

CONCEPTUAL OPERATIONALISATION ISSUES WITHIN THE CONTEXT OF AN INTERNATIONAL STUDY: JAPANESE AND AMERICAN FIRMS

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ABSTRACT

Proper conceptualisation of key concepts is crucial to the development of any field of study. However, this is not necessarily true when it comes to the field of strategy. Although it is widely accepted that firm performance is an essential variable in the strategy literature and that diversification is the most commonly studied variable of strategy (Dess, Gupta, Hennart, & Hill, 1995) the issue of proper operationalisation is conspicuously absent. It is readily observable that there is a plethora of measures being employed to measure both diversification and firm performance. However, the measures of performance and diversification that have been employed have not been unanimously agreed upon. In addition to this general state of confusion, the issue of international variations across measures has not been evaluated. The present paper seeks to address the issues of conceptual operationalisation for performance and strategy across international boundaries.

Keywords: diversification, firm performance, strategy

INTRODUCTION

Firm performance has been and continues to be the pivotal variable across studies within the strategy literature (Dess, Gupta, Hennart, & Hill, 1995; Drucker, 1995; Gary, 2005). Likewise, diversification has been the most researched strategy topic (Dess et al., 1995). Given this wide spread acceptance of these two variables, performance and diversification, one would expect that a general consensus would have evolved over the years. Surprisingly, after a thorough review of the strategy literature it can be concluded that this has not taken place (Gary, 2005; Mayer &

Whittington, 2003). Some researchers have even argued that additional attention should not even be directed to understanding this relationship (Ramanujam & Varadarajan, 1989). This harsh recommendation suggests that "The prospect for gaining new empirical insights by examining cross-sectional relationships between *alternative measures of diversity and performance* seems to be slim" (Ramanujam & Varadarajan, 1989, p. 543, emphasis added).

Instead of a convergence on these central variables, the complete opposite has developed. A plethora of measures have been employed over the past two decades and the proliferation of new measures continues unabated. Each researcher is free to pick and choose or develop privately developed measures for operationalising performance and diversification. The diversity of performance measures being used in research studies has continued to fan the flames of confusion and researchers are calling for a "more revolutionary approach, integrating the *various perspectives* to build a more *realistic* and effective theory of diversification (Hoskisson & Hitt, 1990, p. 644, emphasis added).

Given the current state of confusion that exists with regard to the topic of diversification and its relationship with performance the study of diversification continues to be a source of frustration for those trying to synthesise the reported results from a multitude of studies (Dess et al., 1995, Mayer & Whittington, 2003). In addition, the vast array of methods being utilised in measuring diversification has contributed significantly to a current state of confusion in the strategy literature (Gary, 2005; Robins & Wiersema, 2003). In an effort to rectify some of these concerns, the present study presents an empirical attempt to evaluate a variety of commonly used measures of firm performance and diversification within an international sample (Mayer & Whittington, 2003). Results highlight the differences across countries, and alternative measures of performance and diversification.

Several discrepancies have hampered the advancement of the study of strategy in general and diversification in particular. The root of these discrepancies revolve around three central issues:

1. The operationalisation of firm performance.
2. The operationalisation of diversification.
3. The replication of research studies in a global environment.

The present study seeks to add to the body of knowledge presently available by undertaking a study of these discrepancies. By assessing the impact of these

discrepancies within the field of strategy it is hoped that further light can be shed on the diversification-performance linkage and its generalisability to other countries.

Although Dess et al. have suggested that the diversification-performance linkage is the single most researched topic in the strategy literature, their assessment of the research findings has led them to conclude that in the end; "we know very little" (Dess et al., 1995). What we do not understand up to this time is why, given the vast amounts of studies conducted on the subject, can't we more clearly articulate the effects of diversification on performance? Is it because the diversification construct itself is so slippery and hard to measure? Or does the confusion stem from the operationalisation of firm performance? How much impact do performance measures have on the outcome of a research study? In addition to these issues, are the findings in the strategy literature applicable to other countries? Or are the extant findings limited to U.S. firms?

