Validity Evidence for the Cube One Framework:
A Cross-Lagged Panel Analysis of Objective Data

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The Cube One framework posits that organizational performance results from three sets of practices, namely practices that are enterprise-directed, customer-directed, and employee-directed. To date, most of the research and writing about the Cube One framework has examined survey data and in-depth case studies. The present research examines validity evidence using Fortune's Most Admired Company attribute ratings to measure practices and relative market capitalization data to assess organizational performance. On an across-industry basis, significant associations were found examining concurrent data (with Large and Medium effect sizes). Examining longitudinal panel data, differential cross-lagged correlations approached significance on an across-company basis.

Keywords: Enterprise-directed Practices, Customer-directed Practices, Employee-directed Practices

JEL Classifications: M19, M39, M59

I. Introduction

Over the years, the field of organizational behavior has benefitted from many theories regarding the determinants of organizational performance (e.g., Lawler, 1992; Likert, 1967; Wood and Bandura, 1989). For the most part, past theoretical explanations have focused on human behavior in organizations, with ideas drawn from the fields of psychology, sociology, economics, and anthropology, and from such relatively applied behavioral disciplines as human resource management. More recently, theoretical perspectives have broadened to encompass multiple functional areas in addition to human behavior in organizations, such as marketing, quality management, and customer satisfaction (e.g., the linkage research of Wiley and Campbell, 2006; the service profit chain research of Heskett, Sasser, and Wheeler, 2008); and operational and financial metrics have been incorporated in the balanced scorecard approach of Kaplan and Norton (1996).

In accord with the recent theorizing that incorporates multiple perspectives or functions, the Cube One framework posits that organizational performance results from three sets of practices. Customer-directed practices influence an organization's top-line results; employee-directed practices affect the satisfaction and loyalty of employees; and enterprise-directed practices affect the productive use of all inputs. The basic premise of the Cube One framework is that the management of

an organization selects portfolios of practices pertinent to three primary sets of contributors: customers, employees, and providers of capital.

Thus the Cube One framework holds that successful organizations must perforce satisfy the needs of the aforementioned three parties. Axiomatic to the Cube One framework are three postulates: first, that enacted practices drive organizational performance. Of course, corporate strategies, vision statements, and stated policies provide an overarching framework for the practices that actually may be enacted, but it is the practices per se that are crucial. The importance of practices was succinctly noted by Tsoukas and Chia (2002, p. 577, emphasis in original): "Organizations do not simply work; they *are made* to work."

Second, it is assumed that there is equifinality with regard to enacted practices, i.e., there are multiple ways for an organization to achieve the objectives of the three key parties. Consequently, there is no single, enduring list of best practices—no "silver bullets"—that organizations should employ, or search for. Rather, akin to the paradigm employed in psychological testing, there are almost an infinite number of questions that can be developed to tap a particular content domain.

Third, it is assumed that the three sets of practices inherently are not mutually contradictory or incompatible. Although it is possible to select practices that are self-defeating (e.g., when Continental Airlines decided to reward pilots for conserving fuel, planes were flown at slow speeds causing late arrivals and customer dissatisfaction), such "doom loops" are not a necessary phenomenon. Rather, as Collins and Porras (1994) noted in *Built to Last,* visionary companies are not trapped by an either/or dilemma; instead, they are able to satisfy multiple core values.

Examining the three constituent sets of practices of the Cube One framework in further depth, it should be noted that the efficient use of resources—what is labeled enterprise-directed practices—increases the marginal revenue product of capital and employees. Having greater revenue per unit of input provides the wherewithal for an organization to pay higher wages, to lower the price charged for goods and/or services, to improve the quality of product/service offerings, to invest in new technologies (i.e., managing for the future as well as the present), and to attract and retain capital so that further increases in productivity can be achieved. Practices promotive of efficiency are not just production related, such as just-in-time manufacturing with lean inventories; they also include practices associated with improving the motivation of employees such as GMFAC (goal setting, measurement, feedback, accountability and consequences) that primarily affect human behavior in organizations. Financial techniques can also promote the productive use of capital, e.g., reducing the cost of capital, or insuring against adverse events. Thus, efficiency enhances enterprise effectiveness.

