Managerial Constraint:

The Intersection Between Organizational Task Environment and Discretion

Brian K. Boyd
W.P. Carey School of Business
Arizona State University
Tempe, AZ 85287-4006
briankboyd@asu.edu
http://www.briankboyd.com

Steve Gove
Department of Management and Marketing
713 Miriam Hall
300 College Park
University of Dayton
Dayton, OH 45469-2271

Abstract

Managerial constraint is a central theme in strategic management research. Although discussed using a variety of labels (including choice and determinism) and theoretical perspectives (including resource dependence and population ecology), the common question is the degree to which executives have choices or options when making decisions. Two of the most commonly used approaches for discussing constraint are organizational task environments (Dess & Beard, 1984) and managerial discretion (Hambrick & Finkelstein,1987). These two papers share substantial commonalities in both their theoretical background and operationalization, raising the question of whether discretion and task environment are indeed separate constructs. This chapter reviews both conceptual and methodological issues associated with the use of task environment and discretion. Drawing on a review of published studies and original data analysis, we offer methodological suggestions for future research.

Forthcoming in D. Ketchen and D. Bergh *Research Methodology in Strategy and Management, Volume 3.* Elsevier, in press.

Do managers matter? And, if so, under what conditions? Managerial constraint is a key component in the debate between population ecology and strategic choice perspectives. Two frameworks: Dess and Beard's (1984) model of organizational task environments, and Hambrick and Finkelstein's (1987) managerial discretion are commonly cited sources for studies of managerial constraint. These two papers also share some interesting characteristics. First, while both papers are widely cited, there are only a small number of empirical applications of each framework. Within this set of empirical studies, there are widely varying practices regarding variable selection and the measurement of these variables; differences which can limit the generalizability of results. Additionally, the two perspectives draw on similar theory and employ similar – and sometimes identical – measures. Thus, although the two papers are rarely cited concurrently, it is not clear whether task environment are unique, overlapping, or identical constructs.

The purpose of this chapter is to facilitate the use of task environment and discretion variables in future studies. We begin with a review of the two constructs, including theoretical foundations and intended focus. Second, we review empirical studies that have used task environment or discretion variables, including a content analysis of methodological practices. Next, we discuss the implications of different approaches to definition and measurement. We assess these measurement options based on an analysis of data from 130 industry groups. We offer suggestions based on these analyses for future studies. Finally, we evaluate the overlap between discretion and task environment.

CONSTRUCT DEVELOPMENT AND APPLICATION

In this section, we will review two topics. In a theoretical overview, we compare the notions of strategic choice and determinism. Additionally, we examine how both task environment and discretion relates to these perspectives. In the second section, we present content analyses of how task environment and discretion have been used in prior studies. We identified nearly 500 journal articles which have cited either Dess and Beard (1984) or Hambrick and Finkelstein (1987). From these articles, we identified 87 studies that used task environment or discretion variables in their analyses.

Common Roots, Different Applications

What constrains managerial action? Influenced by general systems theory (Bertalanffy, 1968), management scholars began to explore the role of external forces in shaping a company's direction. One example of this trend was Emery and Trist's (1965) depiction of four environmental archetypes of increasing complexity: placid randomized, placid clustered, disturbed reactive, and turbulent field. A prominent research stream during this period was the creation of measures to assess uncertainty due to environmental factors (e.g., Duncan, 1972; Lawrence & Lorsch, 1967). However, a number of methodological limitations were identified with these studies (Downey, Hellriegel & Socum, 1975, Tosi, Aldag & Storey, 1973), resulting in little consensus on either the definition or measurement of firm constraints.

Subsequently, competing theoretical models emerged to explain the effect of external factors on organizations. Population ecology (Aldrich, 1979; Hannan & Freeman, 1977) characterized the firm's interaction with outside forces as a Darwinian model of natural selection: Companies are essentially unable to control their environment, and internal inertia prevents successful adaptation. Survival, therefore, is contingent on having the right set of attributes at the right time. The conclusion that senior managers are largely interchangeable with one another is representative of this perspective (Lieberson & O'Connor, 1972). In contrast, strategists argued that adaptation to external constraints was the key to organizational survival, and that top managers played a central role in this process (Andrews, 1971; Chandler, 1962). A number of strategy models are descendents of strategic choice: Resource dependence theory (Pfeffer & Salancik, 1978) focused on mechanisms that companies could use to help buffer outside forces. Similarly, research on top management teams and upper echelons (Gupta, 1984; Hambrick & Mason, 1984) addressed how attributes of senior managers drove decision-making and subsequent firm performance. Despite this growing interest in external constraint on organizations, there was little consensus – at either conceptual or empirical levels – on the articulation of these factors. As part of the population ecology framework, Aldrich (1979) integrated prior work to propose six dimensions of business environments: capacity, heterogeneity, stability, concentration, domain consensus, and turbulence.

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Drawing on these common roots, two prominent papers emerged in the 1980's that offered frameworks to characterize factors that constrain managerial action: Dess and Beard's (1984) study of organizational task environments, and Hambrick and Finkelstein's (1987) paper on managerial discretion. On the basis of citations, both articles have been very influential: The Social Science Citation Index reports 309 citations to Dess and Beard[i], and 172 citations to Hambrick and Finkelstein. However, influence does not translate directly to application: Despite the large number of citations, there have been only 19 empirical applications of Dess and Beard's framework that have used all three dimensions and comparable variables; with a number of other papers that used either a partial set of dimensions or very different measures. Similarly, there have been only 16 empirical applications of the discretion construct. Of greater concern, there has been little consistency in the use of either construct: Empirical studies have used a wide range of variables, with an equally wide range of parameters to define and measure these variables. Additionally, empirical studies often tap only limited aspects of these two constructs. Looking across the two perspectives, the concepts of task environment and discretion have been used interchangeably: Multiple articles, for example, have equated highly munificent industry environments with high levels of discretion (e.g., Datta, Rajagopalan & Zhang, 2003; Goll and Rasheed, 1997). Similarly, high levels of industry volatility have been equated with high levels of discretion (Haleblian & Finkelstein, 1993). Additionally, similar or identical indicators are often used to measure both discretion and task environment: Industry growth rates, for example, have been used to tap both task environments (e.g., Boyd, 1990; Keats & Hitt, 1988) and discretion (e.g., Abrahamson and Hambrick, 1995). Additionally, this same variable, measured at the firm level, has also been used to measure discretion (Finkelstein & Boyd, 1998). Thus, although the two papers are rarely cited in the same article, the question remains: How distinct are task environments and discretion from one another? Figure 1 shows some possible answers to this question. First, the lack of co-citation may simply reflect that these are separate and distinct – i.e., they are orthogonal or independent constructs. Alternately, these may be loosely linked – sharing some aspects, but still largely independent of each other. Finally, the task environment and discretion labels may simply another case a common problem: The use of inconsistent labels used to describe a common external pressure (Boyd, Dess & Rasheed, 1993).

Both papers share a common theoretical foundation: The distinction between strategic choice and determinism. However, there are substantial differences in the two frameworks. Dess and Beard's focus is at the **industry** level, and their intent was to develop a reliable set of indicators to measure how levels of uncertainty varied from industry to industry. In contrast, Hambrick and Finkelstein (1987: 370) were interested in constraints at the **individual** level:

It is important to stress that our focus is on the discretion of top managers – specifically chief executives – and not the discretion of organizations per se. Obviously, managerial discretion is limited by organizational discretion, so part of our analysis will still pertain to those who are interested solely in restrictions on organizations. Our interest in chief executive discretion stems from related research we are conducting on executive characteristics, compensation, and succession – phenomena we believe will be far better understood if discretion is considered.

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Both papers treat their respective constructs as multidimensional. Aspects of each are shown in Figure 2. Dess and Beard integrated work by Aldrich (1979), Child (1972), and others to propose that environmental uncertainty would be shaped by three elements of the task environment for a given industry: **Munificence** is the availability of resources, and is negatively associated with uncertainty. Munificent environments are resource rich, with ample ability to support organizational growth. **Dynamism** refers to volatility or unpredictability in the environment, and is positively associated with uncertainty. Finally, **complexity** refers to the variety of an industry – concentration of inputs, for example, or organizational density. Complexity is positively associated with uncertainty. A number of subsequent articles have focused specifically on the conceptualization and measurement of Dess and Beard's framework (Castrogiovanni, 2002; Harris, 2004; Sharfman & Dean, 1991).