These questions served as the impetus for the present study, which seeks to address and incorporate operationalisation issues over diversification, firm performance and international boundaries.

OPERATIONALISING FIRM PERFORMANCE

As is true of all research, it is believed that results of strategic management studies are measure specific. The vast array of research suggests utilising accounting-based measures of performance have suggested that diversification can lead to improved performance. On the other hand, studies assessing the value of firm performance using market-based measures report positive or no relationship between diversification and performance. Despite the accusations that have been levied against the use of accounting-based measures of performance they continue to be the most commonly used proxies of performance. This over reliance on accounting-based measures of performance may have unduly influenced the conclusions currently accepted in the strategy literature.

Accounting-based measures of performance in general, and profit-based measures of performance in particular, have long been widely accepted as valid measures of firm performance (Bettis, 1981; Bettis & Hall, 1982; Montgomery, 1982; Palepu, 1985; Rumelt 1974; 1982). Within the boundaries of the diversification literature several commonly accepted accounting-based measures of performance have become standards for comparison. Whether the measures are used in isolation or in

conjunction with each other, the most frequently utilised measures of performance are return on assets (ROA), return on equity (ROE), and return on sales (ROS). A review of the strategy literature reveals that these few measures are indeed the most commonly employed means of assessing a firm's performance.

Given our previous discussion, the use of accounting-based measures has been and continues to be considered valid and reliable measures of performance within the strategy literature. However, within the domain of accounting-based performance measures a great division exists concerning which measure to use. The plethora of accounting measures has resulted in wide variations and inconsistent findings within the field of diversification. The relationship among strategy types and performance measures has not been studied. Instead, the strategy/ performance relationship has been assumed to be unbiased or neutral and is ignored in the diversification literature.

On the other hand, it has been argued recently that a market-based approach is more accurate in measuring firm performance. In particular, Peter Drucker has suggestion something that is pivotal in measuring firm performance, when he stated; "until a business returns a profit that is greater than its cost of capital, it operates at a loss" (1995, p. 59). Researchers opting for the market-based measure of performance suggest that such a measure incorporates both the shareholders' and industry's evaluation of a firm's future performance. Since the measure is forward looking it is argued that it is a more realistic valuation method for determining a firm's value. It is this value that investors use in determining stock price. The most common measurement technique used in evaluating a firm's value is the market-based system known as the capital asset pricing model (CAPM). However, CAPM suffers from its own problems, namely that it is not very easy to calculate.

In an attempt to combine the benefits of both market-based and accounting-based measures of firm performance Stern Stewart and Co. has introduced two indexes commonly known as economic value added (EVA) and market value added (MVA). The calculation of these measures allow for the use of commonly available accounting-based data and the inclusion of more market-based data like the CAPM without all of the inherent complexities. EVA and MVA measures are accepted as market-based measures of performance, which can be easily calculated using accounting-based information.

The basic tenet of EVA and MVA is that businesses should not invest in businesses, projects, or activities unless they can generate a profit over and above the cost of capital (Drucker, 1995; Misra & Kanwal, 2007; Reddy, Rajesh, & Reddy, 2011;

Sharma & Kumar, 2010). The foundation for these measures is that the cost of capital has been ignored by traditional profit-based measures and indirectly factored into the CAPM. Assuming that the primary goal of most businesses is to create wealth for their shareholders, the cost of capital becomes a critical factor in determining the assessment of shareholder wealth, and therefore, it has been proposed that EVA/MVA may be a more accurate measure for assessing firm wealth (Misra & Kanwal, 2007).

