ORGANIZATIONAL FINANCIAL PERFORMANCE: IDENTIFYING AND TESTING MULTIPLE DIMENSIONS

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ABSTRACT

This research addresses the measurement of organizational financial performance. Its primary purpose is to provide researchers and managers a better understanding of the implications of selecting the dependent variables that should be used in empirical studies and management practice where organizational financial performance is the criterion of interest. This is the first study that has undertaken to empirically identify both the different distinct dimensions of organizational financial performance and the measures that represent those dimensions. Since no prior research has empirically established the domain of organizational financial performance, this research is by necessity exploratory in nature.

A two-part approach was adopted to address this problem. First, a model of overall organizational performance was inferred from empirical data that included the primary constructs of an organization's financial performance and empirical measures of these constructs. Next, the validity and reliability of the constructs and measures were tested.

The identification of different dimensions and measures of financial performance for both annual and three-year timeframes are unique contributions of this research.

INTRODUCTION

There is little dispute that one of the core purposes of both entrepreneurship and strategic management theory and research is the improvement of organizational performance (Eisenhardt & Zbaracki, 1992; Venkatraman & Ramanujam, 1986). However, there is no consensus regarding the best, or even sufficient, measures of organizational performance.

It has long been reported that different measures of organizational effectiveness and performance have been used in entrepreneurship and management studies with little or no thoughtful discussion of why the measures used in the studies were chosen (Cameron, 1986). Little attention has been paid to the limitations that these measures may impose on the interpretation or generalizability of the results of the research. The most frequently used measures of organizational performance are financial. However, no study has successfully proposed and empirically tested a

generalizable multi-dimensional model of organizational financial performance. This is a particularly challenging issue since changing environmental conditions may dictate that different performance dimension priorities exist at different times. For instance, during economic recessions, liquidity may be more crucial than profitability, while during economic booms, profitability and growth may take precedence.

This research examines the multi-dimensional structure of organizational financial performance and seeks to empirically identify distinct financial performance constructs and appropriate measures of those constructs.

THE RATIONALE FOR THIS RESEARCH

The topic of this research is particularly important for several reasons. First, a multi-dimensional model of organizational financial performance has not previously been explicitly studied. However, in 1987, Venkatraman and Ramanujam empirically demonstrated that growth and profitability were distinctly different measures of performance, but did not attempt to propose a specific model for financial performance measurement. In 1996, Murphy, Trailer and Hill examined the dependent measures used in entrepreneurship research and through exploratory factor analysis found nine distinct financial performance constructs among the more than 50 different dependent financial performance variables reported upon. And, in 1998, Robinson empirically tested the relationship between four separate independent variables (stage of the life cycle, industry concentration, entry barriers, and product differentiation) with eight different measures of financial performance used in new venture research and found significantly different results between each independent variable and the eight different dependent financial performance variables. This further demonstrated the existence of multiple dimensions of organizational financial performance. Finally, part of this research involved an analysis of 1,045 articles published in the leading entrepreneurship and management journals between 1996 and 2001. Of these 1,045 articles, 138 purported to use overall organizational performance as the dependent variable. Over 70% of these 138 articles used a financial performance measure as the dependent variable. Further, 46% of these 138 articles used only a single measure, 25% used two measures, and 18% used three measures to represent organizational performance. Overall, a total of 88 different dependent measures were used to represent overall organizational performance in these 138 articles, generally without any support for the validity of the measures utilized. In short, it can be inferred from these statistics that there is no consensus in the entrepreneurship and strategic management research conducted over the 5 years with respect to valid measures of organizational performance. However, it is also clear from this prior research that organizational financial performance is definitely a multi-dimensional construct.

Second, a generalizable and more powerful model for measuring organizational financial performance has significant implications for future research and for reexamining the findings of

prior research where less powerful dependent variable measurement models were used. Such a model can help resolve multiple inconsistent theories where differing dependent variables were used.

Finally, a multi-dimensional model of organizational financial performance can significantly improve organizational stakeholders' understanding of the effectiveness of management. It allows for the measurement of value creation and for reasonable comparison across companies that have chosen different routes to creating value.

THE IMPORTANCE OF EFFECTIVE MEASUREMENT

The development of valid operationalizations of the key concepts and constructs used to form of both independent and dependent variables in the models used in entrepreneurship and strategic management research is fundamental to the description and corroboration of theoretical relationships being tested in research, and is the essence of the measurement stream of research. Put differently, the validity of research studies that use arbitrary dependent measures to represent overall organizational performance is highly questionable. Researchers need to know that the effects they are studying will reasonably be represented by the changes in the dependent variables. The use of different measures as proxies for "performance" makes extension from one study to the next dubious. Peter (1979) clearly summed up the importance of construct measurement as follows:

Valid measurement is the *sine qua non* of science. In a general sense, validity refers to the degree to which instruments truly measure the constructs which they are intended to measure. If the measures used in a discipline have not been demonstrated to have a high degree of validity, that discipline in not a science (page 6).

Measurement is the "careful, deliberate, observations of the real world for the purpose of describing objects and events in terms of the attributes composing a variable" (Babbie, 1998:116). For a variable to be clearly and equally understood by many different individuals, it must be accurate, precise, quasi-invariant across observers, provide discrimination from other variables, and be stable over time. As a result, it is problematic that overall organization performance has been "measured" in scores of research studies by dozens of variables that are generally not strongly correlated over time.