Hambrick and Finkelstein also proposed three factors that would shape the level of discretion[ii] – generally defined as the latitude of action available to an executive. Their determinants were found at the individual, firm, and industry levels. First, they noted that **managerial characteristics** would drive discretion. Specifically, executive personality characteristics (e.g., cognitive complexity, commitment), personal power base, and political skills would serve to create, or limit, options available to a particular manager. Second, **internal forces**, such as organizational slack, firm inertia, or political power held by others, can also shape discretion. Finally, the **task environment** was expected to shape discretion as well. As shown in Figure 2, many of the discretion task environment elements closely resemble munificence, dynamism, and complexity. Because Hambrick and Finkelstein's article was a conceptual one, as opposed to Dess and Beard, subsequent researchers had less guidance – one might even say greater latitude of action – in how to define and measure discretion. As a result, in subsequent applications, discretion has been studied at the individual, firm, and industry levels, has been observed directly and inferred indirectly, and measured in a variety of ways, including expert assessment, survey, and archival measure (Boyd & Salamin, 1998). A few studies have focused primarily on the measurement of discretion (Carpenter & Golden, 1997; Finkelstein & Boyd, 1998; Hambrick & Abrahamson, 1995). In the next two sections, we describe empirical studies which have operationalized both the task environment and discretion frameworks.

Empirical Applications of Dess and Beard's Task Environment

Using the Social Science Citation Index, we identified 306 published papers that cited Dess and Beard's (1984) article on task environments. We should note that this article pool is not an exhaustive list of possible uses, as books and book chapters are not included in the SSCI, nor are some journals. We then reviewed each article on the SSCI list, excluding papers that were not available as hard copy journals, electronic journals, or via interlibrary loan. We then classified papers into three categories: Articles which cited Dess and Beard, but did not use any of their measures; articles which used a subset of Dess and Beard dimensions (e.g., used munificence and dynamism, but not complexity), and articles which used all three of the Dess and Beard dimensions. Overall, we identified 71 papers that used Dess and Beard constructs in their analyses: 28 studies which used all three dimensions, and 43 studies which used a subset of papers. In three quarters of the papers, task environment variables were used as predictor or contingency variables. The remaining one quarter of papers used these dimensions to control for industry effects. Interestingly, while the Dess and Beard model was framed to study objective aspects of industry constraint, a number of studies measured munificence, dynamism, or complexity with perceptual, or survey, items. In fact, of the 28 papers that used all three dimensions, nine relied solely on perceptual measures. Therefore, of the 306 papers, we identified only 19 articles that used industry-level data for all three constructs. Attributes of the full-use studies are shown in Table 1, and partial-use studies are shown in Table 2.

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Time horizon

The first aspect of the papers we reviewed was the time horizon. Munificence and dynamism scores are calculated by regressing an industry variable against time. While five and ten year time windows are the most commonly used horizons, studies also used two, three, seven, nine, and even nineteen year windows. Five and ten year windows typically cited prior work as precedent; otherwise, the rationale for a specific horizon was not emphasized. Additionally, studies did not explore whether different time horizons might affect results.

Industry variables

The variables used to measure munificence and dynamism varied widely. Industry sales and total employment were the most commonly used measures. The price-cost margin and value added were also used by a number of studies. Less commonly used variables included the number of establishments, capital expenditures, and return on assets. Prior use of a variable was the most common basis for justifying its use. The overwhelming majority of studies represented each dimension with a single indicator – Harris (2004) and Jarley, Fiorito and Delaney (1997) are two prominent exceptions. Because of the reliance on single indicators, most studies were not able to report tests of dimensionality[iii] for the industry variables used. Among studies that did test dimensionality, three quarters relied on partial (e.g., reliability of individual dimensions) versus extensive (e.g., confirmatory factor analysis) testing. Also, some studies with multiple indicators reported correlations among composite variables versus raw indicators, which limits comparison against other studies (Boyd, Gove & Hitt, 2005).

Complexity is most frequently measured by economic concentration. Boyd (1990) reported results of the MINL transformation (see Schmalensee, 1977) that yields an approximation of the Herfindahl index based on traditional concentration ratios (4-firm, 8-firm, etc). The use of H with the MINL transformation is the most widely used approach to operationalize complexity. Other studies have measured this dimension via concentration or dispersion of other variables, however, such as value-added or employees.

Standardization

To facilitate comparison across industries, munificence and dynamism scores are standardized, using either the mean of the industry variable, or a log transform. Keats and Hitt (1988) used the log transform approach, while Boyd (1990) used mean standardization; the latter approach is more widely used. These papers are typically cited as rationale in the article. A number of papers, however, used unstandardized scores; the comparability of scores across industries using this approach is not known.

Perceptual measures

As noted previously, roughly one-third of the papers that use the full set of task environment variables do so via perceptual measures. These articles are noted in section (b) of Table 1. We also identified two studies that used only a subset of task environment dimensions and perceptual measures: Lumpkin and Dess (2001) and Luo (2005). While all studies report reliabilities of each dimension of 0.60 or greater, there is virtually no consistency in the survey measures used: The number of survey items used for a dimension, for instance, range between 1 and 16. Some studies will use very different numbers of indicators for each dimension as well – both Hart and Banbury (1994) and Panayotopoulou, Bourantas & Papalexandris (2003), for example, use twice as many survey items for dynamism than for munificence or complexity. Also, while each paper created a unique set of survey items, limited testing is done in regard to reliability and validity. Most studies reported either the survey item itself, or topic of survey questions.

Partial use of task environment dimensions

The majority of studies that include a measure based on Dess and Beard (1984) include only a subset of the munificence, dynamism, and complexity dimensions. These studies typically focus on munificence and dynamism; of the 43 partial studies, only 5 included the complexity dimension. Partial studies are more likely to include task environment as a control variable, and most often rely on single indicator measures.

Empirical Applications of Hambrick and Finkelstein's Discretion

We identified 172 articles through the Social Sciences Citation Index citing Hambrick and Finkelstein's (1987) article. As with our review of articles citing Dess and Beard's (1984) work, this approach excludes most books and chapters, and we excluded papers not available through our libraries, electronic means, or via interlibrary loan. This may represent a limiting factor in our review.

We examined each article citing Hambrick and Finkelstein (1987) and classified how discretion was utilized in the methodology. In total, we identified 16 papers[iv] that used discretion in some form in the analysis, some with multiple operationalizations (e.g., Hambrick & Abrahamson, 1995), and some with measures at multiple levels of analysis (e.g., Boyd & Salamin, 2001; Magnan & St. Onge, 1997). Unlike Dess and Beard's work, discretion has evolved in the literature from conceptual discussion (Hambrick & Finkelstein, 1987). Early applications (Finkelstein & Hambrick, 1990; Haleblian & Finkelstein, 1993; Hambrick, Geletkanycz & Fredrickson, 1993) measured discretion as ordered categories – i.e., either high/low discretion or high/medium/low discretion settings. These rankings of discretion were based on reviews of archival data by study authors, but with little explicit information as to analyses conducted, cutoff levels, or other considerations presented in their methodologies. Additionally, while Hambrick and Finkelstein initially characterized discretion at the level of the individual executive, these high/low groupings were done at the industry level: Neither internal forces nor managerial characteristics were included in these analyses.

As developed by Hambrick and Finkelstein, executive discretion was expected to be shaped by three types of forces: Individual level (managerial characteristics), firm level (internal forces), and industry level (task environment). Subsequently, there have been efforts to refine the measurement of discretion at all three levels, with varying degrees of conformance with Hambrick and Finkelstein. At the industry level, Hambrick & Abrahamson (1995) created discretion measures via an unaffiliated panel of expert raters, (surveys of academic and securities analysts). They reported a high level of agreement within both groups of experts. Following a multiple-trait, multiple-measure approach, the authors examined the correlation between expert ratings and quantitative measures from archival sources. Their methodology did not include a factor analysis, but rather utilized a regression-based approach of predicting the expert panel discretion scores using quantitative indicators. At the firm level, Finkelstein and Boyd (1998) developed a multi-indicator factor model of discretion in a structural equation model predicting CEO pay. Included in their model were indicators of product differentiability, growth, demand instability, capital intensity, regulation, and industry concentration. These indicators can best be described as micro versions of the industry task environment, and differ substantially from Hambrick and Finkelstein's discussion of firm-level forces such as inertia or the presence of powerful inside forces. Finally, at the individual level, Carpenter and Golden (1997) reported results based on a fifteen item scale ($\alpha = .82$) assessing discretion at the individual level as part of a simulation. Their approach is notable as it included sub-scales assessing both low discretion (5 items; $\alpha = .74$) and high discretion (10 items; $\alpha = 78$) environment, though actual items were not reported, for the use of perceived managerial discretion as a dependent variable, and usage of a lab study using a simulation. Again, the Carpenter and Golden measures differ substantially from the individual-level forces as presented by Hambrick and Finkelstein. We use these levels (industry, firm, and individual) to summarize empirical use of discretion, as shown in Table 3. Next, we will highlight some of the key characteristics of this research.

