© *Academy of Management Journal*
1997, Vol. 40, No. 1, 223–240.

ORGANIZATIONAL CONFIGURATIONS AND PERFORMANCE: A META-ANALYSIS

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The link between organizational configurations and performance has become a central and somewhat controversial focus of research in the strategic management literature. We statistically aggregated results from 40 original tests of the configurations-performance relationship. In contrast to previous qualitative reviews, this meta-analysis demonstrated that an organization's performance is partially explained by its configuration. Tests of four potential moderators showed that organizations' configurations contributed more to performance explanation to the extent that studies used (1) broad definitions of configurations, (2) single-industry samples, and (3) longitudinal designs. Results highlight the need for programmatic research.

This article originated as a class project in a doctoral seminar led by the third author. We would like to thank John Hunter for his advice and assistance in using the meta-analysis procedures and for providing the software for conducting the meta-analyses and deriving estimates of omega ($\hat{\omega}$) and the standard error of omega. We are also grateful for the constructive comments provided by David Deephouse, William Glick, Timothy Palmer, John Prescott, and Charles Snow.

Investigators from multiple disciplines study individual (e.g., Lieberson & O'Connor, 1972), group (e.g., Bantel & Jackson, 1989), organizational (e.g., Rumelt, 1974), industry (e.g., Porter, 1980), and environmental (e.g., Hannan & Freeman, 1977) factors that influence performance. The reported study is on the use of organizational configurations to better understand and predict organizational performance. Organizational configurations are defined as groups of firms sharing a common profile of organizational characteristics (Meyer, Tsui, & Hinings, 1993; Miller & Mintzberg, 1984). The Miles and Snow (1978) typology is a good illustration of configuration research. Miles and Snow described four configurations—defender, prospector, analyzer, and reactor—by examining stable relationships among structural and strategic variables. For example, defender organizations tend to have narrow market domains, centralized organizational structures, simple coordination mechanisms, and a single technology. In contrast, prospectors have broad domains, decentralized structures, complex coordination mechanisms, and multiple technologies.

In essence, the study of organizational configurations embraces a variety of research streams (e.g., Dess, Newport, & Rasheed, 1993; Galbraith & Schendel, 1983; Hatten & Schendel, 1977; Ketchen, Thomas, & Snow, 1993; Meyer et al., 1993; Miller & Friesen, 1978). Common to these research streams is the assumption that organizational phenomena can best be understood by identifying distinct, internally consistent sets of firms and their relationships to their environments and performance outcomes over time rather than by seeking to uncover one universal set of relationships that hold across all organizations. Nonetheless, previous qualitative reviews of the literature have suggested that empirical evidence of relationships between configuration membership and performance appeared to be equivocal (cf. Barney & Hoskisson, 1990; Thomas & Venkatraman, 1988). However, meta-analytic results from many arenas suggest variation in effect size—that is, in the strength of the relationship found—across studies may be due to sampling error (Hunter & Schmidt, 1990). Sampling error and other artifactual influences may have hindered prior reviewers' attempts to synthesize results across configurational studies. A logical extension of prior qualitative reviews is to meta-analyze results of empirical studies to discern the strength of the relationships between organizational configurations and performance these studies have shown.

The purpose of this study was to investigate whether (1) organizational configurations are related to performance and (2) study characteristics moderate this relationship. We meta-analyzed 40 empirical investigations of configurations-performance relationships. After estimating the average effect size corrected for random sampling error, we examined four study characteristics for moderating effects.

HYPOTHESES

The belief that performance differences can be attributed to configurations is grounded in structural contingency theory (cf. Meyer et al., 1993). An early configuration idea is Weber's (1947) assertion that there are three types of authority in society—traditional, rational/legal, and charismatic—each of which has an appropriate administrative structure (Ketchen et al., 1993). Weber (1947) predicted the evolution and prosperity of these types to be contingent upon certain societal conditions. Subsequently, Burns and Stalker (1961) identified two organizational structures, mechanistic and organic, and suggested each prospered in particular types of environments: the mechanistic in a stable environment, the organic in a dynamic environment. Woodward (1958), Lawrence and Lorsch (1967), and Galbraith (1973) have offered a similar logic. Thus, viewing the success of organizational types (or configurations) as a function of their appropriateness to environmental conditions is central to structural contingency theory.