PRIOR STUDIES OF ORGANIZATIONAL PERFORMANCE

Despite the importance of accurately measuring organizational financial performance, only seven studies have addressed the question of how organizational financial performance is or should be measured. Perhaps more importantly, none of these studies seem to have significantly influenced how organizational financial performance is actually measured in most of the empirical research that uses this construct as a dependent measure. These seven studies fall into three braod categories. They are (1) Studies that describe the measures actually used in entrepreneurship and strategic

management research. These include the research of Brush and VanderWerf (1992), Murphy, Trailer and Hill (1996), and Carton (2004). (2) Studies that focus on the need for multi-dimensional measures of organizational financial performance. These include the research of Rawley & Lipson (1985), Chakravarthy (1986), and Venkatraman and Ramanujam (1987). And (3), studies that seek to determine the "best" measure(s) of organizational financial performance, i.e., Robinson (1996).

Studies of the Measures used in Entrepreneurship and Strategic Management Research

Brush and VanderWerf (1992) examined thirty-four different studies in the entrepreneurship literature that explicitly used firm performance as the dependent variable. They found that thirty-five different measures of performance were used in those studies indicating that researchers perceived many different dimensions of performance and that there was no agreement on what measures actually represent organizational performance. The most frequently used measures of performance were changes in sales, organizational survival, changes in number of employees, and profitability. Brush and VanderWerf state that they did not attempt to sort out the problem of which performance measures to use. However, they note that the fact that 35 different performance measures were used in just 34 studies indicates that more work needs to be done to identify measures that make sense for use across studies.

Murphy, Trailer and Hill (1996) examined the variables used to measure organizational performance in entrepreneurship research in the years 1987 through 1993. They identified 51 articles published in the top entrepreneurship and strategic management journals that explicitly used firm performance as a dependent variable. They found, consistent with Brush & VanderWerf (1992) and Cooper (1993), that there was no consistency in the variables used to measure new venture performance. In total, they identified 71 different dependent variables used to measure performance in the 51 articles.

Murphy et al. then examined 19 financial variables from a sample of 995 public firms with 500 or fewer employees. They found that less than half of the intercorrelations between performance measures were significant, indicating that these variables measured different dimensions of performance. More than 25% of the significant correlations of performance measures were negative. Murphy, et al. concluded that the "…relationship between a given independent variable and performance is likely to depend upon the particular performance measure used." They further concluded "…research finding support for an effect on one performance variable cannot justify the assumption that the effect is similar across other measures of performance (1996: 21)." Their study also found that the performance measures tested failed to meet the requirements of convergent and discriminant validity necessary to validate a one-dimensional performance construct (Campbell & Fiske, 1959).

Murphy et al. performed an exploratory factor analysis on the 19 variables, which yielded 9 factors that explained over 70% of the variance in the performance measures. In an attempt to

fully examine the results obtained by Murphy et al., we performed a confirmatory factor analysis of the nine factors identified in their research, using LISREL 8.12 as suggested by Bollen (1989). The covariance data reported in the 1996 study was used as the basis for the analysis. The results of this analysis, reported in Carton (2004), indicated that the factors determined by Murphy et al. did not fit the data. The model yielded Chi-square = 1292 with 127 degrees of freedom (p<0.0001), Bentler and Bonnet normed fit index of .727 and a non-normed fit index of .657. This indicates that while the variables did load into factors, these factors may not be supported by the data. This is possible since exploratory factor analysis will force variables into the number of factors specified, even though the factors may not have the best possible fit for the data. Even if the data fit the model, because the analysis was an exploratory factor analysis, there was no theoretical support for the identified constructs. Consequently, the variables within each factor, as determined by the exploratory factor analysis, fail the test for convergent validity using confirmatory factor analysis, and they also did not have any face validity.

Studies of the Multi-Dimensional Character of Organizational Financial Performance

In 1985, Rawley and Lipson examined the relationships among several combinations of performance measures to demonstrate that different common measures of financial performance did not represent the same attributes. Of these comparisons, the only overall performance measures that they found to be related to each other at statistically significant levels were the Q ratio versus cash flow return on investment ("CFROI") adjusted for the Capital Asset Pricing Model ("CAPM") discount rate, and market-to-book value versus return on investment adjusted for inflation. The Q ratio was proposed by Callard & Kleinman (1985) as a substitute for Tobin's Q, and is calculated as the ratio of the value of individual business units divided by the inflation adjusted purchase cost of assets. The other measures that they compared were clearly discriminant and do not measure the same construct. Table 1 summarizes their findings for the S&P 400 companies for the period 1982 through 1984.

Table 1: Summary of Relationships Among Selected Performance Measures from Rawley and Lipson (1985)	
Variables Compared	R^2
Price-to-earnings ratio vs. EPS growth	.12
Price-to-book ratio vs. ROE less CAPM cost of equity	.19
Price-to-book ratio vs. Return on capital employed – CAPM cost of capital	.34
Q ratio vs. CFROI less discount rate	.65
Market-to-book ratio vs. ROI less inflation	.71

Chakravarthy's 1986 comparative study of seven "exemplar" firms with seven "maladapted" firms in the computer industry developed an eight variable discriminant function for the two groups. None of the individual profitability measures tested in this research was capable of discriminating between the two groups. The discriminant function developed included multiple dimensions of performance, again indicating the importance of multivariate measures of organizational performance.