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Level of analysis

While conceptualized as a multi-level construct, the vast majority of studies have measured discretion at a single level. As shown in Table 3, the industry level of analysis is dominant, with only a handful of studies tapping either firm- or individual-level aspects of discretion. Only two studies (Boyd & Salamin, 2001; Magnum & St. Onge, 1997) used measures from multiple levels. At the industry level, indicators typically include some of the usual suspects seen in the Dess and Beard applications – i.e., growth and volatility. Unique indicators included the intensity of advertising and R&D to tap differentiation, capital intensity, and regulation. While industry level studies mainly used archival data, Hambrick and Abrahamson (1995) also used expert ratings of industry discretion.

Two different approaches have been used to measure discretion at the firm level. First, Finkelstein and Boyd (1998) used many of the same archival indicators as the industry studies, but measured at the firm level. So, for example, industry growth became firm growth, and industry concentration became a weighted composite of Herfindahl scores from each of the firm's business segments. Second, Rajagopalan and Finkelstein (1992) extended the scope of discretion by proposing that discretion flowed from company strategy. Using the Miles and Snow typology, they developed hypotheses based on the premise that executives in Prospector firms would enjoy greater latitude in decision options than Defender executives. Strategic orientation has been used in subsequent studies as well (Boyd & Salamin, 2001; Rajagopalan, 1997). Similarly, Magnum and St. Onge (1997) used aspects of firm strategy (product mix, scope, and internationalization) to measure discretion. Finally, the individual level has seen the least empirical use. Additionally, the measures for individual-level studies are very different from those proposed by Hambrick and Finkelstein: Two studies used hierarchical position (Boyd & Salamin, 2001; Aragon-Correa, Matias-Reche & Senise-Barrio, 2004) as proxies of individual power. A third paper (Carpenter & Golden, 1997) developed a perceptual measure of individual discretion.

Measurement practices

As with the pool of Dess and Beard articles, there was considerable variation in the manner that discretion variables were operationalized. For example, some studies standardized growth and volatility scores to adjust for differences in industry size, while others did not. Time windows used to measure variables varied as well, including single and multi-year composites. As with the Dess and Beard articles, the rationale for a specific time window was often not justified when creating growth or volatility measures. The sophistication of measurement also varied widely across studies, including ordinal categories, single measures, and multiple measures. Among the studies with multiple measures, indicators have been aggregated into a single index measure, treated as separate predictors, and loaded onto a multi-indicator latent factor model.

IMPLICATIONS FOR FUTURE RESEARCH

We address three topics in this section. First, as demonstrated in our content analysis, prior studies have used a wide range of options when defining variables, particularly for growth and volatility scores. Using data from 130 industry groups, we examine how choices in definition affect variables. Second, we examine the degree of overlap between discretion and task environment variables. For this analysis, we compare data from a sample of 400 firms with our industry-level measures. Finally, we use the Hrebiniak and Joyce (1985) model of strategic choice and determinism to integrate task environment and discretion.

Recommendations for Measurement

In this section, we review the implications of different choices in the construction of growth and volatility measures, which are central to both discretion and task environment frameworks. While we illustrate these issues with industry level data, the analyses are applicable to firm level measures as well. We collected data for 130 SIC industry groups from *U.S. Industrial Outlook*. Based on our content analysis of prior studies, we created munificence and dynamism scores using a variety of approaches, and then compared the correlations among these different measures. Results are reported in Tables 4 and 5.

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Prior studies used a wide range of time horizons to calculate scores, ranging from as little as 2 years, to as long as 19 years for Dess and Beard articles. Time periods varied for discretion studies as well. We examined the effect of temporal stability by creating scores with four different time horizons: 3, 5, 7, and 10 years. To facilitate comparison, all time windows end in 1986 – i.e., the 10 year window includes 1977-1986 data, while the 5 year window includes 1982 – 1986 data. To address the effect on the choice of industry variable, we constructed separate measures based on industry sales (labeled value of shipments in the *Industrial Outlook*), and industry employment – these were the two most commonly used industry variables as reported in the content analysis of prior studies. Next, we used three different approaches to standardizing scores: Mean and log standardization, and unstandardized scores. While mean standardization is the most commonly used approach, Keats and Hitt (1988) standardized via log transforms, and this alternate method has been used in a minority of studies. For **mean standardization**, a regression model is run using the industry variable (i.e., sales or employment) as the dependent variable, with time as the predictor. Both the parameter estimate and standard error of the regression slope coefficient are then divided by the mean of the industry variable to create munificence and dynamism scores, respectively. For **log standardization**, a log transform is used on the industry variable prior to regression. The antilog of the parameter estimate and standard error of the regression slope coefficient are then used to calculate munificence and dynamism scores, respectively. **Unstandardized scores** have been used as indicators for both task environment and discretion studies, and are more commonly used in the pool of discretion studies. This approach uses the unadjusted parameter estimate and standard error of the regression slope coefficient.

Temporal stability

Munificence and dynamism scores are only minimally affected by the choice of time horizon. For example, munificence scores based on any time window will have a correlation between 0.84 and 0.91 with any adjacent window – e.g., comparing a 5 year window to either 3 or 7 year windows. Scores are also very similar even when comparing extreme ranges of time windows: Using mean-based standardization, for example, 3 and 10 year windows correlate on average at 0.53. Similarly, mean standardized dynamism scores correlate at 0.83 on average. The importance of the time window has been raised in a number of articles. Boyd and colleagues (1993) noted that scores based on a broad time horizon may have limited meaning, as older data may be less relevant to current organizational issues. Additionally, Castrogiovanni (2002) reported that munificence, dynamism, and complexity scores tended to decline as an industry matured. However, the close correspondence of scores across time horizons suggests that the choice of a 5 versus 7, or even 10 year window may not be a meaningful concern.

Industry variable

While industry sales is the most widely used variable, a variety of other indicators have been used, including capital expenditures, net income, profitability ratios, and assets. Total employment is the second most widely used industry variable. As shown in Tables 4 and 5, munificence and dynamism scores based on sales and employment data correlated strongly with each other. However, the 5 and 7 year window mean-adjusted scores tracked much more closely than scores based on either the shortest or longest time windows. For munificence, scores based on industry sales and employment at 7 and 5 year windows correlated at 0.93 and 0.85, respectively. In comparison, 10 year scores correlated at 0.74, and 3 year scores correlated at 0.66. Dynamism scores based on industry sales and employment reported correlations of 0.88 and 0.76 at 7 and 5 year windows, respectively. The 10 year window reported a correlation of only 0.32, and the 3 year window correlated at 0.72. Part of this disparity may be the upward bias of industry sales – typically studies do not discuss transforming sales to constant dollars to control for inflationary pressures.

Standardization

Comparisons of mean and log standardization were made for 5 and 10 year windows, and using both industry sales and employment. Boyd (1990) had previously reported that both approaches correlated strongly; however, this analysis was based on a relatively small sample of industry groups. Our analysis is based on a much larger pool of industries, and report similar, but stronger results than Boyd (1990). On average, munificence measures correlated at 0.97, and dynamism measures correlated at 0.98. There was no noticeable pattern of variation based on time window or the choice of industry variable. Unstandarized scores, however, report a very different pattern of correlations. Munificence scores using industry sales and a 5 year window were not significantly correlated with any other estimates at either 5, 7, or 10 year windows. The unstandardized munificence score did report a significant correlation of 0.35 with the 3 year estimate also based on industry sales, however. Unstandardized dynamism scores reported slightly better results, with a correlation of 0.25 with the 5 year mean adjusted industry sales score, and a correlation of 0.38 with the 3 year mean adjusted industry sales score.

