a Type II error. It is the probability that, given an unclear description, the organization actually is not innovative. Specific documents will be written so that raters consistently score out-of-configuration organizations in a very different pattern from that of in-configuration organizations when an organization actually does not belong to the configuration. Specificity (power) is rarely mentioned in most strategy studies. Figure 1 shows these various probability relationships.

If different organizational documents depict organizational characteristics differently, then the likelihood of both Type I and Type II errors will increase. Knowing the error rate inherent in different document types is a necessary condition for a prospective, rather than a post-hoc, power analysis. Further, in every managerial transaction, including all communication, there is an implicit tradeoff between the Type I and Type II error rates. The use of different document types results in similar but multidimensional tradeoffs between clarity of statements detected and the actual presence of accurate information. The question for strategy researchers is, then, given a certain type of document, what is the probability that descriptions in it will be clear and what is the probability that the organization actually exhibits the characteristic described. Given a certain document type, will descriptions of organizational characteristic be sensitive or will they be specific? The study attempts to

understand these conditional probabilities, not the straight probabilities. Using conditional probabilities allows for a tradeoff between sensitivity and specificity based on the documents' unique natures. Such a process utilizes documents' latent differences instead of estimating study parameters independently under the assumption that documents all have similar underlying structures.

		<b>Actual situation</b>	
		<b>There is an effect (e.g. firm is innovative)</b>	<b>There is no effect (e.g. firm is not innovative)</b>
<b>Based on the statistics, there is an effect</b>	Sensitivity ( $1 - \alpha$ ) Confidence interval	Significance level ( $\alpha$ ) Type I error	
<b>Based on the statistics, there is no effect</b>	$\beta$ Type II error	Specificity ( $1 - \beta$ ) Power	

**Figure I** Actual situation

### Documents used for strategy research

A major problem for organizational researchers has been 'access to reality', (Gummeson, 1991: 11), that is, finding real-world, empirical data and information. Using easily obtainable documents eliminates part of this access problem, but may add other problems. An organization's statements of strategy might vary by document type (Alvarez and Cantos, 1992; Astley and Zammuto, 1992; Barley and Kunda, 1992). Or organizational strategy may be an interpretation (Blackler, 1994) and may not exist except as it is socially constructed in different verbal and written accounts. Thus, access to organizational strategy may be especially difficult.

In addition to access problems, Gummeson (1991: 21) mentions the problem of being able to 'get close to the object of study'. All document types contribute to this problem. If the researcher relies on organizational members for data in either written or spoken form, s/he is getting strategy filtered through the organizational member. If the researcher relies upon reports and documents by non-members, an additional distance is placed between researcher and organization. If the researcher directly observes an organization and writes his/her own documents, s/he still cannot be in all parts of an organization at one time or may not be allowed to talk to all organizational members involved, so temporal factors may impede transmission or strategic issues may be missed. Also, the researcher may impose his/her own perceptual biases on the data. Further, during the variable scoring phase, data are inevitably filtered and simplified, a process that may exacerbate the other problems. This study used three document types. In the following sections, each type is described and its objectives are discussed.

### Documents, narrative and narrative types

Documents consist of narrative, a series of speech or language units, written, spoken or shown, that cannot be separated usefully from thought (Bakhtin, 1986). Although a distinction can be made between narrative and scientific thought (Bruner, 1986), we agree that '(t)he boundaries between narrative knowledge and scientific knowledge are artificial' (DeCook, 2000: 592), because scientific and real-world knowledge can be represented only through narrative. In this sense, strategy depicted in documents is a socially constructed approximation whose correspondence to the organization's strategy is a function of the accuracy of the language employed.

Despite definitional nuances (Chatman, 1989: 13; Jameson, 2000: 16), publicly available documents are and have been viewed as narratives (Barry and Elmes, 1997).

### *Defining narrative*

Narrative texts relate stories, and stories are about someone's or something's relationships with others. Stories consist of fabula, which are the story elements, events, times and actors (Lodge, 1990; Eisenhardt, 1991; Skoldberg, 2001), told by one or more narrator, the voice(s) (Pentland, 1999). Narratives deal with the 'vicissitudes of human intentions' (Bruner, 1986: 16), and are discrete units with beginnings and endings (Reissman, 1993). Their most basic form includes an 'original state of affairs, an action or an event, and some consequential state of affairs' (Czarniawska -Joerges, 1998: 2).

Organizational narratives have provided a wealth of information about organizations (Pentland, 1999), information technology implementation (Brown, 1998) and management training (Kelly and Zak, 1999). Narrative genres, or types, in annual reports have been explored (Thomas, 1997; Hyland, 1998; Jameson, 2000), and organizational processes have been studied using narrative analytic tools (Yates and Orlikowski, 1992; Orlikowski and Yates, 1994; Hodson, 1998). Narrative variations were studied under situational differences (Jameson, 2000), but we found no studies that considered the impact of various narratives' characteristics on data derived from them.

### *Narrative genres, genre objectives and rhetorical devices*

The object of a genre ranges from providing facts or informing to influencing the intended audience. When the objective is to provide facts and information, the narrative is more likely to have narrative fidelity, that is, to be reliable and truthful, which is attained when the story's constituent parts are viewed as accurate statements about fabula and social reality (Fisher, 1987; Reissman, 1993). However, believability and accuracy are closely intertwined in narrative fidelity (Fisher, 1987), and a genre that is highly accurate factually might not be believed because the fact-relating voice is not appropriate in the view of the reader (Reissman, 1993). If narrative fidelity is not maintained, the reader will be unlikely to rely upon the genre. The implication is that some genres may be better, more reliable sources for organizational strategy data than others.

Using the elements described by Yates and Orlikowski (1992), for this study three basic narrative genres were defined, all readily available to strategy researchers. Case studies are stories about organizations and their situations using data sources (including other genres) internal and external to the organization. A second genre is the legal document, that is, SEC filings. Mandated by regulatory agencies, such documents must have specified content and be in a specified format. Finally, there are general business documents, which vary depending upon the intended audience. For this study, the last genre included all materials originating from the organization but written without legal strictures. Both objectives and rhetorical devices influence whether sensitivity or specificity is emphasized within a genre, so in the following sections, genres' objectives are explored, the devices they employ are discussed and hypotheses regarding their sensitivities and specificities are made.