Using confirmatory factor analysis ("CFA"), Venkatraman and Ramanujam (1987) empirically examined the degree of convergence across methods of measuring organizational financial performance and in so doing, demonstrated that sales growth, profit growth, and profitability were discriminate measures of different dimensions of organizational financial performance. They selected these measures based upon a review of the different performance dimensions typically used by different disciplines done by Hofer (1983) and Woo and Willard's (1983) findings of key dimensions of performance based upon an analysis of PIMS data. The implication of this finding is that in isolation, none of the three variables individually measure the organizational financial performance construct. Consequently, the findings from a study that uses sales growth to represent organizational financial performance should not be equated to findings from a study that uses either profit growth or profitability to represent business economic performance.

Studies of the "Best" Measure(s) of Organizational Financial Performance

Robinson (1995) examined ten different new venture performance measures to determine which individual measure was the most effective in accurately assessing long-term economic value creation. The ten measures studies were change in sales, sales level, return on sales, return on invested capital, return on equity, return on assets, net profit, earnings before interest and taxes, earnings multiples, and shareholder value created. All ten performance measures were tested individually for their relationship with multiple independent variables that had been found in prior literature to have positive relationships to new venture performance. The shareholder value created measure (also commonly known as return to shareholders) was determined to be the most effective measure for effectively differentiating among new venture strategies, the second most effective measure for differentiating among the structure of the new venture's entered industry, and the most effective measure in differentiating among the interactions between new venture strategies and the structure of the industry the new venture entered. The fact that the different performance measures of overall new venture performance resulted in significantly different r-squares implies that the variables do not measure the same things.

Summary

In summary, it is clear from the prior empirical studies that there has been no consistency in the measures used to represent the construct of overall organizational performance in strategic management or entrepreneurship research. Researchers compound the problem by confusing determinants of performance with measures of performance ENRf8(Cameron, 1986). Further, prior empirical research has demonstrated that there are multiple dimensions to the performance construct. While Robinson (1995) found that return to shareholders was the most powerful individual performance with respect to new venture performance among companies that have undergone initial public offerings, these findings cannot be reasonably generalized to studies that use different samples. In short, there continues to be no conclusive research that has identified a "best" measure of overall organizational performance, nor has a measurement model that accurately represents the construct yet been developed.

PROBLEMS WITH THE MULTI-DIMENSIONAL VIEW OF PERFORMANCE

As noted above, there is no consensus reflected in prior entrepreneurship and strategic management research regarding the best or even a sufficient set of measures of organizational performance. However, most theorists have concluded that organizational performance is multi-dimensional in character - a conclusion that is supported by all seven of the studies that have explicitly addressed some aspects of the question of how organizational financial performance is or should be measured. Given these facts, the question immediately arises: "Why don't more researchers use multi-dimensional measures of organizational financial performance?" Two important reasons are the facts that: (1) performance has often been characterized by the purposes of the research being performed, and (2) there are many different views on the most desirable outcomes of organizational effectiveness. However, there is at least one additional reason for this situation, namely the lack of any reasonably accurate "individual" measures of organizational financial performance. The "best" macro-measure of organizational financial performance in the view of most accounting, entrepreneurship, finance, and strategic management scholars is that of "shareholder wealth creation" (Rappaport 1986). But, none of the traditional individual measures of organizational financial performance is an effective surrogate for "shareholder wealth creation." The "best" of these traditional individual measures is Return on Assets (ROA), and its correlation (R^2) with shareholder wealth has been found to be only 0.10 (Carton & Hofer, 2006), far below anything that could be considered a "statistically significant" relationship.

The primary objective of this research is to address this issue by developing a new multi-dimensional model of organizational financial performance. The secondary objective of this research is to develop a model that is far "more robust" in its ability to "explain" changes in "Shareholder Wealth" creation. In the process, we show that the simultaneous consideration of these

multiple dimensions is more appropriate for drawing conclusions about the effectiveness of managerial actions than is considering each individual performance dimension separately.

DEVELOPING AND TESTING A MODEL OF ORGANIZATIONAL FINANCIAL PERFORMANCE: OUR METHODOLOGY

The Macro-Design of This Study

Since no prior research has empirically established the domain of organizational financial performance, this research was by necessity exploratory in nature. The process used in this research to infer a multi-dimensional model of organizational financial performance involved four phases.

First, data on shareholder valuation and other financial performance indices was collected from a sample of 1,500 public companies. These data points were then separated into high, medium, and low performance groups based on both annual and three-year financial performance as indicated by their shareholder returns over the specified period of time since shareholder return Robinson (1995) had found were the most robust measure of organizational performance.

Second, the financial performance measures most commonly used in past research and/or discussed in the entrepreneurship and strategic management literatures were then used to compare the high and low performance groups in order to identify the specific measures that differentiated the two groups at statistically significant levels. Also, each measure that was included in this research was evaluated both with respect to its static value and its change in value over the period of interest in order to determine the relative information content of static vs. change scores.

Third, the financial performance variables (both static measures and change score measures) that differentiated between the high and low performing groups of companies in phase 2 were then grouped into different financial performance constructs.

Finally, the validity of these different financial performance constructs was tested.