According to the late Roberto Goizueta (past CEO of Coca-Cola), when he is been asked about MVA, "It's *the only way* to keep score. Why *everybody* doesn't use it is a mystery to me" (Tully, 1994, p. 143, emphasis added). MVA has been touted as the best way for evaluating how well a firm creates shareholder wealth (Reddy et al., 2011; Sharma & Kumar, 2010; Tully, 1994). Others have acclaimed EVA/MVA as "Today's hottest financial idea and getting hotter" (Tully, 1993, p. 24) and "the financial performance measure that comes closer than any other to capturing the true economic profit of an enterprise" (Shil, 2009, p. 169). Misra and Kanwal (2007) also forcefully argue that EVA is the most significant measure of performance.

It has been proposed by Stern Stewart that traditional accounting-based measures, which are the most frequently used proxies of firm performance in the strategy literature, make an implicit assumption that the cost of capital is zero. Traditional accounting-based measures ignore the cost of raising capital through the use of equity. In comparison to generating capital via the use of debt, equity may erroneously be viewed as a source of free capital. Since there are no mandatory interest payments to be made, equity may be erroneously viewed as a windfall. However, the theory behind EVA/MVA argues that all capital comes at a cost and this cost needs to be factored into any evaluation of a firm's profitability (Reddy et al., 2011; Sharma & Kumar, 2010; Shil, 2009).

It is argued that the all-to-frequent assumption that all performance measures are created equal and therefore, are all unbiased proxies of firm performance is a dangerous one. Instead, it is argued that the results of previous strategy research are a by-product of the type of measures used to operationalise performance. Therefore, performance measures and their relationships with different strategy types will vary depending on the performance measure used. Due to the unique composition of these performance measures the conclusions of previous diversification studies may have led to spurious conclusions, which have retarded the development of the field of strategy.

It is proposed, that in addition to the limited set of performance indices used in diversification research, additional measures of performance may exist that can help explain some heretofore-confusing research findings in the diversification literature. One such set of measures, which are actually not new, but have been largely ignored until recently is EVA and MVA (Shil, 2009; Stern, 1994; Tully, 1993; 1994). Known in the past among accounting circles as shareholder value analysis, EVA/MVA is rapidly gaining attention from academics and practitioners alike. EVA represents a discounted cash flow approach that produces the same results as shareholder value analysis, although it is structured differently (Mills & Print, 1995; Reddy et al., 2011; Sharma & Kumar, 2010).

Profits have always been at the centre of attention for managers and investors and have played a pivotal role in assessing a firm's overall performance. Indeed, it can be said that profits will literally make or break a company. The ability of a firm to generate profits for various important stakeholders are of primary importance to CEOs and executive managers, whose compensation packages are largely tied to a firm's financial performance, namely profits. The importance of profit in most measures of performance is widely accepted and serves as the focal point of management's interest. Therefore, the usefulness and importance of profitability measures in managing an organisation is clearly evident.

However, an overemphasis on profits and their associated measures may help explain the many problems plaguing diversification research. One problem with focusing solely on profitability is that the currently used measures ignore the cost of capital (Reddy et al., 2011; Sharma & Kumar, 2010; Tully, 1993; 1994). It is this exclusion of the cost of capital from performance measures that has concerned many in the financial arena and is viewed as a major flaw by EVA/MVA advocates (Misra & Kanwal, 2007; Stern, 1994; Tully, 1993; 1994). As is succinctly pointed out by Tully (1994, p. 162):

Accounting measures are seriously flawed, focusing solely on the returns obtained from company investments. To pass judgment as to whether a firm has indeed created economic or market value requires a comparison of the cost of capital and the resulting returns. It is argued that the cost of capital is a critical and necessary component in determining how efficiently capital has been utilized, which is not reflected in the "typical" accounting-based measures.

Given the wide variety of possible measures of firm performance that are readily available, the three most commonly utilised measures of performance (ROA, ROE, ROS), along with EVA, and MVA and their relationship with diversification will be investigated. Since this is an exploratory study of performance measures no a priori hypotheses have been proposed, other than to say that it is expected that there will be significant differences among the various proxies of performance, countries and measures of diversification. Further, it is expected that there will be significant differences between traditional accounting-based measures of performance (ROA, ROE, ROS) and market-based measures of performance (EVA and MVA).