Potential for omitted variable problems

As noted in earlier Tables, the majority of studies that use task environment variables use only a subset of the munificence, dynamism, and complexity constructs. Similarly, the potential for omitted variable problems are substantial for discretion studies as well: Not only are there multiple levels of discretion that need to be addressed, but most studies use a small number of indicators to represent a particular level. Given the nature of both phenomena, researchers should be alert to potential omitted variable problems. We will illustrate this issue using data on task environments, but the concern is applicable to discretion as well.

In their article, Dess and Beard (1984) proposed that munificence, dynamism, and complexity would be independent dimensions. Thus, their factor model reported orthogonal versus oblique factors. It is important to note that there was no *a priori* theoretical basis for this – rather, Dess and Beard viewed their model as an exploratory one, and reported independent factors solely in the interest of parsimony. In a subsequent replication, Harris (2004) reported significant covariances across all three dimensions[v]. Based on our review of prior studies, both the strength and the direction of covariance among task environment dimensions is highly influenced by the characteristics of a particular sample. Table 6 aggregates the correlations for these dimensions, based on section (a) articles from Table 1. Using on a weighted mean of these articles, the three dimensions would appear to be virtually independent: Munificence and dynamism correlate at 0.11, munificence and complexity at 0.02, and dynamism and complexity at -.02. However, these scores vary dramatically across studies. The largest correlation between munificence and dynamism was 0.88; at the other extreme, one study reported a negative correlation of -.46. Similarly, munificence and complexity reported correlations ranging from -.34 to 0.62. Finally, dynamism and complexity has correlations ranging from -.46 to 0.48.

Omitted variable problems occur when two predictor variables have overlapping variance, and one of the predictors is excluded from the model. As a result, a statistical model may overestimate the effect of the included predictor on the dependent variable. Given the range of strong correlations that have been reported between munificence, dynamism, and complexity, and the general tendency to use only a subset of these dimensions, there is ample basis to question the accuracy of prior studies.

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Net recommendations

The most common approach to building industry-level munificence and dynamism scores is to use a 5 year time window, mean standardization, and industry sales. Continued use of this approach facilitates comparison of results across different samples and analyses. However, if authors have a theoretical basis for either a longer or shorter time window, this change should have only a minimal effect on scores. Similarly, the choice of standardization method should not have an effect on results. Many studies, however, either do not standardize their measures, or are unclear whether or not they standardize scores. As shown in our comparison, unstandardized growth or volatility scores show, at best, only tenuous correspondence with either the mean or log adjusted measures. Thus some form of standardization should be included for any studies that utilize multi-industry samples. The choice of an industry variable is more important than either the time window or standardization approach, as there is some variation between scores based in industry sales and employment. These differences are likely affected by multiple factors, including failure to control for inflation with sales scores, and advances in man-hour productivity, such as lean manufacturing. Scores based on industry sales should ideally be restated to constant dollars. Additionally, the use of multiple measures would be helpful.

Finally, studies should consider including all three task environment dimensions, even as control variables, to address potential omitted variable problems. In the case of discretion, studies should include a broader pool of indicators. A summary of measurement recommendations are shown in Table 7.

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Different labels, common phenomenon?

Based on our review, there appear to be more similarities than differences in the applied use of task environment and discretion. Although intended to capture individual psychological traits, and organizational factors such as inertia or internal politics, as Table 3 shows, the de facto indicators for discretion are typically measured at the industry level. Consequently, industry-level growth rates, volatility, economic concentration, and capital intensity have been used to characterize both discretion and task environment. So, are these truly different constructs, or simply different labels?

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Boyd and colleagues (1993) noted that organizational environments can be measured at multiple levels, and with multiple approaches. A modified version of their framework for classifying measures is shown in Figure 3. Consider a regression slope coefficient for sales, standardized by its mean. When "sales" is measured as "industry sales", this is a measure of munificence, an aspect of industry task environment. However, when "sales" is measured as "firm sales" the variable is now less macro, and now represents the level of discretion facing a firm. In practice, how similar or different are these two measures, separated only by the level of analysis?

Boyd et al (1993) reported comparative data for the semiconductor industry, based on sales data for 1984-89. While semiconductor is often described as a "boom or bust" business, this time period was relatively stable, and reported moderate levels of munificence and dynamism. However, scores based on data for individual members of this industry reported considerably more variation. Intel, for instance, reported a munificence scores 60 percent higher than that of the industry; in contrast, Siliconix reported a munificence score only one quarter that of the industry. Additionally, deviation from the industry norm on a single task environment dimension did not guarantee similar abnormality on another: Chips and Technologies, for instance, reported an average level of dynamism, despite having a munificence score five times that of the industry. Overall, Boyd and colleagues (1993: 215) concluded that industry level measures of uncertainty are "less relevant for characterizing the level and nature of uncertainty felt by individual firms."

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Since the comparison by Boyd, Dess and Rasheed (1993) was anecdotal, and limited to a single industry, we conducted a more comprehensive analysis of firm and industry level munificence and dynamism scores. We obtained firm-level growth and volatility scores for 400 firms; these were a subset of the sample used by Finkelstein and Boyd (1998). We then matched these data via 4-digit SIC codes with the industry-level scores we reported earlier. Both sets of measures were based on the same time period, and correlations are reported in Table 8.

Munificence scores based on sales at the two levels reported correlations of approximately 0.46, and were essentially unaffected by the basis for standardizing the industry level scores. Firm-level growth scores based on sales correlated less strongly with industry-level measures based on total employment, approximately at 0.20. On average, dynamism scores were more loosely linked: Firm and industry-level scores based on sales correlated at approximately 0.17. Interestingly, the firm-level score based on sales correlated more strongly with industry measured based on employment. While recognizing the limitations of correlational analysis, these results should be considered preliminary evidence that task environment and discretion are loosely linked versus independent or totally overlapping constructs. Future research could help clarify the degree of overlap by reporting results with scores based on different levels of analysis.

Integrating task environment and discretion

Recognizing that task environment and secretion are distinct yet overlapping constructs, what are the implications for management research? One salient issue is a broader form of an omitted variable problem: If a researcher is interested in firm-level discretion, and includes it as a predictor in a model, an unknown degree of explained variance may actually be due to an unmeasured, industry-level counterpart. As a result, industry-level studies may have overestimated the role of munificence, dynamism, and complexity, while firm-level studies may have overstated the effect of discretion.

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Insert Figure 4 about here
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One solution may simply be for studies to create both firm- and industry-level variables. A superior approach, however, would be to go beyond integrating measures and instead integrate both task environment and discretion frameworks in future research. A model developed by Hrebiniak and Joyce (1985) offers an excellent basis for developing integrative hypotheses. Briefly, the authors proposed that choice and determinism were not competing perspectives, but rather, complementary ones. A modified version of their model is shown in Figure 4a. Environmental determinism is driven by structural characteristics of industries – a perfectly competitive market, for instance, is highly deterministic. Alternately, an environment rich in resources – which Hrebiniak and Joyce (1985) described as "benign" – is less deterministic. Independent of these structural characteristics, individual firms will have varying degrees of strategic choice available to them. For example, a firm in a commodity market – e.g., – Nucor and steelmaking – may develop innovative ways to build a cost advantage. Alternately, other firms might develop strategies to consolidate industries that were previously heavily fragmented; Blockbuster and video rental, or Service Corp International and funeral homes are two examples. Hrebiniak and Joyce (1985: 342) noted "The essential point is that external constraints and high environmental determinism need *not* necessarily prevent individual choice and impact on strategic adaptation.

Hrebiniak and Joyce (1985) proposed that different strategies would be appropriate for each of the choice – determinism combinations, and that firm performance would be affected by the match between strategy and context. Lawless and Finch (1989) conducted the first empirical test of the choice – determinism model, using the task environment variables munificence, dynamism, and complexity. Overall, they reported that high deterministic quadrants had higher levels of environmental uncertainty; i.e., high determinism translated into less munificence, more dynamism, and more complexity. However, Lawless and Finch were unable to find support for the Hrebiniak and Joyce propositions regarding matching structure to context, or the accompanying performance effects. A probable explanation for their lack of results was the use of task environment variables to characterize both determinism and strategic choice. Hrebiniak and Joyce (1985) defined determinism as an external constraint, which is consistent with Dess and Beard's (1984) model of organizational task environments. Strategic choice, however, was framed either at the level of the firm, or the CEO. In either case, Hambrick and Finkelstein's (1987) discretion model tailors closely to this dimension of the Hrebiniak and Joyce 2x2 model.