Subsequent strategy researchers began to identify organizational configurations that appeared to be equally effective in multiple environments (e.g., Miles & Snow, 1978; Miller & Friesen, 1978). Empirical research has suggested that these configurations are not universally effective. For example, Snow and Hrebiniak (1980) found that analyzers, defenders, and prospectors outperformed reactors in three of four industries. In the fourth industry they studied, which was highly regulated, reactors performed best. Most configurational research has since adopted the earlier perspective that some organizational types will fit a given environment better than others. Importantly, this view does *not* assert that only one approach to a given environment can be successful. Each environment can contain several well-aligned configurations and several poorly aligned configurations.

Consequently, many studies have empirically examined configurations-performance relationships. Prior qualitative reviews have concluded that findings constitute overall "weak evidence of performance variations across groups" (Thomas & Venkatraman, 1988: 548). Barney and Hoskisson (1990) suggested abandoning configurational inquiry in favor of focusing on performance implications of firm-specific characteristics. Unfortunately, these qualitative reviews used a "voting" perspective (Hunter, Schmidt, & Jackson, 1982), concluding the configurations-performance relationship was equivocal because studies offering null results approximated the number reporting positive results (McGee & Thomas, 1986; Thomas & Venkatraman, 1988). Hunter and Schmidt (1990) demonstrated that merely counting studies that support or do not support a relationship often leads to erroneous conclusions. The strength of a relationship can only be accurately estimated across the studies in a literature through meta-analytic aggregation of effect sizes (Hunter et al., 1982; Hunter & Schmidt, 1990). Thus, meta-analytic evidence is needed before configurational inquiry is abandoned.

In addition, two substantive issues have been debated. The first is the adequacy of variables selected to identify configurations (Ketchen et al., 1993; McKelvey, 1982), and the second is whether sets of defining variables should be applied within an industry, technology, market, or nation (Bacharach, 1989). Research conducted from different perspectives has yielded profound differences in empirical results (Dess et al., 1993), making qualitative assessment of configurations-performance links even more difficult. The hypotheses developed below focus on the presence of an overall configuration-performance relationship and potential moderators of that relationship.

In sum, the expectation that organizational configurations will vary in performance is based in contingency theory. According to contingency theory, firms whose configurations are aligned with their environment should perform better than firms in nonaligned configurations (Ketchen et al., 1993). Hence,

> *Hypothesis 1: As a group, extant studies reveal performance differences between organizational configurations.*

In addition, investigators must make important decisions regarding sample, variable selection, and method. Evidence suggests these decisions affect study outcomes (Russell et al., 1994). A first question regarding configuration identification centers on the choice between inductive and deductive theory. Those taking inductive approaches aim at exploratory classification of organizations (Ketchen & Shook, 1996), searching for performance differences between configurations. These approaches do not specify the number, characteristics, or performance strength of configurations. Deductive studies use a priori theory to specify the nature of configurations and expected performance outcomes (Ketchen et al., 1993).

The choice of an inductive or deductive approach is a hotly debated issue. Some have argued that clustering techniques driving many inductive studies capture chance relationships among variables to maximize configuration differences. Cluster analysis groups organizations by minimizing the multivariate distance between firms within group while maximizing the distance between groups (Hair, Anderson, Tatham, & Black, 1992), using *all* observed relationships among configuration-defining variables to assign firms to clusters. Barney and Hoskisson (1990) suggested organizational performance may differ across inductively derived configurations as a result of differences in configuration-defining variables that occur by chance or are in fact caused by performance. Little cumulative theory development surrounds any particular set of configurations—32 of the 40 configurations-performance estimates reported below define unique configurations. Absent strong a priori theory, configurations-performance relationships estimated using inductive procedures should be larger than estimates derived when configuration membership is determined deductively (Barney & Hoskisson, 1990). Thus,

> *Hypothesis 2: Studies using inductively derived configurations will report a stronger relationship (higher meta-analytic effect-size estimates) with performance than studies using deductively derived configurations.*

The scope of variables used to identify configurations has also been controversial. Building on classification theory in the biological sciences, McKelvey (1982) contrasted two general approaches to organization classification. Those taking the *essentialist* approach contend configuration members share a few central, narrowly defined attributes (Hatten & Hatten, 1985; Miller, 1988; Porter, 1979; Tremblay, 1985). The *empiricist* approach suggests many attributes must be examined to encompass organizations' fundamental complexity (Cool & Dierickx, 1993; Dess & Davis, 1984; Miller, 1981; Thomas & Venkatraman, 1988). If using broad sets of variables decreases error in classifying firms as configuration members (McKelvey, 1982), true underlying performance differences are more likely to be captured.