Developing Our Sample of 3,819 Data Points

In order to secure data on shareholder valuations, it was necessary to gather data from a sample of publicly owned firms. The population of public companies used for this research was companies in the Standard and Poor's 1500 on December 31, 2002 (a combination of the Standard and Poor's 500, the Standard and Poor's Mid Cap 400, and the Standard and Poor's Small Cap 600 indices). These companies include a wide cross-section of industries, organizational sizes, and organizational ages. Four years of financial data was collected on each of these firms from the Standard and Poor's Compustat® database. [Note that the fourth year was needed to be able to calculate the change scores.] One and three-year performance variables (both static measures and change score measures) were calculated from this data. Our maximum potential sample was,

therefore, 4,500 individual firm years of data and 1,500 three-year data points. Any firm-year or firm-period of data that was incomplete was eliminated from the final sample. Also any firm-year or firm-period of data that contained significant outliers was also eliminated from the final sample. The final sample included 2,894 individual firm-years of data and 925 three-year periods of data.

Developing a Sample of High and Low Financial Performing Companies

Next, the individual annual firm years and three-year periods in the sample were classified as having high, medium, or low financial performance based upon their returns to shareholders. A firm was classified as having high financial performance if its return to shareholders was one standard deviation or more above the mean. A firm was classified as having low financial performance if its return to shareholders was one standard deviation or more below the mean. All other firms were classified as having medium financial performance.

A total of 309 firm years were classified as having "high" financial performance, 321 firm years were classified as having "low" financial performance, and the remaining 2,264 firm years were classified as having "medium" financial performance. In the case of three-year period data, a total of 124 three-year periods were classified as having "high" financial performance, 143 three-year periods were classified as having "low" financial performance, and the remaining 658 three-year periods were classified as having "medium" financial performance.

Identifying Financial Measures that Differentiate High and Low Performance Firms

The two samples of high and low performing companies were used to compare 20 of the financial measures most commonly used in past entrepreneurship and strategic management research and from the literatures of these fields using *t* tests to determine if there was a statistically significant difference between the high and low performing companies with respect to each of these 20 measures. [Note: A total of 40 tests were performed since each measure was examined using both static and change score data.]

Those static and change score measures that indicated a statistically significant difference between the groups were retained for further evaluation in this research. Those static and change score measures that did not discriminate at statistically significant levels between the high and low financial performance companies were not utilized further.

Testing Our Multi-Dimensional Model of Overall Organizational Financial Performance

Having identified a set of financial measures that effectively discriminated with a high degree of statistical significance between high, medium, and low performance companies, these measures were grouped into several different financial constructs based on a review of accounting

and finance literatures (see Breley, Myers & Marcus, 2001; Copeland, Koller & Murrin, 2000; Penman, 2001). This combination of theoretical financial performance constructs together with the financial performance variables used to represent them became the model of organizational financial performance tested in the next stage of this research.

The validity of these financial performance constructs was tested using confirmatory factor analysis ("CFA") through the use of AMOS 5.0 structural equation modeling software (Bollen, 1989; Venkatraman & Ramanujam, 1987). The CFA framework uses a maximum likelihood approach to providing a statistical analysis of the entire validity of a construct and a decomposition of the measurement variance into its constituent components (Bagozzi, Yi, & Phillips, 1991). The proposed financial performance constructs and their various measures were tested for both discriminant and convergent validity. The financial performance constructs or measures that were not found to be valid were eliminated from our multi-dimensional model of organizational financial performance in order to create a revised multi-dimensional model of organizational financial performance that contained only constructs and measures shown to possess both discriminant and convergent validity.

RESULTS

Financial Measures That Discriminated Between High and Low Performing Companies

This research found that, for annual periods, 35 of the 40 (20 static and 20 change score) financial performance measures tested discriminated between high and low performance companies at $p < .10$, using market adjusted return to shareholders as the basis for classification. For three-year periods, 32 of the 40 (20 static and 20 change score) financial performance measures tested discriminated between high and low performance companies at $p < .10$. Table 2 summarizes the results of the t tests for the variables that did and did not discriminate between high and low performance companies for both annual and three-year periods.

Table2: Measures That Discriminate Between High and Low Performing Companies by Construct				
Variable	Annual	Three-Year	Annual	Three-Year
Profitability				
Return on Assets	**	**	**	**
Return on Equity	**	**	**	**
Return on Sales	**	**	**	**
Return on Investment	**	**	**	**
EBITDA Return on Investment	**	**	**	**
Operating Margin	**	**	**	**

Table2: Measures That Discriminate Between High and Low Performing Companies by Construct				
Variable	Annual	Three-Year	Annual	Three-Year
Growth				
Growth Rate of Sales	**	**	**	*
Growth Rate of Operating Expenses	**	*	**	**
Growth Rate of Total Assets	**	**	**	**
Growth Rate of Employees	**	*	**	NS
Cash Flow				
Growth Rate of Operating Cash Flow	*	*	*	NS
Operating Cash Flow to Equity	**	**	NS	**
Free Cash Flow to Equity	NS	NS	NS	NS
Liquidity				
Liabilities to Total Assets	NS	NS	NS	**
Survival				
Altman's Z Score	**	NS	**	**
Efficiency				
Asset Turnover	+	NS	**	**
Economic Value				
Residual Income	**	+	**	**
Residual Income Return on Investment	**	**	**	**
Cost of Equity Capital				
Cost of Equity Capital	**	**	**	**
Market				
Price to Book Ratio	**	NS	**	**
** $p < .01$ * $p < .05$ + $p < .10$ NS $p > .10$				

One paradox of management research described by Cameron (1986) was that most empirical studies tend to use measures and methods that explain average performance, while the primary focus should be on understanding what makes firms either very successful or very unsuccessful. It is, therefore, essential to select performance metrics that can discriminate sufficiently among companies that perform at different levels of performance. This research identified 32 annual and 27 three-year financial performance measures that discriminated between high and low performance companies at $p < .01$ with respect to market-adjusted returns to shareholders. Of these measures, those that provided the most information about the return to shareholders referent with respect to

the sample of all companies, not just high and low performing companies, should provide the most statistical power for research where shareholder value creation is the phenomenon of interest.