A subsequent paper (Bamford, Dean & McDougall, 1999) also used the Hrebiniak and Joyce framework; however, their strategic choice indicators were measures of decisions made at the time of company founding, versus the latitude of choice available to firms. More recently, Dawley and colleagues (2002) applied the Hrebiniak and Joyce framework: They used munificence to measure the degree of determinism, and firm slack to measure strategic choice. They found that, for firms emerging from bankruptcy, strategic choice was more important than environmental conditions in predicting firm survival.

For many companies, their firm-level discretion will closely mirror the broader industry conditions: Settings with low industry uncertainty (e.g., high munificence, low dynamism, and low complexity) will also have high levels of firm-level discretion, and highly uncertain industry environments will also tend to offer less firm-level discretion. These diagonal elements are shown in Figure 4b, and are the sectors of Maximum Choice and Restricted Choice. The off-diagonal elements are shown in Figure 4c. From a research perspective, these sectors are more interesting: The include Differentiated Choice, where firms have managed to cultivate discretion despite a highly uncertain environment, and Incremental Choice, where firms have little discretion despite a benign industry structure. In Figure 4b settings, task environment and discretion variables are likely to have very similar effects. However, in Figure 4c conditions, the effects of discretion and task environment might vary dramatically. Thus, one avenue for future research would be to include both industry- and firm-level indicators of constraint, and to test hypotheses that integrate task environment and discretion perspectives.

CONCLUSION

Strategic management research has been characterized as placing less emphasis on construct measurement than is warranted (Boyd, Gove & Hitt, 2005; Hitt, Boyd & Li, 2004;

Venkatraman & Grant, 1986). This criticism is applicable to research on both organizational task environments and discretion. Prior studies on both topics have used a wide array of variables, and inconsistent approached to measuring these variables. Greater consistency in measurement will facilitate comparisons of findings and generalizability of future studies. In addition to greater consistency in measurement, studies should consider using multiple indicators of respective phenomena. Finally, we would encourage authors to develop hypotheses that explicitly integrate both discretion and task environment frameworks.

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Figure 1

Possible Relationships between Organizational Task Environment and Discretion

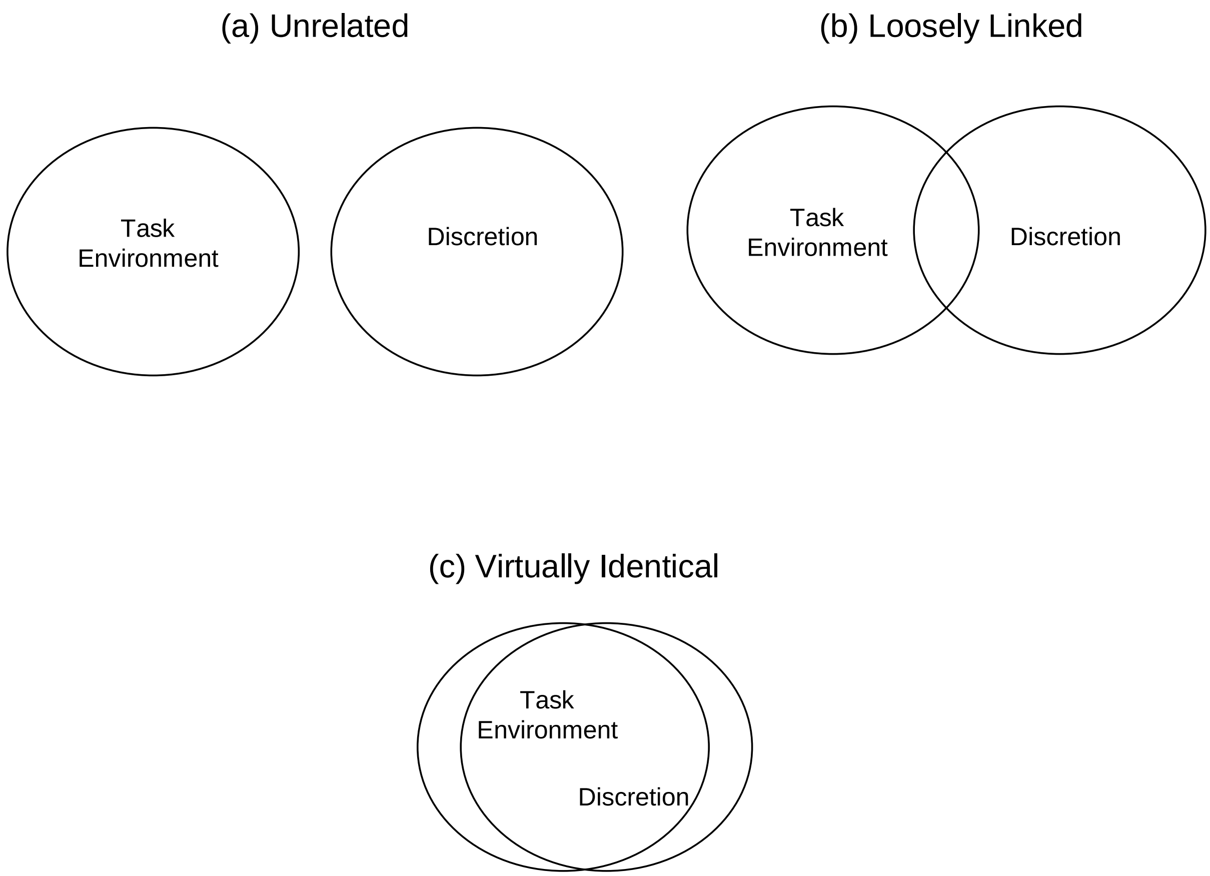
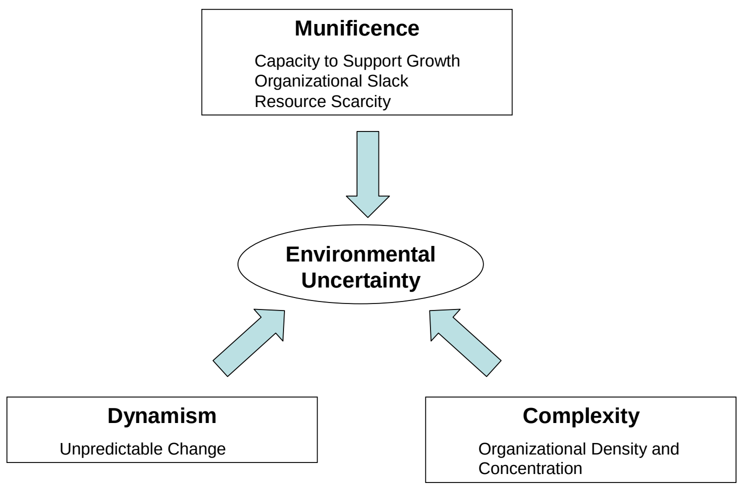