> *Hypothesis 3: Studies using broad sets of configurational variables will report a stronger configurations-performance relationship than studies using narrow sets.*

The second debate centers on whether configurations generalize across populations of organizations and time. Dess and colleagues (1993) and Thomas and Venkatraman (1988) argued that restricting samples to subpopulations (e.g., an industry) constrains configurations' predictive power by attenuating total performance variance. In fact, this is only true if sampling procedures obtain subpopulations with meaningfully truncated performance distributions (Bobko, 1995: 106–107). If performance is truly a function of configuration membership, observed relationships will be attenuated to the extent that representative samples of each subpopulation are not present. Sampling from multiple industries (or contexts) drastically increases the number of firms needed to obtain representative samples of all naturally occurring configurations within each context. Consequently,

> *Hypothesis 4: Studies using single-industry samples will report a stronger configurations-performance relationship than studies using multi-industry samples.*

Finally, Fiegenbaum and Thomas (1993) argued that configurations possess temporal stability occasionally punctuated by brief windows of membership or structural "revolution." If a cross-sectional design captures configurations during a revolution, noise in the form of measurement and sampling error will yield underestimates of configurations-performance relationships. Longitudinal designs should yield less biased estimates as sources of error average out over sequences of measures within firms (Miller, 1987; Tushman & Romanelli, 1985). Further, unless causal processes are instantaneous, only longitudinal designs will capture initial effects of configurational structure on subsequent performance (Dess et al., 1993; Hambrick, 1990; Ketchen et al., 1993; Zahra & Pearce, 1990). Hence, *Hypothesis 5: Studies using longitudinal designs will report stronger configurations-performance relationships than studies using cross-sectional designs.*

METHODS

Sample

All primary research articles in the *Academy of Management Journal,* annual *Academy of Management Proceedings, Administrative Science Quarterly, Management Science,* and *Strategic Management Journal* published between January 1972 and January 1995 were collected and coded for moderator variables, sample size, number of configurations, and effect size. We also searched two databases, the *Abstract of Business Information* (*ABI*) and *Dissertation Abstracts International,* and added studies by examining the reference sections of major qualitative reviews of the strategic groups literature (Barney & Hoskisson, 1990; McGee & Thomas, 1986; Thomas & Venkatraman, 1988). We sent authors located in this initial search letters requesting working papers, papers in press, and papers presented at academic conferences examining configurations-performance relationships.

Three strategic management doctoral students independently coded studies. Coders had 320 opportunities for disagreement in recording effect sizes, number of configurations, and sample size. Disagreement occurred 25 times, so the rate of initial coding agreement was 92 percent. Coding agreement was reached through discussion for these 25 cases. The first author also independently coded all studies, yielding three additional cases of disagreement that were discussed until mutual agreement was reached. The final sample consisted of 33 primary research studies containing 40 independent samples of organizations. Table 1 lists all articles in the meta-analysis and describes how they were coded.

Meta-Analytic Procedures

Meta-analyses reported below use Hunter and Schmidt's (1990) procedure to estimate the strength of the configurations-performance relationships found across 40 independent sample effect sizes. Hunter and Schmidt's procedures partition observed variance in effect sizes across studies into variance attributable to random sampling error and "residual" variance. Strong evidence of a moderator is present when meaningful differences in average effect size occur across levels of the moderator and residual variance in effect sizes decreases.

Some studies derived multiple "configurations" of organizations from the same sample and tested whether each set was related to performance outcomes. We averaged these effect sizes and counted them as one "study" (Hunter & Schmidt, 1990; Schmitt, Gooding, Noe, & Kirsch, 1984).