Tests of Our Annual Multi-Dimensional Model

Figure 1 depicts the initial set of financial performance constructs that was tested for both convergent and discriminant validity for annual data. AMOS 5.0 software was used to test whether the annual data fit the proposed model. Constructs with only one observed measure were constrained to exactly equal the value of that measure, as suggested by Bollen (1989). The variance of each construct was constrained to unity so that the parameters for each observed variable could be freely estimated.

The assumptions of structural equation modeling require that the estimated variance of each measure must be positive and the covariance matrices must be positive definite. Three fit indices, as recommended by Arbuckle and Wothke (1999), were chosen to determine if the data fit the model. These three indices included (1) the comparative fit index (CFI; Bentler, 1990), (2) the Tucker-Lewis coefficient (TLI; Bentler & Bonnet, 1980), which is also known as the Bentler and Bonnet non-normed fit index (NNFI), and (3) the root mean square error of approximation (RMSEA; Browne & Cudeck, 1993). Arbuckle and Wothke (1999) suggest that a value of .90 or greater for both the CFI and the TLI indicates a reasonable fit of the data with a model and, an RMSEA value of about 0.08 or lower, but certainly no greater than 0.10 indicates an acceptable error rate for a model. Accordingly, a model that met all three criteria was considered to have an acceptable fit.

A random sample of 150 high performing firms and 150 low performing firms was used to test the model. This annual data did not fit the model as proposed in Figure 1, since the covariance matrix for the constructs that comprise the model was not positive definite. This indicated that there was a specification error in the model or that the sample size was too small (Jöreskog & Sörbom, 1996). Since our sample had 300 observations, it was reasonable to conclude that the model had a specification error.

An examination of the correlations between financial performance variables across financial performance constructs revealed that residual income return on investment ("RI ROI") was more highly correlated with the profitability construct than with residual income ("RI") in the economic value construct. The model specification error was eliminated by moving the RI ROI measure to the profitability construct. The revised model had $\chi^2 = 2213.4$ with $df = 334$ and $n = 300$. The CFI for the model was 0.83, the TLI was 0.78, and the RMSEA was 0.14. All three tests indicated that the data did not acceptably fit the model. Accordingly, the financial performance measures included in the model were reexamined to determine which should be kept and which should be excluded from a revised model.
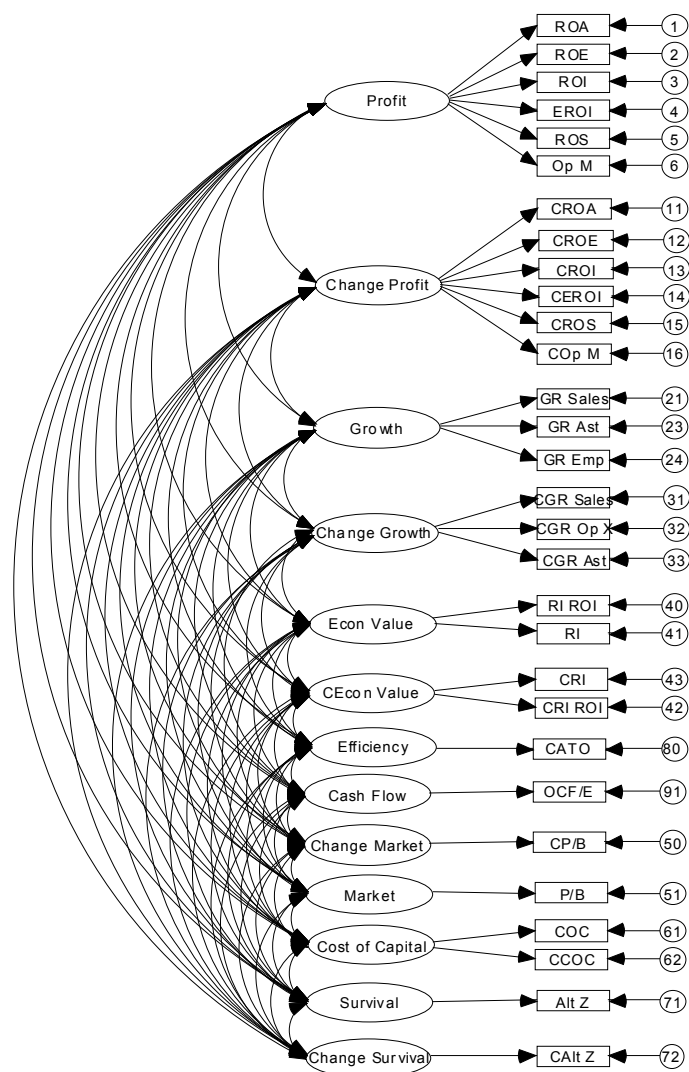
Figure 1 Proposed Constructs and Measures for a Model of Financial Performance for Annual Data

Figure 2 depicts the revised annual model of organizational financial performance that met the tests for convergent validity of the measures with the separate constructs. As a result of these changes in the specification of the model, the data fit the revised ten-construct model. The revised model had $\chi^2 = 405.4$ with $df = 130$ and $n = 300$. The CFI for the revised model was 0.95, the TLI was 0.93, and the RMSEA was 0.08. All three measures indicated that the data fits the model.