### *Case studies*

Case studies take place within a real-life context, typically combine numerous data collection methods and sources and tend to focus on an in-depth understanding of the dynamics in a single setting (Eisenhardt, 1989a; Yin, 1994). Cases are especially adept at dealing with topics such as organizational strategy in which the boundaries between phenomenon and context are not clear (Yin, 1994). Case studies are 'rich in detail' (Ragin, 1999a: 1225) and are concerned with 'making facts understandable' (Ragin, 1999b: 1138) in 'messy' situations (Yin, 1999; Howard et al., 2000: 2604). The General Accounting Office of the United States (GAO) (General Accounting Office of the United States, 1990: 15) says, 'A case study is a method for learning about a complex instance, based on a comprehensive understanding of that instance obtained by extensive description and analysis of that instance taken as a whole and in its context.' For example, Nutt (2004) used three case studies to examine strategic decision-making blunders by Shell Oil, Quaker Oats and the City of Columbus, Ohio. Zhao et al. (2004) used in-depth case studies as follow-ups to interviews in a study of transferring collective knowledge

between organizations in the Chinese auto industry. However, the ‘potential biases in case contents have received little rigorous research attention’ (Liang and Wang, 2004: 398).

### *Case study objectives*

Case studies are written to understand the dynamics present in an organizational setting (Mintzberg and McHugh, 1985; Mintzberg and Waters, 1985; Eisenhardt, 1989b; Sharma et al., 1999), or to evaluate a project or a process such as the implementation of a government program or a public health intervention (General Accounting Office of the United States, 1990; Yin, 1993). Alternatively, case studies are pedagogical tools, developed to focus on one element or discipline such as human resources or criminal liability, and data gathered are likely to be most directly germane to that element or discipline.

Information for inclusion in a case may be drawn from the two other document types used in this study, which ideally would increase both sensitivity and specificity. Nevertheless, case studies are unique because their purpose is to moderate the relationship between the sensitivity and the specificity of the information, and not necessarily to improve accuracy of information. However, even though cases have been considered rich data sources for strategy studies (Miller and Friesen, 1978, 1984), assuming that case studies approach the ideal because they incorporate other materials is, to date, unsubstantiated.

Pedagogical case studies teach students to search out relevant information, consider alternatives and practice decision-making based on their theoretical understanding. Generally, the cases contain extensive descriptions related to the case writer’s discipline. To that end, they contain spurious or superfluous anecdotes pushing students to deal with ambiguity (Banning, 2003) and leading them to draw initial faulty conclusions. However, they also include theoretical analysis in separate notes to help instructors guide students toward relevant theory. When the nature of an organization is obscured by detail, it seems likely that both the probability of rejecting a true null hypothesis and of accepting a false alternative hypothesis rises, thus lowering the sensitivity and the specificity. However, the inclusion of notes increases specificity toward the theoretical focus. Most cases used in this study fell into the pedagogical category, but raters were also given all instructors’ manuals plus case writers’ additional source notes when available.

### *Case study rhetorical devices and rules*

In most case studies the voice is that of the case writer, potentially a biased voice (Butler, 1997). Further, the passive voice and past tense common in cases constitute a genre rule that impacts persuasiveness by distancing the reader. Any voice distortion, which impacts narrative persuasiveness, and thus narrative fidelity, is likely to increase the likelihood of rejecting a true hypothesis, a Type I error, or of accepting a false hypothesis, a Type II error.

Genre objectives thus imply that case studies with instructors’ notes, designed to address particular disciplines such as strategy, will tend to have high specificity relative to that discipline’s theories. At the same time, genre rules imply that the scope of a case study will be limited either by the theoretical or the perspective biases of the researcher, effectively increasing the probability of Type I error. Increased probability of Type I error implies an increase in  $\alpha$ , and a decrease in  $(1 - \alpha)$ , sensitivity. Based on these objectives and genre rules, the following hypothesis is made.

**HYPOTHESIS 1** Case studies’ specificity (power) will be greater than their sensitivity in detecting differences in strategy constructs.

### **SEC and documents constrained by regulatory agencies (SEC RDs)**

Publicly traded organizations are supposed to present not only true, but also full pictures of changes in strategic or financial position in 10-K and 10-Q reports, registration statements, prospectuses and other similar reports. Companies must report audited financial data completely in annual reports, but there is considerable latitude in how the information may be presented. In the descriptive parts of annual reports very little oversight is exercised. A great deal of strategy research, particularly that dealing with initial public offerings (IPOs), has

relied on SEC documents as its data source. For example, Pollock (2004) used the offering prospectuses filed with the SEC in a study of the factors influencing the degree to which brokers employ their social capital to benefit buyers or sellers in IPOs.

### *SEC RD objectives*

The SEC intends that publicly traded company documents should be accurate and complete representations of all material events, that is, they should possess and maintain narrative fidelity. Theoretical considerations and observational biases are not supposed to have an impact on SEC RDs and organizations shown to have presented false or misleading information are subject to fines and/or prosecution. Thus, the liability of falsifying such documents makes accuracy an essential aspect of this document type. This requirement for accuracy is much like sensitivity, so it can be said that, in general, the objective of SEC RDs is to maximize sensitivity or to minimize the probability of a Type I error.

### *SEC RD rhetorical devices and rules*

SEC RDs are intended for wide audiences including individual and institutional investors, government regulators, investment analysts, business journalists, the financial community and perhaps the general public (Thomas, 1997), but Jameson (2000) summarized studies showing that comprehension ease is not among genre rules for annual financial reports. Rather, the average reader had difficulty understanding the technical data and legal wording used in them. Legal rhetoric is often incomprehensible because of its extensive use of passive verbs, long sentences, difficult words and illogical order (Gopen, 1989). However, for trained readers such rhetorical devices convey a large amount of information.

All public documents involve attempts by powerful organizational members to ‘influence the audience’ (Hyland, 1998: 230). In addition, organizations view their position in the world and reflect that position not in absolute terms, but relative to their performance. Thomas (1997) found that as performance worsened, more rhetorical devices were used, which made the organization’s negative performance appear to be the object of circumstances attributable to ex-organizational members. During years in which an organization lost money, SEC RDs showed a great increase in the use of the passive voice and of ‘relational process verbs’ (Thomas, 1997: 48), which suggests objectivity because they appeared to be statements of fact, such as ‘opportunities narrowed’. She also found a decrease in personal pronouns, such as ‘we’, in reference to the organization, an increase in inanimate noun use, such as ‘the company’, and an increase in ‘condensations’ (Thomas, 1997: 62).