Customer satisfaction/loyalty is another key contributor to organizational performance. Customers contribute to top-line revenues, and loyal customers have been found to be very profitable. Reichheld (2006) in *The Ultimate Question* found that a 5 percent increase in the rate of customer retention increased the net present value of the average customer by about 60 percent. The success of many companies has been attributed to their adoption of customer-centric practices. For example, at Disney's theme parks, employees ("cast members") are consistently friendly even after repeatedly being asked "What time is the 3 p.m. parade?" (Ford *et al,* 2001). More broadly, Kohli *et al*, (1993) have specified practices associated with a marketing orientation and a meta-analysis by Ellis (2006) a found a consistent relationship with overall organizational performance and product quality. Along these lines, Schneider *et* al, (2005) have shown that customer-directed practices ultimately lead to greater sales. Thus, according to the

Cube One framework, customer-directed practices are viewed as a necessary pre-condition for organizational success.

Employee satisfaction/loyalty is the third essential component of organizational performance according to the Cube One framework. Employees are essential to converting inputs to outputs, i.e., goods and services. Not only is turnover costly, employee satisfaction is closely linked to customer satisfaction and profits (Heskett *et al,* 1997). Along these lines, Rosenbluth and Peters (1992) have argued in *The Customer Comes Second*, that companies cannot reasonably expect their employees to treat customers better than they (employees) feel they are being treated.

Although enterprise- customer- and employee-directed practices might seem obvious pre-conditions for organizational success, most management-related books just focus on one factor or function be it human resource management, production, marketing, or finance. As noted above, in recent years there have been some works that have focused on more than one function, such as the service profit chain and the balanced scorecard, yet despite the seeming commonalities there are also important differences. The balanced scorecard recognizes four perspectives, but they are not conceptually isomorphic with the dimensions of the Cube One framework. The internal/business perspective is comprised of process quality and process cycle time domains (i.e., practices pertinent to quality and customer satisfaction and to efficiency); and the learning and growth perspective encompasses job-related motivation (a productivity-related phenomenon) and personal growth (an employee-directed phenomenon). Further, the balanced scorecard perspectives are defined in terms of outcome metrics (e.g., the customer perspective is linked to market share, customer retention, and other intermediate outcomes), not to specific practices.

The aforementioned service profit chain books (Heskett *et al,* 1997; Heskett *et al,* 2008) conceptually define the first phase of the service profit chain as the internal system, which they see as comprised of productivity, output/service quality, and employee satisfaction and loyalty—in essence constituting the three components of the Cube One framework in the first panel of their chain. Interestingly, the final 10 pages of both Heskett *et al,* (1997) and Heskett *et al,* (2008) consist solely of questionnaire items that could be used to assess practices in organizations, but no survey data are provided.

While there has been prior writing that has referenced the importance of efficiency, customer satisfaction, and employee satisfaction in achieving organizational performance, there has been a paucity of research that has systematically examined practices, and related practice data to objective organizational performance data. Further, the Cube One framework is the only theory to date that relates specific practices—across multiple functions or disciplines—to organizational performance. Hence, there is merit in investigating research on the Cube One framework.

II. The Cube One Taxonomy

Organizations can enact High, Middle, or Low levels of each set of practices—that is customer-, employee, and enterprise-directed practices—and organizations that are High in all three regards (High, High, and High) are seen as being in Cube One; organizations that are Low in connection with all three sets of practices are classified as being in Cube 27. A schematic representation of this three-dimensional framework appears in Figure 1.