Accordingly, the revised model met the requirements of convergent validity (Arbuckle and Wothke, 1999; Bollen, 1989; Jöreskog & Sörbom 1996).
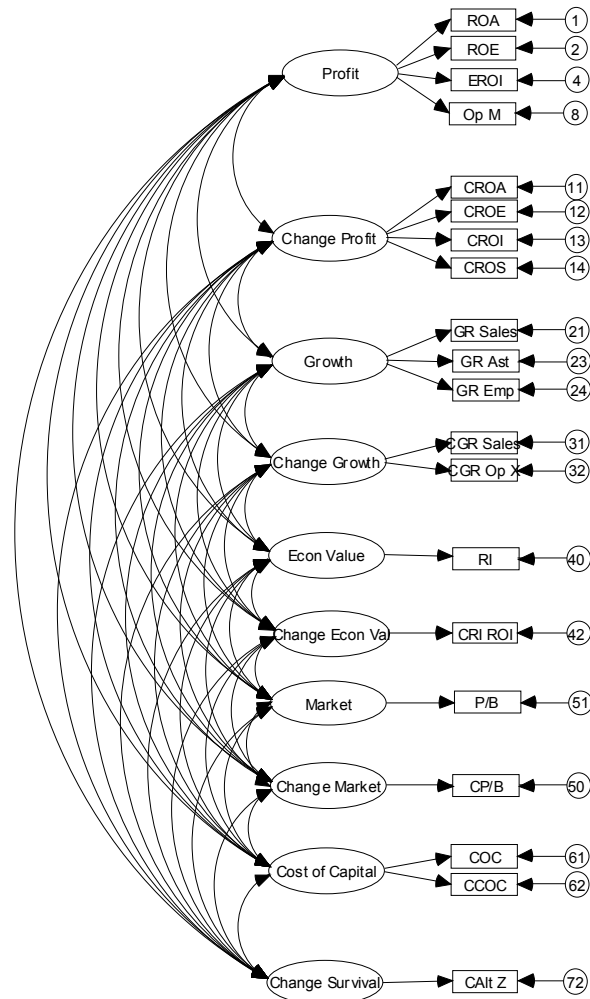

Figure 2 Revised Constructs and Measures for a Model of Financial Performance for Annual Data

Using a confirmatory factor analysis framework, discriminant validity is achieved when the correlations between the separate constructs are statistically significantly lower than unity (1.0) (Bollen, 1989). Any correlations that appeared "high" were tested by setting the correlation between

the two constructs equal to unity, and then testing the statistical significance of the change in χ^2 between the two models.

For the revised model, only two constructs, growth and growth change, were correlated in excess of 0.60. Consequently, the correlation between the two constructs was constrained to unity and the model was retested. The result was $\chi^2 = 414.0$ with $df = 131$. The change in χ^2 was 8.6 with $df = 1$ and $p < 0.01$. Thus, these constructs were found to be discriminant for the revised model. All other combinations of constructs had correlations below 0.52, which indicated that all constructs met the requirements for discriminant validity.

In summary, 10 of the original 14 constructs and 20 of the original 30 measures were retained in the annual financial performance measurement model. It was also demonstrated that these constructs were discriminant and that the measures of the constructs met the tests for convergent validity.

Having shown that it is possible to create an annual financial performance measurement model that contains 10 financial performance constructs and 20 financial performance measures that possesses both discriminant and convergent validity, the question naturally arises as to whether this model might be useful in future research. A complete answer to this question is beyond the scope of this paper. The simple answer, however, is YES! In a forthcoming paper, the authors develop a composite annual financial performance measure from this annual financial performance measurement model that explains over 46% of the variance in market adjusted returns to shareholders, a 350% improvement over all existing financial performance measures.

Testing Our Three-Year Multi-Dimensional Model

Figure 3 presents a diagram of the initial set of financial performance constructs and their corresponding measures for three-year data. The convergent validity of the financial performance measures for each financial performance construct was tested using confirmatory factor analysis, as was done with the annual data model.

The three-year data did not fit the proposed multi-dimensional financial performance model. The model had $\chi^2 = 1013.2$ with $df = 307$ and $n = 120$. The fit indices were CFI = 0.81, TLI = 0.74, and RMSEA = 0.14. There were specification errors in the model, as indicated by estimated negative residuals for four measures including ROI, CROI, GR Sales, and COC. Consequently, adjustments to the initial model were necessary, as was the case with the annual data model. Therefore, the financial performance measures included in the three-year model were reexamined in order to determine which should be retained in a revised model.

As a result of the changes made in the model specification, the data fit the revised, 10-construct model depicted in Figure 4. This model had $\chi^2 = 212.1$ with $df = 137$ and $n = 120$.