Professional writers or managers may write documents subject to SEC regulations, but SEC RDs are usually collaborative, involving many organizational members (Couture and Rymer, 1989, 1998; Cross, 1998). When collaborators have difficulty agreeing, ‘multivocality and hyperstructure’ (Jameson, 2000: 15) often occur, which results in a multidimensional narrative using a wide variety of rhetorical devices. Even like-minded collaborative writers are always aware of their collaborators (Thralls, 1992). Just as organizational “‘rationality’ is a product of collective action’ (Hassard, 1993: 21), so collaborators ‘view their writing as originating both from others and from themselves’ (Couture and Rymer, 1989: 82). Bakhtin (1986: 93) said one collaborator is always aware of the ‘preceding links in the chain’ even while s/he is aware of ‘subsequent links in the chain’. This conflicting combination of genre objectives, which push toward accurate reporting, and genre rhetorical devices, with obfuscatory, relative, or multivocal impacts on narrative fidelity, leads to the following hypothesis.

**HYPOTHESIS 2** SEC-regulated documents’ sensitivity will be greater than their specificity in detecting different strategy constructs.

### **Unregulated organizational documents (UODs)**

Organizational documents falling into neither of the first two categories comprised the third classification. They included materials such as strategic plans, budgets, annual reports, organization charts and other documents, many of which were obtained from the organizations’ websites.

### *UOD objectives*

UODs are generally produced either to educate insiders and/or outsiders about strategies, to cultivate alliances with the general public and outside organizations, or to inform key constituencies about organizational progress. Because there is no threat of immediate decline in stock price or of regulatory sanction if UODs are inexact, any version of operations and strategy most beneficial to the organization and its top management might be included, whether completely accurate or not. Such documents are best considered a part of organizations' political attempts to legitimate their actions and interests (Brown, 1998) and to differentiate themselves from each another.

### *UOD genre and rhetorical devices and rules*

Unlike either case studies or SEC RDs, these narratives do not necessarily have one set of accepted genre and rhetorical device rules associated with them. Moreover, because they are intended to be politically persuasive, rhetorical device variations due to organizational culture or ideology may be pronounced. Many of the devices mentioned for SEC RDs regarding powerful organizational members and collaboration apply to UODs as well, but a unique set of genre and rhetorical device rules is likely to be found in internet-accessed documents because of the way they developed. Organizational members imported characteristics from many other media for use in electronic media genres. However, electronic genre rules for all users ended up being shaped by the systems administrators, called 'technology-use mediators' by Yates et al. (1999: 84). Rules were usually in the form of changes toward a more electronic friendly genre, not toward textual manipulation devices, but even so, mediators influenced other organizational members' knowledge and expectations, and explicitly shaped how members new to the medium enacted genres over time (Yates et al., 1999: 99).

In addition to changes introduced by mediators, Yates et al. (1999: 101) found 'opportunistic modification', defined as change in response to unexpected conditions associated with the new medium. They further showed that 'the generation of inappropriate official announcements, and the proliferation of apparently official announcements' (1991: 100) increased because formal or informal prescreening was loosened. Using the internet shapes the ways people behave and the ways in which an organization makes sense of itself (Berthon et al., 2000). Considering this mix of no clear genre objectives and incidental augmentation of genre rules and devices in unvetted documents, the third hypothesis is as follows.

**HYPOTHESIS 3** The organizational documents without legal constraint will be more specific than they are sensitive.

### *Relative explanatory power*

Because some of the objectives and rhetorical devices discussed relative to case studies served to lower both sensitivity and specificity, case studies probably offer the lowest overall explanatory power.

**HYPOTHESIS 4** The sum of case studies' specificity and sensitivity will be less than that of other document types.

### **Methods**

Latent class analysis (LCA) uses a general mathematical model that gives the probability that an individual respondent belongs to one of several latent classes, and the conditional probability that an individual's scores on a series of variables will exhibit a certain pattern given the individual's latent class (Dillon and Goldstein, 1984). LCA parameters are probabilities. LCA models are a subset of latent structure analysis techniques, long used in psychology and education and more recently to study organizational characteristics, attitudes and performance (Guion and Ironson, 1983). The general format for each latent class of the model is

$$P(r_1 \dots r_v) = \sum_{j=1}^{j \max} p(r_1 | c_j) \dots p(r_v | c_j) f(c_j)$$

where  $p$  is the probability of a response pattern across all variables,  $c$  denotes latent classes,  $p(r_v | c_j)$  denotes the conditional probability of a given response on variable  $v$  given class  $c_j$ , and  $f(c_j)$  is the distribution at the latent class  $c_j$ .

For this study, LCA provided congruence of method and subject: the use of conditional probabilities, rather than absolute frequencies, is consistent with questions of subjectivity in documents. Strategy can be considered a tradeoff between quality and cost. That tradeoff represents a conditional probability. The strategist must decide upon the quality to be produced for a given cost of production assuming uncertain customer acceptance. From this perspective, ‘probability is personally defined by the conditions under which a person (or an organization) would make a bet or assume a risk in the pursuit of some reward (profit)’ (Gill, 2002: 4). In addition, latent construct parameters are determined independently of the sample distributions of the attributes being measured. The techniques produce item characteristic curves, which represent the probability that an item measures a given latent trait. This feature is important for the study because there was a complete separation of the sub-samples, as detailed in the sample and procedures section below, so it is likely that sub-sample distributions differ. With LCA, the net effect is that the samples’ distributions are standardized to comparable metrics.

LCA also provided statistical perspective. This study focused on patterns or profiles of responses across all variables. Both classical econometrics and psychometrics assume that scale items have the same degree of precision and neglect patterns of item responses. In contrast, we hypothesized that different genres lead to different degrees of precision in scoring, and that response patterns might differ by genre as a result, in keeping with an LCA perspective.

Specifically, we used Procrustes discriminant analysis (PDA), a latent structure analysis technique, and the statistical package called HOLMES 2000 (Gonzalez-Arjon et al., 2000). PDA was developed to determine latent structures in data matrices and to assess data sources’ sensitivities and specificities retrospectively (Muñoz-Ruiz and Vromans, 1998). PDA is based on partial least squares (PLS) algorithms (Gonzalez-Arjon et al., 2000), which in general, are used to model association between blocks of data (Wegelin, 2000). PLS, which uses covariance matrices, is ‘probably the least restrictive of the various multivariate extensions of the multiple linear regression model’ (StatSoft, 2001: 2), and significantly reduces the need for large sample sizes. Thus, PDA is well suited to deal with the relatively small sample sizes associated with each type of document. It indicates class membership for each respondent, and it also produces a matrix showing correctly and incorrectly classified members of the data set. In this study, the technique indicated source document type, the latent variable, for each respondent based on the respondent’s pattern of scores. Computing the ratio of correctly classified or of incorrectly classified to the total number of response patterns produces either sensitivity or specificity.