Eta ($\hat{\eta}$): The Estimate of Effect Size

In the studied research, ANOVA designs were typically used to test for performance differences between configurations. We transformed the re-

TABLE 1
Studies and Coded Information Used in Meta-Analysis

Studies	Basis of Configuration	Breadth of Variables	Sample Industry	Time Frame of Study
Porter, 1979	Deductive: Size	Narrow	Multi-industry	Cross-section
Snow & Hrebiniak, 1980	Deductive: Miles & Snow	Narrow	Multi-industry	Cross-section
Hambrick, 1983b	Deductive: Miles & Snow	Narrow	Multi-industry	Cross-section
Dess & Davis, 1984	Deductive: Porter	Broad	Paint & allied products	Cross-section
Hawes & Crittenden, 1984	Inductive	Broad	Retail grocery	Cross-section
Calori, 1985	Inductive	Broad	Multi-industry	Cross-section
Tremblay, 1985	Inductive	Narrow	Brewing	Longitudinal: 28 years
Cool & Schendel, 1987	Inductive	Broad	Pharmaceutical	Longitudinal: 20 years
Obaidat, 1987	Deductive: Porter	Broad	Multi-industry	Cross-section
Miller, 1988	Inductive	Narrow	Multi-industry	Cross-section
Namiki, 1988	Inductive	Broad	Computer hardware manufacturing	Cross-section
Robinson & Pearce, 1988	Inductive	Broad	Multi-industry	Longitudinal: 5 years
West, 1988	Deductive: Porter	Broad	Food service	Cross-section
Lawless, Bergh, & Wilsted, 1989	Inductive	Broad	Multi-industry	Cross-section
Lawless & Finch, 1989 (minimum choice environment)	Inductive	Broad	Multi-industry	Cross-section
Lawless & Finch, 1989 (differentiated choice environment)	Inductive	Broad	Multi-industry	Cross-section
Lawless & Finch, 1989 (maximum choice environment)	Inductive	Broad	Multi-industry	Cross-section
Lawless & Finch, 1989 (incremental choice environment)	Inductive	Broad	Multi-industry	Cross-section
Mascarenhas & Aaker, 1989	Deductive: Mobility barriers	Narrow	Oil drilling	Longitudinal: 10 years
Namiki, 1989	Deductive: Miles & Snow	Broad	Semiconductors	Cross-section
Smith, Guthrie, & Chen, 1989	Deductive: Miles & Snow	Broad	Electronics manufacturing	Cross-section
Barney & Hoskisson, 1990	Inductive	Broad	Food processing	Cross-section
Conant, Mokwa, & Varadarajan, 1990	Deductive: Miles & Snow	Broad	Health maintenance organizations	Cross-section
Fiegenbaum & Thomas, 1990	Inductive	Broad	Insurance	Longitudinal: 15 years
Lee & Yang, 1990	Deductive: Export strategy	Narrow	Multi-industry	Cross-section
Lewis & Thomas, 1990 (size)	Inductive	Narrow	Retail grocery	Cross-section
Lewis & Thomas, 1990 (strategy groups)	Inductive	Broad	Retail grocery	Cross-section
Lewis & Thomas, 1990 (factor groups)	Inductive	Broad	Retail grocery	Cross-section
Corsi, Grimm, Smith, & Smith, 1991	Inductive	Broad	Less-than-truckload motor carriers	Longitudinal: 10 years

TABLE 1 (continued)

Studies	Basis of Configuration	Breadth of Variables	Sample Industry	Time Frame of Study
Lawless & Tegarden, 1991 (conforming industries)	Inductive	Broad	Multi-industry	Cross-section
Lawless & Tegarden, 1991 (nonconforming industries)	Inductive	Broad	Multi-industry	Cross-section
Park, 1991	Inductive	Broad	Computer	Longitudinal: 14 years
Tallman, 1991	Inductive	Broad	Auto	Longitudinal: 12 years
Dowling & Ruefli, 1992	Inductive	Broad	Telecommunications equipment	Longitudinal: 12 years
Tehrani, 1992	Deductive	Broad	Multi-industry	Cross-section
Cool & Dierickx, 1993	Inductive	Broad	Pharmaceuticals corporations	Longitudinal: 20 years
Ketchen, Thomas, & Snow, 1993	Inductive	Broad	Health care facilities	Longitudinal: 5 years
Ketchen, Thomas, & Snow, 1993	Deductive: Zammuto, 1988	Broad	Health care facilities	Longitudinal: 5 years
Reger & Huff, 1993	Inductive	Broad	Banking	Cross-section
Gales & Kamath, 1994	Inductive	Narrow	Insurance	Cross-section