Figure 2

Conceptualization of Task Environment and Discretion

(a) Dess and Beard's (1984) Three Elements of Task Environment



(b) Hambrick and Finkelstein's (1987) Three Elements of Discretion

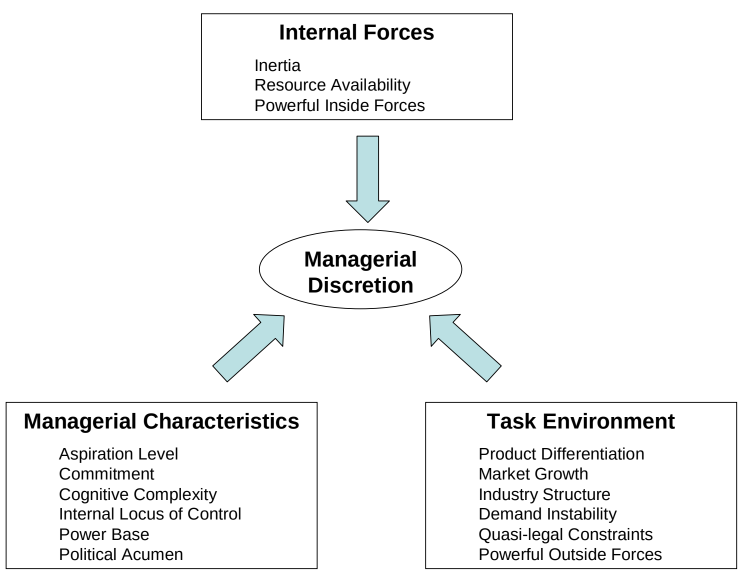
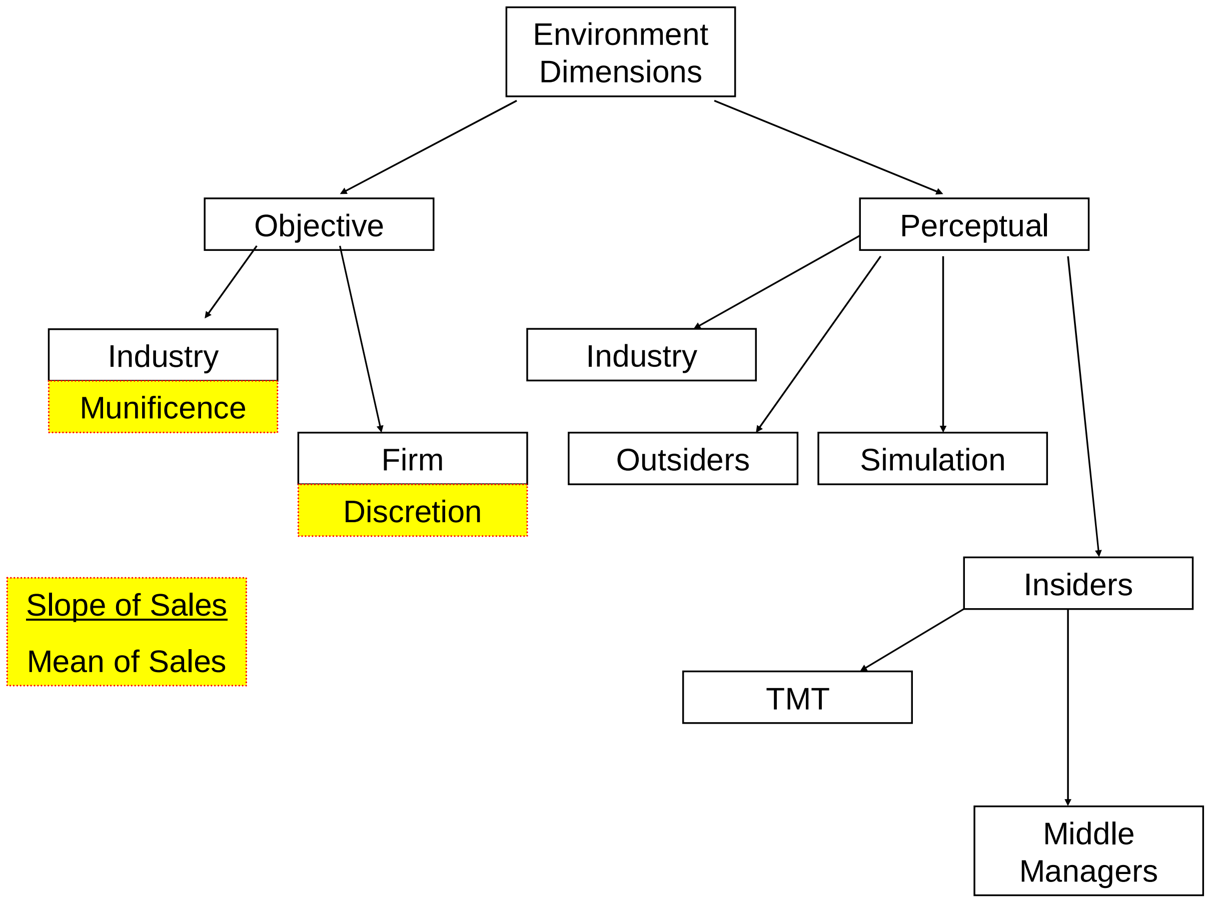


Figure 3

Levels of Environmental Measurement

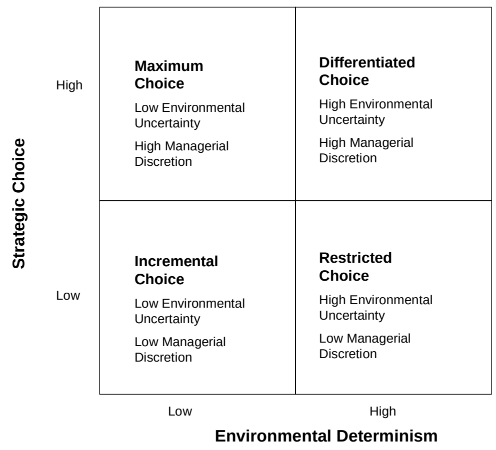


source: Boyd, Dess & Rasheed (1993).

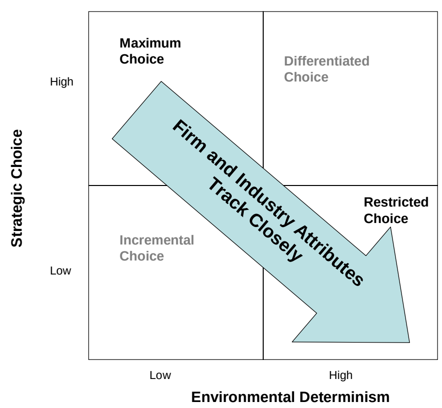
Figure 4

Using Hrebiniak & Joyce (1985) to Integrate Task Environment and Discretion

(a) Original Model



(b) Diagonal Elements



(c) Off-Diagonal Elements

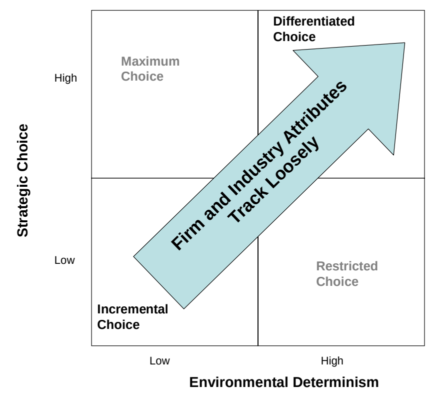


Table 1

Studies Using All Three Dess & Beard Dimensions

(a)
Studies using archival measures

Article	Munificence			Dynamism			Complexity
	Variables	**Time**	**Adjust**	**Variable**	**Time**	**Adjust**	**Variable**
Bamford,, Dean, & Douglas (2004)	bank deposits	5	log	bank deposits	5	log	number of bank branches divided by log of population
Bamford, Dean, & McDougall, (2000)	bank deposits	5	log	bank deposits	5	log	number of bank branches divided by log of population
Bergh, (1998)	sales	5	mean	sales	5	mean	H (MINL)
Berman, Wicks, Kotha, & Jones (1999)	sales	9	mean	sales	9	mean	C (4-firm)
Boyd (1990)	sales	5	mean	sales	5	mean	H (MINL)
Boyd (1995)	sales	5	mean	sales	5	mean	H (MINL)
Castrogiovanni (2002)	sales, employees, value added, price-cost margin	5	mean	sales	5	mean	specialization ratio, coverage ratio
Harris (2004)	Sales, price-cost margin, employees, value-added, # of establishments	10	mean	Sales, price-cost margin, employees, value-added, intermediate industry output	10	mean	Dispersion of sales, value-added, employees, # of establishments
Jarley, Fiorito & Delaney (1997)	Not fully described	5	log	Not fully described	5	log	Industry size, regional production dispersion, concentration
Karimi, Somers, & Gupta (2004)	sales, price-cost margin, employment, value-added	NA	NA	sales, price-cost margin, employment, value-added	NA	NA	Concentration of sales, value-added, employment, # of establishments
Keats & Hitt (1988)	sales, net income	5	log	sales, net income	5	log	Grossack
Lawless & Finch (1989)	summary MDC scores taken directly from D&B84						

Lepak & Snell (2002)	sales	5	mean	sales	5	mean	H (MINL)
Lepak, Takeuchi, & Snell (2003)	sales	5	mean	sales	5	mean	H (MINL)
McArthur & Nystrom (1991)	sales, price-cost, employment, value-added, # of establishments	10	mean	sales, price-cost, employment, value-added	10	mean	concentration of sales, value-added, employment, inputs, # of establishments
Pagell & Krause (2004)	sales	5	log	sales	5	log	C (MINL)
Palmer & Wiseman (1999)	sales, employment	5	log	sales, net income	5	log	C (4-firm), count of competitors
Sharfman & Dean (1991)	sales, employees, C-8 ratio	10	mean	sales, employees	10	mean	Geographic concentration, product breadth, percentage of scientists and engineers in the workforce
Snell, Lepak, Dean, & Youndt (2000)	sales	N.A.	log	sales	NA	log	C (MINL)