### **Sample and procedures**

Samples from two studies were combined to create the database for this analysis (Ford, 2001; Reeves et al., 2003). Both studies used variables, variable definitions and scoring processes described in Miller and Friesen (1984), with minor modifications to accommodate the passage of time and the industry. The two studies had 19 variables in common, as shown in Appendix 2, and 117 organizations and agencies were studied in total. Data for both were derived from publicly available documents of healthcare sector organizations and agencies. The first study used 20 case studies and 57 sets of SEC RDs as scoring sources and the second used 40 sets of UODs obtained directly from organizational sources. Cases, written by various scholars, were drawn from strategic management textbooks; the *Case Research Journal* for the years 1990 through mid-1995; Harvard Business School 1994–5 Catalog of Teaching Materials; the *Preferred Individualized Case (PIC) Catalog*; the European Clearinghouse Catalog of Cases; the Western Ontario Business School Teaching Materials Catalog; and the Darden Graduate School of Business Catalog of cases. Sets of SEC RDs always included several years’ annual reports and 10-K Reports, plus any other the organization may have issued, such as Reports 10-Q, Forms S-1 and prospectuses. UODs included materials found on the organizations’ websites, plus press releases, position documents, planning documents and executives’ speeches.

Multiple raters scored 18 of the variables with values ranging from 1 to 7: a score of 1 indicated an organization or agency was much lower in a characteristic than others in the sample, and 7 indicated an organization or agency with much more of the characteristic. One variable, tenure of organizational leaders, was measured continuously in months.

Following procedures established by Miller and Friesen (1984), each rater was given a detailed set of instructions, a scoring sheet for each organization, a definition of each variable and examples of statements that, if found in an organization's documents, would result in a high or a low score for each variable. Before engaging in actual scoring, raters were coached by the researchers and practiced until they could reach consensus on a group of documents not included in the study. Two or three raters were used for the first study, and at least three raters scored the second. For the first study, two raters scored 33 organizations (43% of the total). Ninety-nine percent of the time, raters' scores varied by 2 or less and interrater scores were consistent with acceptable degrees of reliability, that is, Cronbach's alpha  $>.60$  (Pedhazur and Schmelkin, 1991), were attained or exceeded on both studies.

Even though raters were only looking for specific pieces of information related to the variables and were not making any interpretations of the documents, in order to avoid 'prejudice' (Prasad, 2002:18) or bias due to differences in raters' backgrounds, all raters were affiliated with an academic medical center, had health services careers in research or administration and were experienced at reading the study documents. Raters were used because we assumed that the distribution of items' measures might differ, but as in many strategy studies, the distributions for each variable were not estimated a priori. Using LCA, which does not rely on prior knowledge of the distribution, is ideal.

PDA requires that data pooled from different samples exhibit equality of covariance matrices (Tabachnick and Fidell, 1996; Jöreskog and Sörbom, 1996). Thus, the next step was to test for this. A Box's M test of the covariance matrices' equality for the two samples did not reject the null hypothesis that the matrices are comparable in structure (F-test = 0.585;  $p = 0.444$ ) for the 19 variables used. Henceforth, having used a previously developed and tested set of variables, having scored using previously defined rubrics, having showed inter-rater reliability, and having established comparability and consistency of data structures, combined data were used for the remaining procedures.

The next step was to determine whether there were any common latent factors within the combined dataset and if so, how many. Using a cross-validation method available in HOLMES 2000, three latent constructs were identified, based on the patterns of scores for the respondents.<sup>1</sup> These three corresponded to the three document types hypothesized. In the final step, using the identified latent constructs, the predicted document type was determined for each respondent based on the respondent's 19 variables' score patterns. Predicted types were determined using an iterative process in which each observation (respondent), sequentially, was used as the test observation, with the remaining observations serving as the training set upon which predictions were based. Two validation parameters were determined, the sensitivity and specificity of each document type.

## Results

Table 1 gives the actual, on the horizontal axis, versus the predicted, on the vertical axis, classification into type from the PDA analysis. Of the 117 observations, the types of 84 were correctly classified (Fisher's Exact Test = 63.717,  $p < .001$ ), indicating that significant differences in strategy configuration variables can be attributed to the characteristics of the data source. Table 2 shows sensitivity and specificity for each document type, which can be calculated from Table 1. Sensitivity is the number whose type was correctly predicted divided by the total actual number in that classification. For example, for case studies the calculation is 8 divided by 20. Specificity is the number correctly identified as not being in a document type divided by the total number not in the document type. The calculation for case studies is  $(51 + 1) + (9 + 25)$  divided by  $(57 + 40)$ .

**Table 1** Actual versus predicted document type in the data sources\*

↓ Predicted Document Type	Actual document type			Total
	Case studies	SEC documents	Unregulated organizational documents	
Case studies	8	5	6	19
SEC Documents	10	51	9	70
Unregulated organizational documents	2	1	25	28
Total	20	57	40	

**Note**

\*The actual total for each of the document types are shown in the row across the bottom labeled Total, while the numbers predicted for each document type, based on the profile of scores for each respondent, are shown in the column on the far right labeled Total. The diagonal shows the respondents for which the prediction was correct, and off-diagonal figures represent inaccurate predictions. For example, of the 57 actual SEC Documents in the data (see column headed 'SEC Documents'), 5 were inaccurately predicted to be case studies, 1 was inaccurately predicted to be an UOD and 51 were accurately predicted to be SEC RDs.

**Table 2** Narrative document types' sensitivities, specificities, and error ratios

Narrative document type	N	Sensitivity <sup>1</sup>	Specificity <sup>2</sup>	Sum	Seriousness of a Type I error relative to a Type II error <sup>3,4</sup>
Case studies	20	0.40	0.89	1.29	0.19
SEC documents	57	0.90	0.68	1.58	3.01
Unregulated documents	40	0.63	0.96	1.59	0.10

**Notes**

<sup>1</sup> Calculated from Table 2: (number classified in a document type)/(actual number in a document type)

<sup>2</sup> Calculated from Table 2: (number correctly classified as not in a document type)/(number not in a document type)

<sup>3</sup> Calculated as  $(1 - \text{Specificity}) / (1 - \text{Sensitivity})$  or Beta/Alpha

<sup>4</sup> Cohen (1988) suggests that a 4.0 ratio is typical for behavioral science research with specificity and sensitivity equaling .80 and .95 respectively.

Hypothesis 1 proposed that case studies would have greater specificity than sensitivity because they are often limited in scope and emphasize a single discipline's theoretical base. This hypothesis was supported. Case studies were found to be relatively poor at providing information to correctly identify strategic variables with a sensitivity of only .40, compared with a normally accepted value of .95 (Cohen, 1988), and a corresponding a value of .05. In contrast, case studies have high specificity (power), or the ability to determine negative results when strategy variables are truly absent. The standard specificity (power) level suggested is usually .80 (Cohen, 1988) and a value of .89 was found for case studies. In this sense they are good for identifying organizations that lack strategy characteristics of interest.