Thus, the revised multi-dimensional financial performance model met the requirements for convergent validity (Arbuckle and Wothke, 1999; Bollen, 1989; Jöreskog & Sörbom, 1996). As with

the testing of the financial performance measurement model for annual data, any correlations between constructs that appeared "high" were tested by setting the correlation between the two constructs equal to unity, and then testing the statistical significance of the change in χ^2 between the two models. Two pairs of constructs appeared to be "highly" correlated. They were (1) the change in profitability and the change in survival and (2) the cost of equity capital and the change in survival.
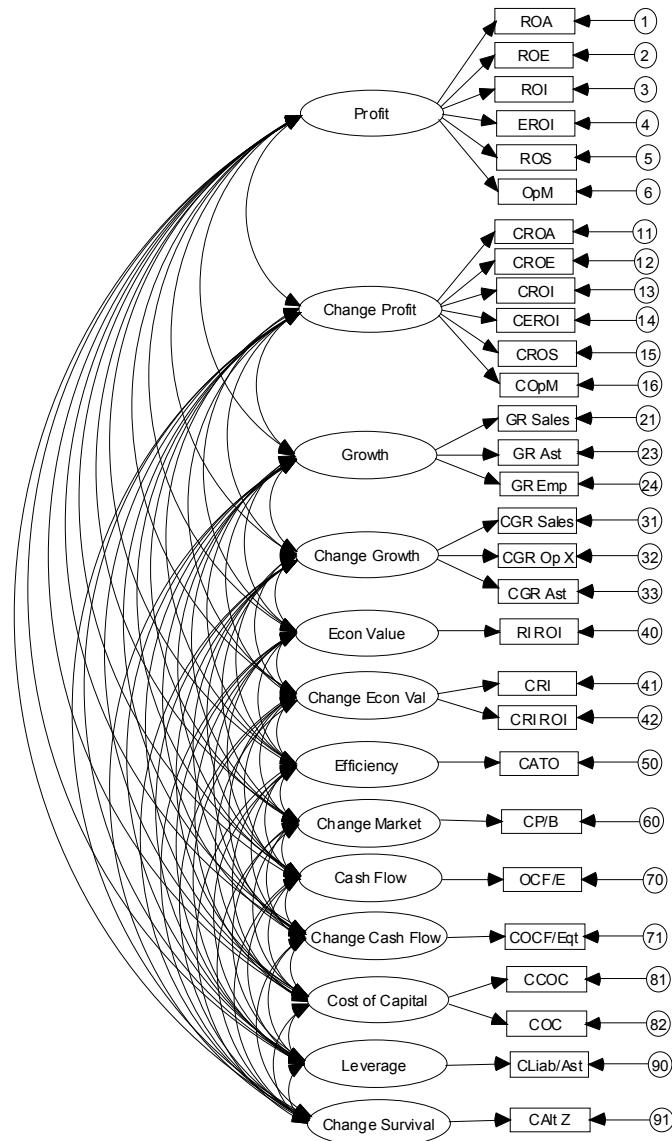

Figure 3 Proposed Constructs and Measurses for a Model of Financial Performance for Three-Year Data
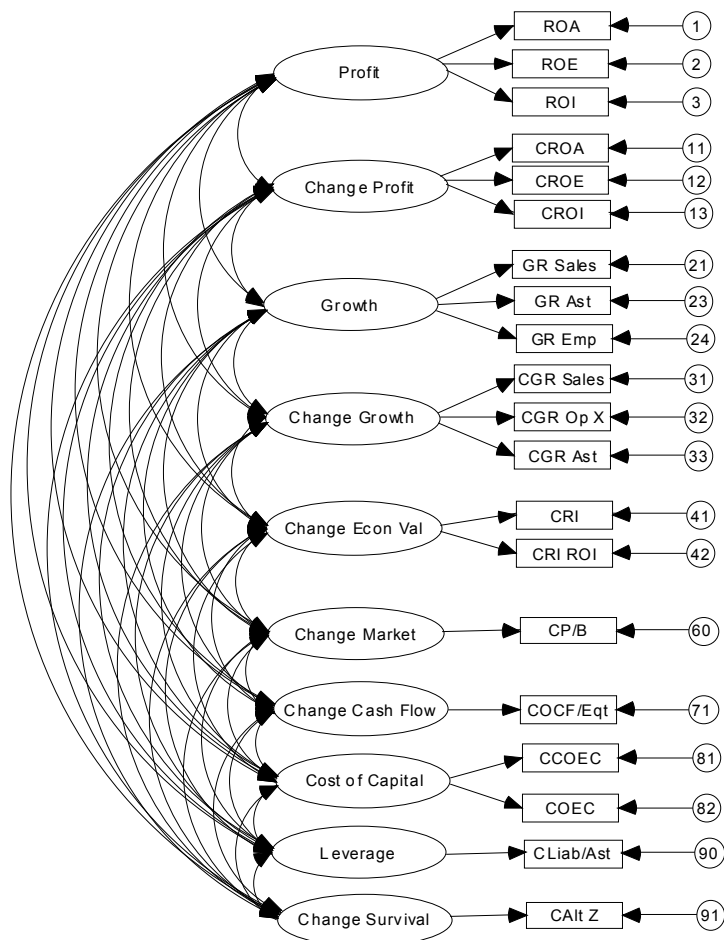
Figure 4 Revised Constructs and Measurses for a Model of Financial Performance for Three-Year Data

First, the correlation between the change in profitability and the change in survival was constrained to unity, and the model was retested. The result was $\chi^2 = 251.1$ with $df = 138$. The

change in χ^2 was 39 with *df* = 1 and *p* < 0.001. Therefore, the constructs were deemed to be discriminant. Next, the correlation between the cost of equity capital and the change in survival was constrained to unity and the model was retested. The result was χ^2 = 230.0 with *df* = 138. The change in χ^2 was 17.9 with *df* = 1 and *p* < 0.001. Thus, for the revised model, the constructs were deemed to be discriminant.