(b)
Studies using survey measures

Authors	Munificence			Dynamism			Complexity		
	Indicators	Items Reported	Reliability	Indicators	Items Reported	Reliability	Indicators	Items Reported	Reliability
Baum, Locke & Smith (2001)	4	None	0.73	4	None	0.84	2	None	0.68
Bensaou & Venkatraman (1995)	1	Full	Single item	3	Partial	0.79	1	Full	Single item
Camison (2004)	25 survey items for all three dimensions, aggregated into a single variable. Individual items are not reported, but a Cronbach's alpha of 0.93 is reported								
Chen & Lin (2004)	2	Partial	0.60	4	Partial	0.66	4	Partial	0.97
Hart, & Banbury (1994)	2	Full	0.63	8	Full	0.63	2	Full	0.67
Hart & Quinn (1993)	1	Full	Single item	1	Full	Single item	1	Full	Single item
Luo (1999)	16	Full	0.70+	16	Full	0.70+	16	Full	0.70+
Luo & Peng (1999)	10	Partial	0.70+	10	Partial	0.70+	10	Partial	0.70+
Panayotopoulou, Bourantas & Papalexandris (2003)	3	Partial	0.60	11	Partial	0.79	5	Partial	0.81

Table 2

Studies Using a Subset of Dess & Beard Dimensions

Article	Munificence			Dynamism			Complexity
	Variables	Time	Adjust	Variable	Time	Adjust	Variable
Andersen (2001)				sales	10	mean	input-output concentration
Andersen (2004)				sales, income	10	std error	
Bantel (1998)	3 survey items			5 survey items			
Baucus & Near (1991)				sales	19	NA	# of firm SIC codes
Bergh (1993)	sales	5	mean	sales	5	mean	
Bergh & Lawless (1998)				sales	5	mean	
Bloom & Michel (2002)	sales	5	mean	sales	5	mean	
Boeker (1997)	sales	NA	NA				
Buchko, (1994)				production	NA	NA	
Carpenter & Fredrickson (2001)				sales	5	mean	
Chattopadhyay, Glick, Miller & Huber (1999)	sales, capital expenditures, assets	7	NA	sales, capital expenditures, assets	7	NA	
David, Hwang, Pei & Reneau (2002)				sales	NA	std devn	H
Dawley, Hoffman & Lamont (2002)	sales	5	growth rate				
Dean & Sharfman (1993)	NA	10	NA				
Dean & Snell (1996)	sales	5	log				H (MINL)
Dean & Sharfman (1996)				sales, employees	10	mean	
Delacroix & Swaminathan (1991)	sales	NA	NA	sales	5	1 minus r-square	
Floyd & Wooldridge (1992)	sales	5	mean	sales	5	mean	

Floyd & Wooldridge (1997).	sales	5	mean	sales	5	mean	
Goll & Rasheed (1997)	sales	10	mean	sales	10	mean	
Goll & Rasheed (2004)	sales	10	mean	sales	10	mean	
Goll & Rasheed (2005)	sales	10	NA				
Kotha, & Nair (1995)	change in Japan GNP						C (4-firm)
Li & Simerly (1998)				sales	5	mean	
Li & Ye (1999)				sales	5	mean	
Lumpkin & Dess (2001)	3 survey items			3 survey items			
Luo (2005)				2 survey items			
Mishina, Pollock & Porac (2004)	sales	5	mean	sales	5	mean	
Rajagopalan & Datta (1996)	sales	5	NA	sales	5	coeff. of variation	
Rasheed (2005)	sales	5	NA	sales	5	NA	
Sharfman & Dean (1997)	sales, employees	10	mean				
Sheppard (1995)				sales	NA	σ	
Simerly (1997)	sales	5	mean	sales	5	mean	
Simerly & Li (2000)				sales	5	mean	
Spanos, Zaralis & Lioukas (2004)	sales	2	NA				
Stetz & Beehr (2000)	sales, cost of operations, ROA, number of establishments	10	mean	sales, cost of operations, ROA, number of establishments	10	mean	
Stoeberl, Parker & Joo (1998)	sales	5	NA	sales	5	(1-r-square)	
Tushman & Anderson (1986)	annual sales growth	5	mean growth	ratio of forecasted to actual industry	5		

				growth			
Wally & Baum (1994)	ordinal ranking of industries based on environmental uncertainty						
Weinzimmer, Nystrom & Freeman, (1998)	sales	NA	mean	sales	NA	mean	
Wholey & Brittain (1989)				sales	3	mean	
Wiklund & Shepherd (2003)	4 survey items						
Zhang & Rajagopalan (2004)				sales, employment	3	mean	

Table 3

Studies Using Hambrick and Finkelstein Discretion

	Level of Analysis		
Article	**Industry**	**Firm**	**Individual**
Abrahamson & Hambrick (1997)	Expert assessment data from Hambrick & Abrahamson (1995)		
Aragon-Correa, Matias-Reche & Senise-Barrio (2004)			Political power based on membership in a dominant coalition
Boyd & Salamin (2001)		Strategic orientation	Hierarchical position
Carpenter & Golden (1997)			Perceived discretion
Datta, Guthrie & Wright (2005)	Capital intensity, growth, R&D intensity, and industry volatility		
Datta & Rajagopalan (1998)	Advertising intensity, growth, and capital intensity		
Datta, Rajagopalan & Zhang (2003)	Capital intensity, growth, advertising intensity		
Finkelstein & Boyd (1998)		Market growth, R&D intensity, advertising intensity, demand instability, capital intensity, concentration, and regulation	
Finkelstein & Hambrick (1990)	Industries ranked high, medium, and low discretion based on a review of product differentiation, growth, demand instability, capital intensity, and degree of regulation		
Haleblian & Finkelstein (1993)	Industries ranked high and low discretion based on R&D intensity, growth, advertising intensity, instability, and regulation		

Hambrick & Abrahamson (1995)	Archival measures: R&D intensity, advertising intensity, capital intensity, growth, demand instability, and regulation. Expert (academic and analyst) ratings		
Hambrick, Geletkanycz & Fredrickson (1993)	Industries ranked high and low discretion, based on Finkelstein & Hambrick (1990)		
Henderson & Fredrickson (1996)			
Magnan & St. Onge (1997)	Banking laws that prohibit takeovers or branching	Company strategy, including product mix, internationalization, and geographic scope	
Rajagopalan (1997)		Strategic orientation	
Rajagopalan & Finkelstein (1992)		Strategic orientation	

Table 4

Comparison of Munificence Scores

	Variable	Basis	Window	1	2	3	4	5	6	7	8	9	10	11	12	13
1	VoS	Mean	10	1.00												
2	TE	Mean	10	0.74	1.00											
3	VoS	Log	10	1.00	0.74	1.00										
4	TE	Log	10	0.89	0.94	0.89	1.00									
5	VoS	Mean	7	0.91	0.68	0.88	0.81	1.00								
6	TE	Mean	7	0.89	0.69	0.88	0.85	0.93	1.00							
7	VoS	Mean	5	0.73	0.56	0.69	0.63	0.90	0.78	1.00						
8	TE	Mean	5	0.73	0.58	0.71	0.69	0.86	0.91	0.85	1.00					
9	VoS	Log	5	0.73	0.55	0.71	0.63	0.87	0.80	0.95	0.88	1.00				
10	TE	Log	5	0.73	0.57	0.71	0.67	0.84	0.89	0.85	0.98	0.92	1.00			
11	VoS	None	5	*0.16*	*0.12*	*0.16*	*0.14*	*0.07*	*0.12*	*0.14*	*0.07*	*0.08*	*0.05*	1.00		
12	VoS	Mean	3	0.57	0.41	0.54	0.48	0.69	0.61	0.84	0.66	0.82	0.70	0.35	1.00	
13	TE	Mean	3	0.61	0.48	0.60	0.57	0.69	0.77	0.66	0.87	0.75	0.87	*0.07*	0.66	1.00
	Mean:			0.05	-0.02	1.07	0.99	0.04	-0.02	0.05	-0.01	1.06	1.00	5475	0.03	0.00
	Std. Devn:			0.05	0.06	0.06	0.05	0.07	0.06	0.08	0.07	0.12	0.09	29492	0.10	0.08