Hypothesis 2, that SEC RDs would have greater sensitivity than specificity, was moderately supported. Although not quite at the .95 level suggested by Cohen (1988), SEC RDs are sensitive at the .90 level; they are relatively good at correctly identifying strategy variables. However, these documents are relatively lacking in specificity (power), with a value of .68, so they are unlikely to be good data sources for determining organizations lacking the studied strategic variables.

Hypothesis 3 stated that UODs would have a greater specificity than sensitivity. This hypothesis was supported. In fact, UODs' specificity, at .96, was above the .89 level found for case studies and well above the recommended .80 level. In other words, these documents, from a document type with a variety of objectives and lacking accepted rules, are better at identifying the absence of a strategic construct than they are at including the constructs. Hypothesis 4 states that the sum of case studies' sensitivity and specificity would be lower than those of other document types, and it was also supported. Of the document sources used, case studies offer the least explanation overall in terms of providing information to correctly identify strategy variables and to correctly conclude that such variables are absent.

### **Discussion and suggestions for researchers**

The organizational documents investigated here may be called 'data from the surface' (Pentland, 1999: 721), but they are also media in which an organization's strategic reality is defined and discussed as strategies are formulated, disseminated and recounted in the documents' stories (Mintzberg, 1978; Barry and Elmes, 1997; Hendry, 2000). Such documents may even be legitimate explanations and the most appropriate representations of strategies, actions and events in organizations (Czarniawska-Joerges, 1995; Brown, 1998). Because the study found that the organizational strategy recounted is likely to vary by document type, choosing which type to use should be an important consideration for the strategy researcher. Document type sensitivity and specificity as discussed here may be useful starting points for the researcher to consider.

Some context-specific documents may be the most effective for scoring particular strategic characteristics. For example, UODs have high specificity, that is, the ability to reject a hypothesized construct when it is not present. For researchers wishing to do an in-depth analysis about a certain pre-determined 'reactor' (Miles and Snow, 1978) organizational group, or a group of organizations 'stuck-in-the-middle' of Porter's (1980) generic strategies, these multi-vocal documents may be optimal. 'Reactor' or 'stuck-in-the-middle' organizations would be expected to lack strategic configuration constructs, and documents with high specificity levels would be optimal for uncovering such a lack. These would not be the documents to use should the researcher wish to describe characteristics found among the organizations, as opposed to those that were lacking.

Strategy researchers seldom have the luxury of access to all organizational narratives from which to glean data. However, the powerful latent class techniques used in this study allowed determination of the effects different data types had on scoring without having a large number of all data types. In this study, none of the document data sources used rose to the .95 sensitivity levels normally expected in social sciences research, but two sources did reach specificity levels above the acceptable .80 level. Based on these levels, researchers may wish to consider one of two implied statistical alternatives when developing or scoring variables and when, as is often the most practical case, only a small sample can be gathered and scored on numerous variables. First, the  $\alpha$  value used to reject a specific hypothesis could be increased to require less sensitivity. However, peer reviewers commonly accept the  $p < .05$  level, but do not commonly accept a  $p < .08$  or  $p < .10$  level. Researchers using a larger than .05  $p$  value may have difficulty publishing their findings.

Second, perhaps the more practical but not widely used alternative is a triangulation method. In dealing with organizational documents, this involves using 'multiple techniques within a given method' (Jick, 1979: 602) or gathering and comparing variable measures from two or more different document types for each organization studied (General Accounting Office of the United States, 1990). A stronger case for triangulation could be made, perhaps with a bigger impact on editors, if the 'weaknesses in each single method' were known (Jick, 1979: 604). For example, all document types in this study appear to have less sensitivity than desired, but scoring SEC RDs simultaneously with UODs would yield a sensitivity of .96, that is, {sensitivity of SEC RDs (SESEC) + sensitivity of UODs (SEUOD)} - {SESEC \* SEUOD}, and a specificity of .67, that is, {specificity of SEC RDs \* specificity of UODs} (Thrusfield, 1995). Although, at .67, the combined data set would be somewhat underspecified, a researcher may believe the gain in sensitivity is well worthwhile, given an increased ability to distinguish actual strategy constructs, and s/he can clearly report the tradeoff made.

Several limitations to this study should be noted. In general, this was an initial attempt at assessing the impact document types might have on scoring strategy variables. Corroborating earlier research, the study found that the contexts in and for which organizational documents were developed are important for strategy researchers because different contexts produce different document types. However, the object of this study was not construing strategy from documents, as it might have been for a hermeneutic analysis (Prasad, 2002). In addition, narrative effects, themselves, were not the major study objects as they would have been in a narrative analysis.

Specific limitations include, first, the small number of document types used. Obviously organizations produce many more document types than those studied, such as memos and emails. Research surveys and questionnaires are other types used to study organizations. We hope this study serves as the basis for examinations of these other types, which would in turn help to complete the picture of all document types' sensitivity and specificity and their value in strategy research.

Second, all organizations whose documents were used in this study are part of the health services industry. It is unclear whether generalizing these findings to other industries is yet warranted. However, it is clear that the context in which organizational documents are prepared is an important implication of the study. Context, in this case, was the objective for which the document was written, but context may extend beyond objective to industry; the sensitivity of, for example, SEC RDs may be lower or higher in other industries. Moreover, even if variation due to industry is small, all organizations whose documents were included in this study were based in the United States. The organizations' documents were prepared in the US context, intended for US audiences and adhered to US standards of practice. Accordingly, any generalizations of the study to non-US source materials should be made with extreme caution.

These limitations suggest several interesting future research agendas. First, narrative analysis is needed on organizational document types not yet examined, followed by sensitivity and specificity analyses of those types. Second, the study should be expanded to industries beyond health services. Finally, the national context in which an organization operates will surely affect the way in which publicly available documents are written and organizational characteristics are depicted, which would, in turn, affect characteristics' scoring. An examination of rhetorical devices, narrative objectives and their effects in other cultures and in other languages, and of the effects in one culture compared with another would provide fruitful future research directions.

## **Conclusions**

An examination of document type may provide another way for the researcher to assess a document's explanatory power in a particular study, but neither the document type nor the words contained in it are the whole explanation of organizational strategy no matter what media are used. This article makes a first attempt at examining variable scoring differences based on the explanatory abilities of different publicly available information sources. We acknowledge that words are only proxies for thought processes, and that the stories and words contained in any document compete with other possible stories and words. However, our intent was not to champion or interpret any one story, but to provide a way to account for the scoring differences resulting from the several stories that probably exist.