Figure 1. Schematic Representation of the Cube One Framework
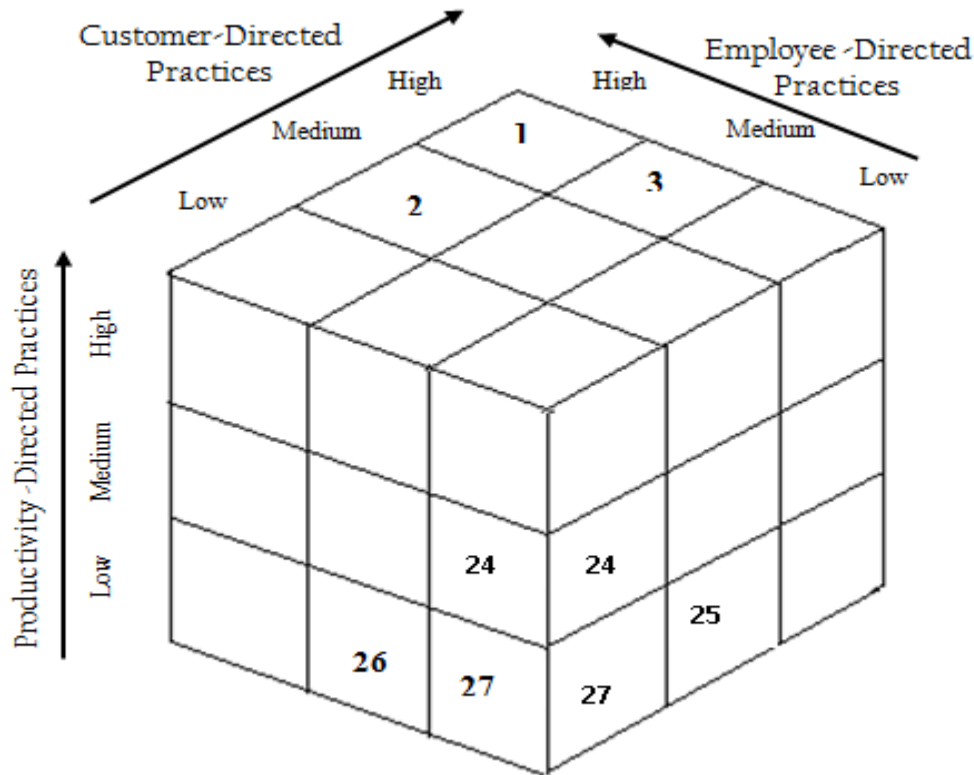
The fundamental question is whether there is a relationship between the practices an organization enacts and its performance. At the extremes, are the organizations in Cube One, more successful than those in Cube 27? And, more generally, is there a lawful, systematic relationship between enacted practices and organizational performance? Briefly stated, is the Cube One framework substantively valid?

To date, research and writing on the Cube One Framework has primarily been of two kinds: survey research and in-depth case studies. Results from these two research approaches are next reviewed briefly. Subsequently, the present research is described and discussed.

III. Prior Cube One Research

A. Survey Research

In one study approximately 700 respondents provided data pertinent to the practices enacted in the organizations where they worked. Among the 10 enterprise-directed practices were five that might be characterized as GMFAC: goal setting, performance measurement, specific feedback, accountability, and consequences. Other practices included systematic methods for employee selection and training. The 10 customer-directed practices included obtaining continuing improvements in product/service quality, and responding quickly to performance lapses. The 10 employee-directed practices included the sharing of information and mitigation of work/life conflicts. Organizational performance was assessed by ratings of organizational goal

attainment, comparisons with similar organizations, and attainment of potential. As hypothesized, the three sets of practices correlated with rated performance (the median r being .50), and differences in performance were aligned as predicted across the various cubes. Rated organizational performance of organizations in Cube One was 14.2 standard errors higher than in Cube 27, a very large difference—Kopelman and Prottas, 2010; Kopelman and Prottas, 2012. (For comparative purposes it is notable that the acclaimed six sigma threshold—six standard errors—corresponds to a probability of 3.4 occurrences in 1 million observations.)

In a second survey research study ($n = 800$), three sets of practices emerged from factor analyses of 128 practices developed after first reviewing the contents of 2,100 books and articles drawn from prominent applied psychology, marketing, and management journals over a decade-long period. As hypothesized the three sets of practices were significantly related to rated organizational performance ($R = .62$)—Letzler and Kopelman, 2008. It is notable that the survey data in both studies were obtained from a combination of for-profit and nonprofit/government organizations. Results were essentially the same across sectors; however in the first survey study, somewhat surprisingly, results were stronger in the nonprofit/government sector compared to for-profit organizations. Thus, there is evidentiary support for the claim that the Cube One framework is generalizable across sectors.