ported F-statistics into estimates of $\hat{\eta}^2$, or the percentage of total performance variance explained by variance between configuration group means (Maxwell, Camp, & Arvey, 1981; Reynolds, 1977). The "true" population parameter being estimated by $\hat{\eta}^2$, commonly called the proportionate reduction in error (PRE; cf. Reynolds, 1977), is:

$$PRE = \frac{\sigma_y^2 - \sigma_e^2}{\sigma_y^2}.$$

The formula for $\hat{\eta}^2$ is:

$$\hat{\eta}^2 = \frac{\frac{SS_{total}}{N} - \frac{SS_{within}}{N}}{\frac{SS_{total}}{N}}.$$

"Standardized" estimates called omega ($\hat{\omega}$), using estimates of sums of squares, mean squares, and a correction for degrees of freedom (Hayes, 1963: 382), were derived from information reported in each study (only Calori [1985] directly reported $\hat{\omega}^2$ results). The formula was:

$$\hat{\omega}^2 = \frac{SS_{between} - (J-1)MS_{within}}{SS_{total} + MS_{within}}.$$

F-statistics reported in each study tested the null hypothesis that performance outcomes differed across configurations. Dividing $MS_{between}$ by MS_{within} yielded these Fs; thus, with knowledge of the number of configurations (J) and sample size (N_j), we could use a simple arithmetic transformation to generate standardized estimates of $\hat{\omega}$ for each study. We used formulas from Hunter and Schmidt (1990) to meta-analytically estimate population values of $\hat{\omega}$ and observed variance in $\hat{\omega}$ ($\sigma^2_{\hat{\omega}}$). Variance due to sampling error (σ^2_e or SE_η) was derived from a program developed by Hunter (no formula exists for SE_η because of different noncentral F-distributions associated with each ω), and residual variance attributed to true differences across situations (σ^2_ω) was derived by subtracting σ^2_e from observed variance in $\hat{\omega}$ ($\sigma^2_{\hat{\omega}}$). Estimates for ω were derived from the 40 effect sizes and for effect-size subgroups corresponding with each moderator level.

RESULTS

Table 2 presents meta-analytic results. The average effect size ($\hat{\omega}$) across all studies was estimated to be .276, indicating the best estimate of variance explained in performance across all studies is $.276^2$, or approximately 8 percent. Note that $\hat{\omega}$ and not $\hat{\omega}^2$ is linearly related to the utility of strategic decisions to change configurations; the value of .276 suggests that organizational configurations account for approximately 28 percent of the utility available if one could perfectly predict differences in firm performance. Thus, there was support for Hypothesis 1.

We also derived simple correlations between the moderator variables examined in Hypotheses 2–5. Results suggest codings of studies as inductive/deductive, narrow/broad, single/multi-industry, and longitudinal/cross-sectional tended to be uncorrelated, though multi-industry studies were more likely to be cross-sectional ($r = -.45$ between single/multi-industry and longitudinal/cross-sectional codings, $p < .001$). Hence, tests of Hypotheses 4 and 5 are not independent of one another as significant differences in effect sizes may be a result of single versus multiple industry status, use of longitudinal versus cross-sectional designs, or both.

Hypothesis 2 predicts the average effect sizes found for studies using inductively derived configurations will be higher than those found for studies using deductively derived configurations. With $\hat{\omega}$ equal to .273 for inductive configurations and .278 for deductive configurations ($p > .05$), no difference is indicated. Hypothesis 3, predicting broadly defined organizational configurations will yield stronger effect sizes than narrowly defined configurations, was supported: $\hat{\omega}$ is .356 and .169 for broadly and narrowly defined configurations, respectively ($p < .05$). Studies focusing on a single industry had larger effect sizes ($\hat{\omega} = .327$ and .251, $p < .05$, for single and multiple industries, respectively), supporting Hypothesis 4. Finally, longitudinal studies demonstrated larger effect sizes ($\hat{\omega} = .349$) than cross-sectional studies ($\hat{\omega} = .260$, $p < .05$), supporting Hypothesis 5.