The study advances strategy research in two ways. First, it provides the groundwork and some initial suggestions for strategy researchers seeking ways to overcome insufficiencies in specificity (power) in documentary data. Using several different document types as data sources in addition to employing a triangulation method to measure strategic variables could overcome these insufficiencies. Second, by showing a method to assess different documents' sensitivity and specificity, this study may provide a way to look across different contexts with a common understanding of the document types produced in those contexts. Unlike post-modern and hermeneutic work, which assumes that results will always vary in various contexts, this study points toward a way to overcome the hopelessness of considering all subjects irretrievably contextual.

At the minimum, we hope results from this exploratory study will alert researchers to pay attention to the type of source materials used to score strategy and other organizational studies – all document types are not equal. Some may be ‘more veracious, reliable, and trustworthy in respect to knowledge, truth, and reality than some other(s) ... but no form or document type has final claim to these virtues’ (Fisher, 1987: 19). Our results support the idea that each document tells ‘but one of many competing alternatives’ (Barry and Elmes, 1997: 433) and that each document type recounts its content in a different way. In the face of different contexts, organizational narratives, like stories (Jermier and Domagalski, 2000; Mills, Boylstein and Lorean, 2001), depict strategy or other organizational characteristics differently, which may be reflected in how those characteristics are scored. An organization’s strategy is constructed and is meaningful only in its social and organizational context, and that context is reflected in the document type.

Although this study was not an exploration of organizational strategies or of an organization’s strategy, nonetheless, it provides strong support for Pentland’s (1999) view that organizational researchers examining processes such as strategy making must go beyond cursory data. Researchers may be able to objectively identify a document’s content without understanding the context in which the document type was generated, and they may be able to score strategy variables using one or a combination of document types, but they still may be no closer to an explanation about how ‘changing X will affect Y’ (Pentland, 1999: 722), how strategy is made or how it impacts organizational outcomes. For such explanation, researchers may have to become involved in a complete process of organizational discovery and find underlying themes that will help to organize the ‘surface phenomena’ (Kets de Vries and Miller, 1987), as configurational research suggests. However, a starting point for that discovery is in understanding the strengths and weaknesses of the various data sources.

## Note

1 Beginning with some estimated  $n$  latent classes, the double cross validation method identifies the  $n$  with highest predictive ability by finding the smallest ratio of predicted residual error sum of squares with  $n$  to predicted residual error sum of squares with  $n - 1$  classes. A ratio of less than one indicates that  $n$  latent classes provide the best fit to the data (Wold, 1978; Brereton, 1992).

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**Appendix I Strategic configuration and strategic group studies 1979–2004\***

Author, date, journal	Industry	Issue examined	Data source(s)	Comments	Number of cites
Porter, 1979, <i>The Review of Economics and Statistics</i>	Consumer goods industries	Strategy differences among firms; profit differences among groups	Various secondary data sources		N/A
Snow and Hrebiniak, 1980, <i>Administrative Science Quarterly</i>	Plastics, semiconductor, automotive, air transportation industries	Strategy, competency, performance relationships based on Miles and Snow's types	Two sources: self-report using questionnaire to top managers; income to asset ratio for performance	Data from self-reported questionnaire to top managers used for strategy and competencies; income to asset ratio for performance measure from archival	247
Hambrick, 1983, <i>Academy of Management Journal</i>	Multi-industry	Differences among 'extreme' Miles and Snow group members	Single: PIMS database	Prospectors' performance was not as good as 'defenders'. Results contrary to Miles and Snow's characterizations and contrary to earlier studies. Authors note inadequacy of strategy measures from the data	180
Dess and Davis, 1984, <i>Academy of Management Journal</i>	Paint and allied products	Firm performance and growth and strategic group differences	Single: Self-report using questionnaire developed by authors	Both three group and four group solutions are presented. Questionnaire, developed with the help of interviews, was used with three different panels	261
Hawes and Crittenden, 1984, <i>Strategic Management Journal</i>	US supermarkets	Success differences among strategic groups of generic brand grocery product sellers	Single: mail surveys; self-report by top management	Groups differ by retail strategy and success in selling generic products	41
Calori, 1985, <i>Long Range Planning</i>	Solar energy industries	Strategic groups and survival in emerging industries	Single: results evidently based on questionnaires	To develop the questionnaire, multiple primary and secondary sources were used, but data reported are evidently based only on questionnaire	3
Tremblay, 1985, <i>Journal of Industrial Economics</i>	US beer producers	Demand and cost differences among strategic groups	Numerous: secondary data sources	Data sources included industry journals and other references, various Moody's publications, and US government documents	20

**Appendix I continued**

Author, date, journal	Industry	Issue examined	Data source(s)	Comments	Number of cites
Cool and Schendel, 1987, <i>Management Science</i>	Pharmaceutical	Performance and stability of strategic groups	Multiple data sources	Data sources included SEC data, FDA data, other industry-specific sources	113
Hatten and Hatten, 1987, <i>Strategic Management Journal</i>		Ways to expand the strategic group concept	Theoretical only	N/A to this study	63
Robinson and Pearce, 1988, <i>Strategic Management Journal</i>	Multi-industry	Role of planning sophistication on strategy-performance relationship	Single: self-reported survey data from sample of CEOs	Self-reported subjective results and some ambiguity over whether strategy sophistication involved strategy implementation as well as strategy formulation	96
Miller, 1988, <i>Strategic Management Journal</i>	Multi-industry	Technology, strategy, and performance differences among groups	Single: PIMS database	Groups correspond to those found in earlier research, although technology and performance were not related	30
Lawless et al., 1989, <i>Journal of Management</i>	Multi-industry	Firm performance and strategic group membership	Multiple: several secondary data sources	Include industry directories, trade publications, and National Science Foundation report. Data sources were selected to address issues examined in study	23
Lawless and Finch, 1989, <i>Strategic Management Journal</i>	Multi-industry	Strategic group membership and environmental fit	Dual: archival data and Compustat	Study designed primarily to test preexisting theory. Dual data sources	35
Masarenhas and Aaker, 1989, <i>Strategic Management Journal</i>	Oil-drilling	Relationship among mobility barriers in strategic groups and group stability and performance	Single: oil-industry publication on drilling rig location and characteristics	Strategic groups identified based on three operational characteristics. Basis of strategic group membership limited	31
Smith et al., 1989, <i>Organizational Studies</i>	Electronics manufacturing	Relationship between Miles and Snow typology and organizational performance	Dual: interviews and questionnaires	Personal interviews with the CEOs and executive level managers of a random sample of West Coast firms followed by questionnaire. While these represent two data sources, respondents and content were similar and so may be like one source	24