VoS = Value of Shipments TE = Total Employment All data from US Industrial Outlook

All time windows end with 1986 data – e.g., 10 year window includes years 1977-86, 3 year window includes 1984-86

Correlations *in italics* nonsignificant. All other correlations significant at .001

Table 5

Comparison of Dynamism Scores

	Variable	Basis	Window	1	2	3	4	5	6	7	8	9	10	11	12	13
1	VoS	Mean	10	1.00												
2	TE	Mean	10	0.32	1.00											
3	VoS	Log	10	0.94	0.29	1.00										
4	TE	Log	10	0.39	0.99	0.38	1.00									
5	VoS	Mean	7	0.96	0.29	0.91	0.36	1.00								
6	TE	Mean	7	0.90	0.31	0.83	0.40	0.88	1.00							
7	VoS	Mean	5	0.91	0.26	0.89	0.34	0.95	0.81	1.00						
8	TE	Mean	5	0.82	0.29	0.87	0.41	0.78	0.89	0.76	1.00					
9	VoS	Log	5	0.93	0.27	0.88	0.35	0.96	0.86	0.98	0.90	1.00				
10	TE	Log	5	0.93	0.32	0.85	0.41	0.91	0.95	0.86	0.99	0.92	1.00			
11	VoS	None	5	*0.13*	*-0.04*	0.20*	*-0.06*	*0.15*	*-0.11*	0.25*	*-0.09*	0.18*	*-0.08*	1.00		
12	VoS	Mean	3	0.78	0.23	0.77	0.25	0.81	0.59	0.83	0.58	0.84	0.68	0.38	1.00	
13	TE	Mean	3	0.88	0.29	0.74	0.34	0.84	0.87	0.77	0.86	0.85	0.89	*-0.03*	0.72	1.00
	Mean:			0.01	0.01	1.01	1.01	0.01	0.01	0.02	0.02	1.02	1.01	2960	0.02	0.01
	Std. Devn:			0.01	0.03	0.01	0.02	0.02	0.01	0.02	0.02	0.03	0.02	16982	0.04	0.03

VoS = Value of Shipments   TE = Total Employment   All data from US Industrial Outlook

All time windows end with 1986 data – e.g., 10 year window includes years 1977-86, 3 year window includes 1984-86

Correlations *in italics* nonsignificant. *significant at .05. All other correlations significant at .001

Table 6

Correlations Between Munificence, Dynamism, and Complexity

		Correlations		
Article	**N**	Munificence - Dynamism	Munificence- Complexity	Dynamism - Complexity
Bamford,, Dean, & Douglas (2004)	490	0.04	-0.33	-0.01
Bamford, Dean, & McDougall, (2000)	140	-0.14	0.15	-0.07
Bergh, (1998)	168	0.21	0.13	-0.03
Berman, Wicks, Kotha, & Jones (1999)	486	0.1	0.39	-0.46
Boyd (1990)	147	0.36	0.58	0.29
Boyd (1995)	192	0.49	0.02	-0.13
Castrogiovanni (2002)	45	-0.19	0.38	0.24
Harris (2004)	247	-0.46	-0.17	0.48
Jarley, Fiorito & Delaney (1997)	50	0.28	0.62	0.2
Karimi, Somers, & Gupta (2004)	77	0.35	0.29	0.39
Keats & Hitt (1988)	262	0.06	-0.34	-0.14
Lepak & Snell (2002)	206	-0.2	0.03	0.13
Lepak, Takeuchi, & Snell (2003)	148	-0.22	-0.01	0.16
McArthur & Nystrom (1991)	109	0.26	-0.03	0.18
Pagell & Krause (2004)	168	0.88	0.04	0.05
Palmer & Wiseman (1999)	235	0.15	-0.06	-0.13
Snell, Lepak, Dean, & Youndt (2000)	74	0.86	-0.21	-0.15
Weighted Mean:		**0.11**	**0.02**	**-0.02**
Min:		**-0.46**	**-0.34**	**-0.46**
Max:		**0.88**	**0.62**	**0.48**

Table 7

Recommended Measurement Practices for Future Studies

Issue	Description
Time window for growth and volatility scores	Five year windows offer greatest generalizability to other studies. However, measures are generally comparable if window size is adjusted up or downwards by two years.
Standardization for growth and volatility scores	Mean and log standardization yield almost identical results, but mean is most widely used practice. Unstandardized scores correlate poorly with either mean or log standardization, and should be limited to single-industry samples.
Choice of variables for growth and volatility scores	Sales offers the greatest generalizability to other studies.
Omitted variables	Correlations between dimensions have varied widely from study to study, creating a realistic potential for omitted variable problems. Task environment studies should include measures for munificence, dynamism, and complexity even if hypotheses relate to just one dimension. Discretion studies should use multiple measures, ideally at different levels – e.g., firm versus individual – when appropriate.
Level of analysis	Scores based on industry- versus firm-level data will covary but still measure different aspects of constraint. Authors should provide explicit rationale for use of a given level.

Table 8

Comparison of Industry Level and Firm Level Scores

(a) Munificence Variables

	Variable	**Basis**	**1**	**2**	**3**	**4**	**5**
1	VoS	Mean	1.00				
2	TE	Mean	0.84	1.00			
3	VoS	Log	0.95	0.86	1.00		
4	TE	Log	0.84	0.98	0.91	1.00	
5	Firm Sales	Mean	0.45	0.21	0.46	0.18	1.00
	Mean:		0.06	0.00	1.06	1.00	0.08
	Std Devn:		0.07	0.05	0.08	0.06	0.12

(b) Dynamism Variables

	Variable	**Basis**	**1**	**2**	**3**	**4**	**5**
1	VoS	Mean	1.00				
2	TE	Mean	0.36	1.00			
3	VoS	Log	0.97	0.54	1.00		
4	TE	Log	0.43	0.99	0.57	1.00	
5	Firm Sales	Mean	0.16	0.19	0.17	0.29	1.00
	Mean:		0.02	0.01	1.02	1.01	0.03
	Std Devn:		0.02	0.01	0.02	0.01	0.03

all correlations sig at a=.001

All variables based on 1982 – 1986 data. Industry data from US Industrial Outlook. Firm data based on a subset of the sample from Finkelstein & Boyd (1998).

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[i] As of August, 2005.

[ii] It is relevant to note that the concept of discretion did not originate with Hambrick and Finkelstein (1987). Pfeffer and Salancik (1978: 244-247), for example, discussed determinism, constraint, and superior-subordinate relations as determinants of individual discretion. Similarly, Mintzberg (1983) discussed discretion in the context of organizational power.

[iii] Although studies did not typically report tests of dimensionality, virtually all papers followed the convention of treating munificence, dynamism, and complexity as separate predictors. Exceptions to this practice included Camison (2004), who aggregated 24 survey items into a single environmental uncertainty measure. Similarly, Wally and Baum (1994) reduced the three task environment dimensions to a composite score of environmental uncertainty.

[iv] We included Datta and Rajagopalan (1998) in this list. Discretion is not developed as a prominent theory in the paper, but the measures and approach are consistent with Hambrick and Finkelstein (1987), and another discretion paper (Hambrick & Abrahamson, 1995) is used to justify measures.

[v] Harris concludes that the Dess and Beard framework does *not* meet the requirements of construct validity, based on (a) covariance among dimensions, (b) lack of predictive validity, and (c) methods bias. As we noted previously, Dess and Beard reported that their model used orthogonal versus oblique factors because they viewed their analysis to be exploratory in nature. Subsequent applications (e.g, Keats & Hitt, 1988; Boyd, 1990) have allowed munificence, dynamism, and complexity to covary. Regarding predictive validity, Harris cites Sharfman and Dean (1991), but none of the 70 other empirical applications of Dess and Beard that are listed in Tables 1 and 2. Finally, the assessment of methods bias is made based on a comparison of two models (Models 4 and 5, on p. 868). While Harris (2004: 869) noted that "the final model (5) suggests good fit with the data", the $\chi 2$ difference between models is not significant, and the NFI, CFI, and GFI for the two models are identical. Thus, while acknowledging the importance of covariation across dimensions, the conclusions of Harris (2004) appear to overstep available data.