TABLE 2
Average of Total and Moderated Omega Coefficients[a]

Variables	Number of Omegas	Sample Range	Sample Total	$\bar{\omega}$	$\sigma^2_{\hat{\omega}}$	σ^2_e	σ^2_ω[b]	Percentage of Total Variance Due to Sampling Error
Total effect sizes	40	7–850	4,410	.276	.02868	.06643	—	232
Inductively derived	26	7–792	2,196	.273	.03317	.07593	—	229
Deductively derived	14	19–850	2,214	.278	.02422	.05701	—	235
Narrow definition of strategy	8	16–850	1,903	.169	.00840	.04134	—	492
Broad definition of strategy	32	7–303	25,077	.356	.02902	.08547	—	294
Cross-sectional designs	28	7–850	3,624	.260	.02719	.06095	—	224
Longitudinal designs	12	16–260	786	.349	.02899	.09170	—	316
Single-industry	23	16–260	1,405	.327	.03184	.09442	—	297
Multi-industry	17	7–850	3,005	.251	.02537	.05334	—	210

[a] Note that $\sigma^2_{\hat{\omega}}$ = variance in observed values of $\hat{\omega}$, σ^2_e = portion of variance in observed values of ω that is due to sampling error, and σ^2_ω = residual true variance ($\sigma^2_{\hat{\omega}} - \sigma^2_e = \sigma^2_\omega$) in ω after correction for sampling error.

[b] For many meta-analyses, the expected level of variance in effect sizes due to random sampling error is greater than the actual observed variance in effect sizes. When investigators subtract expected variance due to random sampling error from observed variance in effect sizes, a "negative" residual variance results, and they are left with a negative squared variable to report. An alternative convention has been adopted in meta-analysis reporting—the dash shown here.

DISCUSSION AND CONCLUSION

The results remove any equivocality surrounding configurations' ability to predict performance. On the basis of the estimate of overall performance effects attributable to configurations ($\hat{\omega}$ = .276), 27.6 percent of the utility available from prediction of performance differences across firms is predicted by configuration membership in this sample. The current meta-analytic findings more accurately depict the configurations-performance relationships reported in the literature than have previous qualitative reviews, which have been unable to account for sampling error across studies (Hunter et al., 1982).

The only hypothesized moderator not supported involved inductive versus deductive configuration origins. Research using inductively derived and theory-based, deductively derived configurations explained essentially equal amounts of performance variance. One unfortunate limitation of meta-analysis is its inability to detect moderator processes, although it can detect moderator effects (Russell & Gilliland, 1995). Similar effect sizes for inductively and deductively derived configurations suggest the variables used to define configurations are probably not deficient—investigators have selected well. They must now determine what latent processes operating among these variables causally influence performance outcomes. The deductive configurations investigated here recorded an $\hat{\omega}$ of .278 and, therefore, hold great promise (Schwab, 1980). Replicating findings for extant deductive configurations is a necessary first step toward understanding the boundaries and comparative strengths of competing configurational theories. A strong theory of organizational configurations will specify latent causal processes influencing firm performance and receive support when it predicts organizational performance more accurately than configurations derived inductively; $\hat{\omega}$ equal to .273 will be an important standard for future deductive efforts.

Curiously, no study in the sample examined whether inductively or deductively derived configurations incrementally increased the other's predictive power. Inductive and deductive approaches might predict nonoverlapping aspects of the performance domain; using them together might increase criterion-related validity. Again, $\hat{\omega}$ of .273 would be used as a benchmark.

The presence of moderator effects suggests directions for future efforts. Results indicated configurations based on broad sets of organizational dimensions have larger effect sizes. Post hoc analyses suggested studies using broad definitions yielded significantly more configurations (χ^2 = 9.89, p < .05). Broad sets of variables may permit finer calibration of configuration measures, yielding more construct validity than coarsely calibrated studies based on narrow sets of variables (Russell & Bobko, 1992). If the "true" number of configurations in a population is large, broad variable sets may provide more accurate measures of latent configuration structure and performance relationships.

Results also suggested studies focusing on a single industry had larger effect sizes. Configurations may be most useful as an intraindustry concept, in theorizing strategic groups, for instance. Future applications of multi-industry designs should carefully control for the role of industry.