B. In-Depth Case Studies

Detailed, case analyses provide a richness of data and explanation that cannot be obtained via questionnaire surveys completed by employees across organizations. Accordingly, the second primary source of evidentiary support for the Cube One framework has entailed in-depth examination of managerial practices via case studies. One case study compared practices at two Internet search companies: Google and AltaVista. It was concluded that Google's remarkable success is not accidental; rather it has been engineered via practices that are strongly supportive of customer satisfaction, employee satisfaction, and productivity. Indeed, some of Google's practices, such as catered quality dining, and allowing employees to spend 20 percent of their work time on projects of their own choosing have received considerable attention.

A second case study examined the turnaround at Continental Airlines. The top executives who literally took the company from "worst in the airline industry to first" explained their achievements by invoking such concepts as "flying to win" (Bethune, 1998). The top management team at Continental essentially enacted the three sets of practices necessary for successful organizational performance per the Cube One framework, but they did it relying on an intuitive understanding of what needed to be done. It might be said that what they did worked out in practice, but they did not have a coherent theory to guide them. A more generalizable and parsimonious explanation (in contrast to "flying to win") is provided by the Cube One framework: there was extensive use of productivity-, employee, and customer-directed practices.

Most recently, practices at three highly successful customer-centric organizations—Zappos, Four Seasons, and Nordstrom—were studied. Internet-based evidence (e.g., ratings at Glass door.com) enabled comparisons of the focal companies with appropriate comparison companies, e.g., Four Seasons and Ritz-Carlton. Across- and within-company comparisons demonstrated consistently higher levels of customer satisfaction, and generally higher levels of employee satisfaction. Results of the three case analyses were consistent with the findings of Basuki and Henderson (2003) who found that companies that were *almost exclusively* dedicated to customer satisfaction were below average in financial performance. Hence, based on the case

studies of customer-centric companies, it was concluded that customer satisfaction is but one-third of the job.

C. Market Capitalization Research

One prior study has examined longitudinal objective data to test hypotheses derived from the Cube One framework. In this study, data on management practices were drawn from Fortune's Most Admired Company ratings and were used to predict organizational performance as assessed by relative (within-industry) market capitalization. Data were examine for the 2005/6 and 2007/8 periods, leaving only a two-year lag between measurements. Also, data were not examined across companies, just across industries.

IV. The Present Research

There are advantages to the two primary methodologies used to date in examining the substantive validity of the Cube One framework. The in-depth (ideographic) case study provides richness of data and explanation that can rarely be attained using survey methods; in contrast, the survey (or nomothetic) approach permits a breadth of inquiry and sophistication of analysis that cannot be achieved with in-depth case studies. However, as noted above, the one market capitalization study is the only research effort to use a relatively objective (or "hard") organizational performance criterion. But, the two-year lag may not have allowed enough time to transpire between ratings of practices and performance based on relative market capitalization. Indeed, the correlation between the measure of predicted organizational performance (POP) at times 1 and 2 was $r = .84$—a level of stability that would be considered evidence of good test-retest reliability.

The present research uses three measures from *Fortune's* Most Admired Companies database (measures that correspond to the three pivotal sets of practices in the Cube One framework) as the basis for assessing predicted organizational performance (POP). The criterion for organizational performance is the relative market capitalization of a company (MC).

The fundamental research questions that the present research addresses are two-fold. First, is there evidence using objective data that supports the conceptual premise of the Cube One framework. The second question relates to the issue of causal priority: Do successful companies subsequently tend to adopt customer-, enterprise, and employee-directed practices, or do companies that adopt these practices tend over time to become more successful?

Two hypotheses are tested. First, on a concurrent basis it is posited that there will be positive correlations between assessments of predicted organizational performance (POP) and relative market capitalization (MC) both in 2006 (Hypothesis 1a), and in 2010 (Hypothesis 1b). Second, based on the fundamental premise of the Cube One framework that management practices drive organizational performance, it is hypothesized that the $POP_1 MC_2$ correlation will exceed the $MC_1 POP_2$ correlation (Hypothesis 2).