Barney and Hoskisson, 1990, <i>Managerial and Decision Economics</i>	Food processing	Test of fundamental assertions of strategic group theory: (1) do strategic groups exist? (2) is performance dependent on strategic group membership?	Single: measures from CompuStat tapes	Statistical operating and financial data provided the information needed but strategy and performance measures limited to those available in data sets	60
Conant et al., 1990, <i>Strategic Management Journal</i>	Health maintenance organizations	Development of a multiple measures scale for identifying strategic groups	Single: mail survey	Mail survey to marketing directors of health maintenance organizations	82
Corsi et al., 1991, <i>Transportation Journal</i>	Less than Truckload Motor Carriers	Examination of success of different strategies for strategic groups after industry deregulation	Single: annual reports	Data obtained from annual reports of firms in regulated and unregulated period, written primarily for investors	4
Galbraith et al., 1994, <i>Strategic Management Journal</i>	Non-tactical Navy information systems	Changes in strategies and (seller/buyer) groups with imposition of new regulations	Single: self-reported survey administered to each of four groups	Questions for each group from the same survey, evidently	5
McDougall et al., 1994, <i>Strategic Management Journal</i>	Two electronic equipment industries, computing and radio/TV equipment	Performance of new venture group in different industry growth segments, and with different market focus	Single: self report by top management using survey	Survey tested for reliability; small sample used	28
Zinn et al. 1994, <i>Health Services Research</i>	Nursing home industry	Group membership's impact on performance and strategy	Two sources: secondary data from two governmental agencies	National nursing home certification database and Pennsylvania licensure database used for source data. Although two sources of data were used, both were from government agencies, and thus might be construed as one genre	11

**Appendix I continued**

Author, date, journal	Industry	Issue examined	Data source(s)	Comments	Number of cites
Fiengenbaum and Thomas, 1995, <i>Strategic Management Journal</i>	Insurance industry (all types of insurance)	Strategic groups act as reference points to which members adjust their strategic behavior	Two sources: longitudinal data from two Best's reports	There were two different Best's reports used— <i>Aggregates and Averages</i> and <i>Insurance Reports Property-Casualty</i> . These two sources might be considered one genre as both come from the same source	33
Wiggins and Ruefli, 1995, <i>Academy of Management Journal</i>	Five industries: pharmaceuticals, paints and allied products, primary metals, office equipment, general merchandise	Conditions under which strategic groups associated with performance exist as stable entities	Single: Compustat PC-database	The study only sampled on the dependent variable so it is not appropriate for inclusion, even though only one data source was used	11
Pouder and St. John, 1996, <i>Academy of Management Review</i>		Geographical clusters of firms and their changes over time	Theoretical paper	N/A to this study	35
Houthoofd and Heene, 1997, <i>Strategic Management Journal</i>	Beer industry in Belgium	Distinguishing strategic scope groups from strategic groups and the performance differences in each type of group	Multiple: financial statements, questionnaire, advertising data	Found 5 strategic scope groups that are associated with performance differences but found no differences in performance among strategic groups	8
Nath and Gruca, 1997, <i>Strategic Management Journal</i>	Hospitals in one MSA	The study compares archival, perceptual, and direct measures' utility in classifying organizations based in their competitive structures	Multiple: AHA and HCFA secondary data, surveys, perceptual assessments	Data sources included American Hospital Association and Health Care Finance Administration secondary survey data (somewhat like SEC data), direct surveys of organizations, and perceptual assessment of competitors: The study found that secondary and perceptual measures of structure had convergent characteristics, but perceptual and direct measures of strategy and structure did not exhibit convergent behaviors.	14

Smith et al., 1997, <i>Strategic Management Journal</i>	US domestic airline industry	Looks at direct measure of rivalry between groups and between firms	This research note does not report method of gathering data for grouping. Rivalry data from one source	The source of the grouping data is not clear, but rivalry data are all taken from <i>Aviation Daily</i>	6
Dranove et al., 1998, <i>Strategic Management Journal</i>		Uses 'New Economics of Industrial Organization' to model necessity that group membership affect performance	Theoretical, non-empirical	N/A for this study	16
Mehra and Floyd, 1998, <i>Journal of Management</i>		Theoretically frames strategic group formation based on the IO intra-industry heterogeneity and the resource-based views of organizations	Theoretical, non-empirical	N/A for this study	7
Greve, 1998, <i>Strategic Management Journal</i>	US Radio broadcasting industry	Examination of mimetic mechanisms by which strategic groups might arise	Multiple: <i>M Street Directory, Broadcasting Yearbook 1983-93, Arbitron</i>	While measuring managerial cognition from secondary data source may be difficult, multiple data sources were used in this study	23
Ketchen and Palmer, 1999, <i>Journal of Management</i>	Metropolitan hospitals	Responses to poor performance as defined by the strategic group (referent group)	Multiple: several archival data sources	Data from the Center for Healthcare Industry Performance Studies, the <i>AI-A's Guide to the Health Care Field</i> , and US census data. Multiple data sources, even though groups were defined by self-report from hospital executives	7
Marlin et al., 1999, <i>Medical Care Research and Review</i>	Acute-care hospitals in Florida	Strategic group membership and firm performance studied over a 3-year period	Single: Florida health care administration annual reports	Longitudinal study used measures from documents similar to the SEC RD genre and was able to support the major hypotheses proffered	2

**Appendix I continued**

Author, date, journal	Industry	Issue examined	Data source(s)	Comments	Number of cites
Whittington et al., 1999, <i>Organization Science</i>	Various European industries	The role of innovation in firm performance. More innovative organization groups performed better than less innovative groups	Two sources: INNIFORM survey and self-reported financial data	The Innovative Forms of Organizing for the Twenty-first Century (INNIFORM) survey data were used with self-reported financial data. The authors warn that the low response rate, the exploratory design of the survey, and the subjective nature of the financial reporting may mean reliability and validity problems	24
Segev et al., 1999, <i>Strategic Management Journal</i>	25 leading US MBA programs	Compares program content to create strategic groups and assess success as measured by rankings (U.S. News and World Reports and Business Week)	Two sources: course bulletins and curriculum guides	These sources may be similar to the SEC RD genre because schools are assessed and accredited on the material	4
Ferguson et al., 2000, <i>Strategic Management Journal</i>	US insurance Industry	Relationships among strategic groups, reputation, and performance	Single: data were drawn from NAIC information	The National Association of Insurance Commissioners regulates the industry. The data approximate the SEC-RD genre. The reputation measure was ability to meet future claims contained in the same dataset	6
Forte et al., 2000, <i>Strategic Management Journal</i>	Acute-care hospitals in Florida	Assessing fit between organizational form (measured using Miles and Snow's typology) and environmental change on firm performance	Mixed: National survey database and Florida state database	American Hospital Association Annual Survey and Florida's Hospital Financial Data Report were the data sources. Using a natural experiment, Medicare's move to prospective, the study used measures similar to the SEC RD genre to support the major hypotheses	4
Pegels et al., 2000, <i>Strategic Management Journal</i>	US airline industry	Relationships between competitive groups, TMT heterogeneity, and performance	Multiple: <i>Aviation Daily</i> , D&B Reference of <i>Corporate Management</i> , companies' SEC statements	Defines groups as firms that are strategically dependent upon each other	5