Studies using longitudinal designs reported larger effect sizes. Although limits on data, time, and money often constrain investigators' ability to conduct longitudinal research (Summer et al., 1990), this finding suggests longitudinal designs should significantly enhance the criterion-related validity of configurational research. Conclusions drawn from tests of Hypotheses 4 and 5 should be considered tentative because studies' use of single or multiple industries was moderately confounded with studies' use of longitudinal or cross-sectional designs. Additional primary research examining multiple industries in longitudinal designs (current $N = 786$) should clarify these effects.

The need for programmatic configurational research is apparent. These results constitute an important contribution by demonstrating that observed variation in configurations-performance relations across studies is largely due to random sampling error: configurations are important predictors of firm performance, and conclusions drawn by qualitative reviews have been inaccurate. Unfortunately, the current findings were not able to address the merits of any one configurational theory. Before this literature can offer managerial implications, future researchers need to programmatically (1) replicate existing configurations-performance relationships in multiple contexts, (2) examine ways to integrate and extend configurational theories, and (3) develop critical tests of competing predictions made by alternative models.

Replication is important to determine the degree of generalizability and extant boundary conditions on performance prediction. Although use of meta-analysis controls for expected sampling error in estimating effect size, inferences are necessarily limited by the quality, breadth, and depth of studies contributing to the meta-analysis (Sackett, Tenopyr, Schmitt, & Kehoe, 1987). Systematic replication and extension (i.e., programmatic research) would establish not only the magnitude of the configurations-performance relationship (the overall effect size) but also the specific nature of the link (why some groups perform better than others and under what conditions) through sequences of critical tests of competing explanations. Unfortunately, we could find only five studies that examined a single profile of configurations with independent data sets: Conant, Mokwa, and Varadarajan (1990), Hambrick (1983), Namiki (1989), Smith, Guthrie, and Chen, 1989, and Snow and Hrebiniak (1980) all examined the Miles and Snow (1978) typology. Three studies examined Porter's (1980) model. No two of the remaining effect sizes were based on common configurations.

Second, the number of competing theories and models should be reduced through conceptual comparisons and integration. Future investigators should engage in theory reduction by identifying commonalities among configurations and testing competing predictions. Some progress was made in this direction when Segev (1989) demonstrated parallels between Porter's (1980) model of generic strategy and the Miles and Snow (1978) typology.

The current results suggest configurational research provides a technology for explaining performance, though performance explanation will be limited until there is greater integration of existing theory.

Longer-term, critical tests of configurational models' competing predictions will have a profound effect on theory development (McGrath, 1964). By investigating competing predictions using samples drawn from the same population or populations, investigators will begin to discover the relative strengths of alternative configurational theories. In two examples, Doty, Glick, and Huber (1993) demonstrated some advantages of Miles and Snow's (1978) typology over Mintzberg's (1979) typology, and Ketchen and colleagues (1993) found Zammuto's (1988) classification model to be more effective than inductive configuration methods. By continuing critical tests such as these, the number of competing models can be reduced, and research attention can be focused on the most promising configurational theories.

Finally, reporting practices hindered examination of the configurations-performance relationship and need to be revised. For example, studies rarely reported information regarding diversification status. Although researchers usually classify firms at the business level, performance data are often reported at the corporate level. Given this potential confound, we attempted to code whether sampled firms were single or multibusiness but quickly discovered that very few studies offered sufficient information. For example, Ketchen and colleagues (1993) examined hospitals, failing to distinguish those involved in peripheral businesses such as hospital supply, laboratories, and even off-site parking garages from those without such businesses. More broadly, the environmental conditions (for instance, Dess and Beard's [1984] dynamism, complexity, and munificence) confronting sampled organizations were rarely described.

Where will configurations research be after programmatic efforts yield another 40 estimates of configurations-performance effects? Hopefully, a relatively small number of competing configurations-performance models will have evolved, each characterized by a meaningful number of supportive empirical studies. Application of meta-analytic procedures to this expanded literature will, again, decrease the sampling error haze through which individual effect sizes are necessarily viewed. To the extent that researchers replicate prior research, consolidate configurational models, and perform critical tests of competing predictions, meta-analysis of this larger literature will permit strong theoretical inferences. Ideally, these results will guide managers as to what configuration to adopt under particular environmental conditions. Given the relative youth of the existing research, the reported meta-analytic results permit more limited conclusions: configurations are related to organizational performance, and a number of organizational, environmental, and study characteristics covary with that relationship.

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