A. Correlations and Causality

Researchers are continually cautioned not to conflate correlational associations with established causal relationships. However, as Pelz and Andrews (1964) noted nearly fifty years ago, longitudinal panel data can provide a strong evidentiary basis for causal inferences. In their

words "If in fact A determines B rather than the reverse, then the cross-lagged correlation A_1B_2 should exceed the cross-lagged correlation B_1A_2" (Pelz and Andrews, 1964, p. 848). Building on this work Lawler (1968) labeled the six correlations that comprise a complete cross-lagged panel analysis. Figure 2 provides a schematic using the variables and time frames in the present investigation. The key correlations are the differentials, correlations 5 and 6.

Figure 2. Correlations Comprising the Cross-Lagged Correlational Analysis in the Present Research
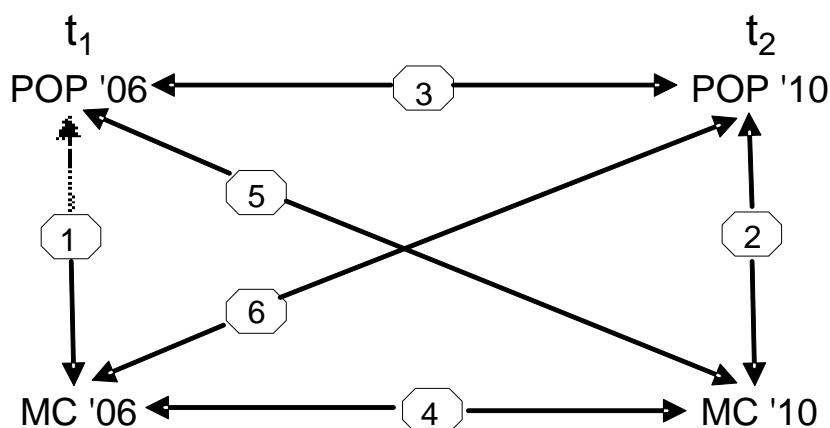
Kenny (1975) noted that if the cross-lagged differential is not zero, this may indicate a causal effect. However, as Kenny (1975) further noted, interpretation requires examination of the relative stability of the two sets of measures, as the greater the relative stability of a measure the smaller the cross-lagged differential will be. And, of course, the use of cross-lagged correlational analysis does not rule out the potential effects of unmeasured third variables that may spuriously inflate or suppress observed correlations.

B. Procedure

In the present research, data pertinent to the three sets of management practices identified by the Cube One framework were used to construct a measure of predicted organizational performance (POP); and relative market capitalization (MC) data served as an objective indicator of organizational performance. Comparison of the two key differential correlations parallels what Platt (1964) referred to as "strong inference." If the correlation between POP at time 1 with MC at time 2 exceeds the reverse correlation (MC at time 1 with POP at time 2) this would be supportive of the basic premise of the present inquiry, i.e. the substantive validity of the Cube One framework.

Fortune's list of Most Admired Companies provides experts' judgments with regard to eight attributes (nine beginning in 2008). Three of the attributes correspond conceptually to the three sets of practices seen as essential for successful organizational performance according to the Cube One framework. One attribute, *People Management: Ability to attract, develop, and keep talented people* (called Talent Management in 2005/6) reflects practices that are employee-directed. The attribute *Quality of products and services offered*, taps practices that are customer-directed. Finally, the attribute designated as *Use of Corporate Assets* is reflective of enterprise-directed practices.

The Most Admired Company ratings have been administered by the Hay Group since 1997, relying on the inputs of corporate directors, top executives and security analyst ratings of the Fortune 1000 companies operating in the U.S. For the 2008 ratings, 3,721 individuals who were "highly knowledgeable" about 621 companies provided attribute ratings late in 2007 which were then published early in 2008 (Fortune Datastore, 2008). Ratings were obtained on an 11-point scale with endpoints of zero (poor) and ten (excellent), and these ratings were then converted to attribute rankings (Money, 2011).