In summary, 10 of the original 14 constructs and 20 of the original 30 measures were retained in the three-year financial performance measurement model. It was demonstrated that these 10 constructs were discriminant and that the revised set of 20 financial performance measures of these 10 financial performance constructs met the tests for convergent validity.

Having shown that it is possible to create a three-year financial performance measurement model that contains 10 financial performance constructs and 20 financial performance measures that possesses possess both discriminant and convergent validity, again the question naturally arises as to whether this model might be useful in future research. And again, a complete answer to this question is beyond the scope of this paper, but the simple answer is YES! In the forthcoming paper mentioned above, the authors develop a composite three-year financial performance measure from this three-year financial performance measurement model that explains over 62% of the variance in market adjusted returns to shareholders, a 520% improvement over all existing financial performance measures.

SUMMARY AND CONCLUSIONS

For over fifty years, management scholars have suggested that organizational performance is a multi-dimensional construct. However, this is the first study that has undertaken to empirically identify both the distinct dimensions of organizational financial performance and the financial measures that represent these dimensions. The major contribution of the research described in this paper is the development of two (a one-year and a three-year) multi-dimensional models of organizational financial performance that possess both discriminant and convergent validity. Even more important, though, is the fact that these models can be used to develop composite (one-year and three-year) financial performance measures that correlate with shareholder wealth 350% (the one-year) to 520% (the three-year) better than any measures in current use.

Limitations of this Research

Overall organizational performance is a multi-dimensional construct. This research focused on only one of these dimensions, namely financial performance. The operational and stakeholder dimensions of overall organizational performance were not examined. As a consequence, the relative importance of financial performance to the two other organizational performance dimensions was not examined. A model of overall organizational performance that includes all

major performance dimensions might require a different set of financial performance dimensions or different measures of the identified financial performance dimensions because of overlapping information across the higher order constructs.

An additional limitation of the research design was the selection of only two timeframes, one and three years. While these two timeframes are those most frequently used in entrepreneurship and strategic management research, 21% of the empirical studies summarized in this research used other timeframes, most notably single point in time measures and five-year measures. Also, the annual and three-year models of financial performance developed in this research were not the same, implying that different dimensions of financial performance are more or less important at different times. Accordingly, the generalization of the results of this research to other timeframes will require additional testing.

A final limitation of the research design of the study was the omission of risk from consideration in the financial performance model. While financial risk was indirectly included through the calculation of the cost of equity capital, strategic risk was not considered in any way. Bromiley (1990) suggested that risk should be a component of the analysis of organizational performance. However, it should be up to the discretion of the researcher whether it is appropriate to capture the effects of risk as an independent measure or as a component of the dependent measure.

The sample utilized in this study limits the generalization of the findings in several ways. These limitations include: (1) only U.S. companies were included in the sample; (2) only publicly traded companies were included; (3) financial services firms such as banks and insurance companies were disproportionately eliminated from the sample because they did not report sufficient information to calculate the measures tested in this research; (4) only one three-year period was used to develop and test the three-year financial performance model; (5) the annual data was from the same timeframe as the three-year data; (6) one primary source was used to gather most of the financial data; and (7) the three-year sample did not include any companies that went out of business during the three-year period.

Implications for Future Research

This research empirically demonstrated that organizational financial performance is a multi-dimensional construct. Consequently, if the unit of analysis for a study is the entire organization, and if the phenomenon of interest is organizational financial performance, it is incumbent upon the researcher to consider the effects of the independent variables on multiple performance dimensions simultaneously.

However, if only one dimension of organizational performance is examined in a study, then it is inappropriate to claim to be studying the effects of the independent variables on "overall organizational performance". In such situations, it would be more appropriate to specify the specific

dimensions of organizational performance being studied, which would provide better context and understanding to readers of the research.

This research identified 10 separate performance dimensions for both annual and three-year timeframes as well as multiple measures of these constructs. The theories being tested should help guide researchers in selecting the dimensions of organizational performance that they should examine. Specifically, those dimensions of organizational performance that are hypothesized to create value for the constituents of interest should be used as the dependent variables. In general, dependent measures representing the phenomenon of interest should be selected with great care and a full explanation for the criteria used for their selection should be provided for users of the research.

Implications for Management Practice

Potentially the most important finding for practioners is the fact that the changes in performance metrics are separate constructs from static measures of performance. Top management already places some emphasis on changes in performance metrics as indicated by the content of the management discussion and analysis (MD&A) sections in annual reports and SEC filings. Typically, changes in performance period-over-period are the primary focus of the MD&A section. However, while changes may be explained post hoc, management planning should focus on actions that will accomplish needed organizational changes.

Those performance metrics that have been shown in this research to discriminate between high and low performing companies should receive the primary attention of management and users of financial statements. Those companies that attain and sustain competitive advantage in the market do not strive to be average. Therefore, the metrics they use to gauge performance should focus on outcomes that set them apart from the competition.

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