Nair and Kotha, 2001, <i>Strategic Management Journal</i>	Japanese steel industry	Strategic group membership and firm performance studied over a 13-year period (1980–7 and 1988–93)	Single: <i>The Analysts' Guide</i>	The <i>Analysts' Guide</i> is one of the most respected and comprehensive independent sources for information on Japanese firms, and may be similar to SEC RD. Data cross-referenced with another analyst series the <i>Japan Company Handbook</i>	6
Osborne et al., 2001, <i>Strategic Management Journal</i>	Pharmaceutical industry	Compares cognitive to performance strategic groups	Single: presidents' letters from annual reports	Study found that cognitive and performance strategic groups converge using novel analysis methods, but only a single source of data	7
Garcia-Pont and Nohria, 2002, <i>Strategic Management Journal</i>	Worldwide auto industry	How strategic groups, also called organizational niches, inform the dynamics of alliance formation	Variety: a variety of narrative documents used for alliance information; groups defined from previously used dataset	This study used a variety of narrative source such as the <i>Wall Street Journal</i> , <i>Financial Times</i> , <i>Japan Economic Journal</i> , <i>Automotive News</i> , <i>American Metal Market</i> to find that alliances depend more on the strategic group than on the industry	3
Lee et al., 2002, <i>Strategic Management Journal</i>		Uses a genetic algorithm to simulate formation of groups using mobility barriers, strategic interactions, dynamic capabilities, and boundaries as variables	Theoretical, non-empirical	N/A to this study	2
McNamara et al., 2002, <i>Strategic Management Journal</i>	Commercial banks in Minnesota	The study examines the positioning within strategic groups' effect on performance	Single: survey	Survey of bank CEOs to elicit cognitive maps of local strategic groups	3
Marin et al., 2002, <i>Health Care Management Review</i>	Florida skilled nursing facilities	Examines the relationship between strategic group membership and financial performance	Single: Florida and federal health care administration annual reports	Study used measures similar to the SEC-RD genre and was able to support the major hypotheses	4

**Appendix I continued**

Author; date, journal	Industry	Issue examined	Data source(s)	Comments	Number of cites
Orlitzky et al., 2003, <i>Organization Studies</i>		Relationship between corporate social and environmental responsibility, reputation and performance		Meta-analysis	3
Reeves et al., 2003, <i>Journal of Business Research</i>	Health care providers	Strategic configurations and financial performance	Mixed: case studies and SEC documents		0
Vorhies and Morgan, 2003, <i>Journal of Marketing</i>	US trucking industry	Assessing the fit between marketing activities and business strategies in relationship to financial performance using configuration theory	Mixed: mail survey and secondary financial performance data	Mail survey used to gather marketing and strategy measures. Secondary financial performance data usually are considered reliable	1
Nair and Flier, 2003, <i>Strategic Management Journal</i>	Japanese steel industry	Strategic group membership and competitive dynamics	Single source: <i>Daiwa Securities' Analysis Guide</i>	Data from the single source were cross-checked with the <i>Japan Company Handbook</i> for reliability	2
Combs et al. 2004, <i>Journal of Business Venturing</i>	Restaurant franchises	Resource scarcity among strategic group members influences group performance	Single: SEC documents	Study finds significant group performance differences relying on SEC-RDs	0
Daniel et al., 2004, <i>Journal of Business Research</i>	Multiple US industries	The study assesses the relationship between organizational slack and performance	Meta-analysis of 66 studies	N/A	0

Notes

\* Articles are taken from: 1) Ketchen, et al.'s organizational configuration meta-analysis (1997), for which the most recent data are from 1994 (only articles were included), 2) articles on organizational configurations or strategic groups published after Ketchen et al.'s data collection (1994) and before publication of the Ketchen et al. article (1997); and 3) configuration and strategic group articles in Ketchen et al.'s recent article (2004). Number of citations was found using the ISI Web of Knowledge: Science Citation Index, Social Citation Index, and Arts and Humanities Index during the time period April 20–25, 2005. The number for pre-1983 articles may not be accurate because cites from some journals are not indexed until after 1982 in the Social Citation Index and the Arts and Humanities Index. Rows in italics are single-source studies.

## Appendix 2 Variables used in the research

Variable dimension	Variable label	Definition*
Environmental variables	Dynamism	The amount and unpredictability of change in the environment
	Heterogeneity	The differences or complexity in the services provided resulting in differences needed in competitive tactics
	Munificence	Appears as steady funding, regulatory discretion, adequate work force, sufficient materials and favorable demographic trends
Structural variables	Scanning	The amount of search for opportunities and threats in the environment
	Delegation of operating authority	The amount of authority for day-to-day operational decisions transferred from top managers to lower and middle level managers
	Centralization of strategy-making	The distribution of power to make long-term, strategic decisions
	Resource availability	The amount of available labor, materials, capital, facilities, and other resources. This differs from munificence which relates to issues outside the agency's control
	Management tenure	Average number of years top managers have held their positions
	Controls	The number and scope of systems to measure performance trends
	Internal communication	The ease and fidelity with which all kinds of information flows throughout the agency
Organizational differentiation		The degree of differences in goals, administration, behavior, operations, management style between units or departments
	Technocratization	The percent of staff with professional qualifications
Strategy-making variables	Innovation	The amount of innovation used in terms of number and novelty of new services/products
	Adaptiveness /proactiveness	The amount of response by the agency to external environmental conditions, and the appropriateness with which and degree to which the agency attempts to shape its environment
	Integration of decisions	The degree to which actions in one unit of the agency complement or support those in other units
	Conscious strategic analysis	The amount of time and thought devoted to real or perceived problems and to ways to deal with the problems
	Multiplexity	The range of factors considered by top managers when making strategic decisions
	Futurity of decision	The time frame used by the agency in strategic planning
Precedents	The degree to which the agency rethinks its strategies and the way in which it will attain its strategies	

### Note

\* For a complete description of each variable refer to Miller and Friesen (1984).