C. Measures

C.1. Predicted Organizational Performance (POP)

Predicted Organizational Performance (POP) scores were computed only for companies for which attribute data were provided for 2005 and 2006 and also for 2009 and 2010. Attribute rankings for 2005 and 2006 were averaged for each of the three components separately (e.g., *People Management*) and mean scores were converted to High, Middle, and Low categories which were scored 3, 2, and 1, respectively for each industry. Because the Cube One framework posits that all three sets of practices are necessary for successful performance, the scores for each attribute were combined multiplicatively. Thus, the Predicted Organizational Performance (POP) score calculated for each company in an industry could range from 1 to 27. An identical scoring protocol was used for attribute ratings obtained for 2009 and 2010. For brevity, the 2005/2006 and 2009/2010 data are labeled 2006 and 2010.

C.2. Market Capitalization (MC)

The organizational performance criterion was the market value of each company. Although this metric is affected by numerous factors including the debt and financial leverage of a company, it is an objective measure of the success of a company. Market Capitalization (MC) scores were computed only for companies with stock market data available on January 1 of the three years 2005-2007 and also for January 1 of the three years 2009-2011. Data were accessed at the NYU financial database (NYU financial data, 2011).

D. Sample and Analyses

As noted above, the present research only included companies for which there were Most Admired attribute ratings and market capitalization data for the four years 2005, 2006, 2009, and 2010. Although the prior market capitalization study (examining results for 2005/2006 and 2007/2008) included data from 285 companies in 52 industries, two years later the pool was reduced to 186 companies in 36 industries. This reduction occurred for a variety of reasons, including companies being acquired, fortune dropping entire industries (such as automobiles), and due to the existence of (six) industries with complete data being available for only two companies.

The unit of analysis for the present inquiry was (primarily) the industry, and Spearman rank-order correlations were computed to test the hypotheses advanced. Because correlation coefficients are nonlinearly constrained between -1 and +1, mean correlations were calculated using an *r* to *z* transformation.

V. Results

It was hypothesized that Predicted Organizational Performance (POP) scores derived from attribute ratings that corresponded conceptually to the Cube One framework would be positively related to relative levels Market Capitalization (MC) on concurrent bases. Data for 2006 and for 2010 are presented in Table1. As predicted, in 2006 the mean correlation for the entire sample was positive and statistically significant ($r = .49$, $p < .01$, one-tailed). Similarly, a positive, statistically significant (and quite sizable) positive correlation was found in 2010 ($r = .81$, $p < .001$, one-tailed).

Table 1: Mean Correlations between Predicted Organizational Performance and Market Capitalizations: Concurrent and Cross-Lagged Results

		Correlations between			
Number of Companies in Industry	Number of Industries	POP '06 MC '06	POP '10 MC '10	POP '06 MC '10	POP '10 MC '06
3 to 4	k =14	.43	.85***	.74**	.48*
5 to 6	k =14	.57*	.81***	.64**	.51*
7 to 8	k = 8	.48	.72*	.48	.51
All Industries	k =36	.49**	.81***	.65***	.50**

POP = predicted organizational performance; MC = market capitalization; k = number of industries in category. (***) Significant at .1%, (**) Significant at 1%, (*) Significant at 5%.

It was also deduced that if management practices (as captured by the POP measure) are causally related to organizational performance (as measured by relative MC level), then the correlation between POP_1MC_2 should exceed the MC_1POP_2 correlation—viz. Hypothesis 2. With regard to those industries comprised of a small number of companies (3 or 4 companies), the data were consistent with the prediction. The corresponding mean differential correlations were as follows: POP_1MC_2, $r = .74$ ($p < .01$) versus MC_1POP_2 $r = .48$ ($p < .05$). However, given the small number of cases ($n = 14$), the standard error of the difference between correlations was .43, so the difference in mean correlations was not statistically significant ($Z = .60$; $p = .23$). Likewise, non-significant differences were found among industries with more companies. Examining the differential correlations for the entire sample, results were in the predicted direction ($r = .65$, $p < .001$ versus $r = .50$, $p < .01$) but the difference was not statistically significant ($Z = .61$, $p = .23$). It might be noted the key differential in the present research (.65 versus .50 = .15) exceeded the differential found in the one past study which used a two-year measurement interval (.60 versus .50 = .10).

VI. Discussion and Conclusion

As hypothesized, there were positive associations between attribute ratings and market capitalizations when examined on contemporaneous bases in 2006 and 2010, the correlations being $r = .49$ and $r = .81$, respectively. The magnitudes of effect sizes can be characterized (per Cohen, 1992) as almost Large, and clearly Large. The magnitudes of the differential cross-lagged correlations paralleled those hypothesized as well. Among companies in industries with 3-4 companies, the POP_1MC_2 and MC_1POP_2 correlations were .74 and .48, respectively—a difference in explained variance of 55 percent versus 23 percent. Yet the difference was not

statistically significant given the small number of observations. For the whole sample the corresponding differential correlations were .65 versus .50, a difference which did not approach significance ($p = .23$). It is somewhat encouraging, that the differential in the present research with a 4-year measurement interval (.15) exceeded the differential found previously (.10) with a 2-year interval.

There are two factors, though, that importantly impede finding support for Hypothesis 2, i.e., that practices are more associated with subsequent organizational performance than vice versa. First, past research on *Fortune's* attribute ratings has found that they are subject to a "halo effect," being significantly affected by prior financial performance (Brown and Perry, 1994; Fryxell, and Wang, 1994). As Brown and Perry (1994, p. 1348) put it: "Unfortunately, the Fortune most admired ratings have been shown to be heavily influenced by previous financial performance." And according to Fryxell and Wang (1994, p. 11) financial performance is the "dominant factor" underlying most admired ratings. Although, the halo effect is likely mitigated by the passage of time, it serves to operate in the direction opposite to the one predicted by the Cube One framework. Thus, the present research design has a built in tendency toward bi-directionality, reflecting both the effects of practices/attributes on performance and financial performance on practices/attributes.

The second factor that impedes finding clear-cut evidence of causal priority is the small sample size. Indeed, as Kenny (1975, p. 894) observed: "it is very difficult to obtain statistically significant differences between cross-lagged correlations even when the sample size is moderate (75 to 300)." In the present research, the sample size of 36 is not even close to moderate.

Accordingly, to increase the degrees of freedom and statistical power, a post hoc analysis was conducted examining results on an across-company instead of an across-industry basis. Each company's industry rankings were converted to parallel those of an 8-company industry. Thus a company ranked 3rd out of four would have a ranking of six out of eight, and so forth. On an across-company basis the two differential cross-lagged correlations were POP_1MC_2, $r = .46$ and MC_1POP_2, $r = .34$, the difference more closely approached statistical significance, $Z = 1.15$, $p = .13$.

As is the case with virtually all empirical research there are a number of shortcomings in the present endeavor. First, as noted above the experts' attribute ratings of the Most Admired Companies may not have been entirely valid; there is evidence that they reflect a "halo effect" that incorporates past financial success. Second, although the attribute ratings conceptually correspond to the three dimensions of the Cube One framework, they refer to broad categories of intermediate performance criteria, rather than specific practices enacted. Practices are not measured directly in the present inquiry, but they are clearly a component of the attribute ratings.

A couple of strengths of the present undertaking might also be noted. The attribute ratings and market capitalization data were examined not just longitudinally but on a longitudinal panel basis. The use of market capitalization data introduces a high level of objectivity into the criterion variable, and permits comparisons on an across-industry basis. Further, the use of data obtained from different sources mitigates the problem of common method variance.

A potential strength of the Cube One framework is that there are clear cut practical applications. If the framework is validated, survey data might be used for diagnostic and intervention purposes. An organization might conclude based on such data that one or more sets of practices needs to be strengthened.

While it is clear that correlational data per se cannot establish or "prove" causality they can be suggestive of causal relationships (Cliff, 1983). The present research suggests that there are

reciprocal relationships between management practices and organizational performance, with the primary causal priority likely being from practices to performance. In the present research the quest has been to examine additional evidence pertinent to a little-known management perspective, the Cube One framework. Of course, one study can never be dispositive; but the present endeavor is contributory.

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