OPERATIONALISING DIVERSIFICATION

Keats (1990), in a review of the strategy literature, expressed her suspicion regarding the performance/strategy relationship when she stated that:

...diversification and performance are multidimensional constructs and...identification of appropriate criteria for performance assessment depends on the strategy pursued. (emphasis added, p. 61)

Clearly, Keats is advocating that more attention and detail must be paid to the selection of performance variables. As suggested by Keats (1990), the possibility of unexpected interactions between various performance measures and different strategy types could lead to erroneous conclusions. Could it be that researchers have inadvertently biased their results by adopting measures of performance that unduly reflect the benefits of certain strategies, while downplaying the strengths of other strategies? It seems clear from the comments of Keats (1990) that if we are to accurately assess organisational performance it is imperative that strategy scholars employ multiple measures. The suggestion provided by Keats (1990) highlights the likelihood of contingent strategy/performance relationships that have been ignored in previous research studies.

In general, strategy scholars believe that relatedness across lines of business will result in better performance than unrelated diversification (e.g., Bettis, 1981; Bettis & Mahajan, 1985; Rumelt, 1974, 1982; Varadarajan & Ramanujam, 1987). Such a conclusion has been questioned by a variety of scholars (e.g., Amit & Livnat, 1988; Bettis & Hall, 1982; Dubofsky & Varadarajan, 1987; Palepu, 1985). Such discrepancies can sometimes be blamed on the different perspectives and

methodologies used by researchers (Harrison, Hall, & Nargundkar, 1994; Hoskisson & Hitt, 1990; Montgomery, 1979; Venkatraman, 1989).

The operationalisation of diversification has been fraught with inconsistencies and dissension since its inception. Discussions and discrepancies over the inconsistencies among the various methods of assessing diversification have received a great deal of attention (Hall & St. John, 1994; Hoskisson & Hitt, 1990; Hoskisson, Hitt, & Moesel, 1993; Robins & Wiersema, 2003). After a review of all of the extant findings concerning the matter of construct validity, diversification still continues to generate discussion and study (Robins & Wiersema, 2003).

The bulk of research has opted for the entropy measure of diversification (Palepu, 1985). However, the Herfindahl and concentric (Montgomery & Hariharan, 1991; Robins & Wiersema, 2003) indexes have also been proposed as easy to use measures of a firm's overall level of diversification. In a recent article by Robins and Wiersema (2003) the concentric measure of diversification was found to be a more conservative and accurate measure of diversification than the entropy index. One possible explanation for such findings is that the indexes are assessing different aspects of the diversification construct.

In support of such an argument, the interchangeableness of these common indexes is being questioned by Robins and Wiersema, who argue that:

...the measures do not capture exactly the same dimensions of portfolio strategy. Although they often have been viewed as alternative approaches to the common problem of measuring related diversification, the measures can produce contradictory results because they differ in their sensitivity to underlying dimensions of portfolio strategy. (2003, p. 43)

So, the issue of which measure of diversification is more accurate in assessing a firm's level of diversification has not been settled. In order to test the effectiveness of the various diversification indexes it is necessary to incorporate multiple measures within the boundaries of a single study, where the results can be compared and evaluated. Only by comparison can the usefulness of the different proxies for diversification be truly assessed.

AN INTERNATIONAL PERSPECTIVE

The vast majority of diversification studies that have been conducted to date have adopted what can be called an *American perspective* (Geringer, Tallman, & Olsen, 2000). The adoption of such a perspective can be seen throughout the strategy literature and has had a tendency to retard the development of the diversification construct. The generally accepted typology relies on assessing the relatedness across lines of business in a corporate portfolio to determine diversification. Adopting such a typology, it has been widely concluded that firm performance is positively correlated with the apparent relatedness across businesses within a firm's business portfolio (Rumelt, 1974, 1982).

It can be argued that the time is long past for viewing diversification from such a limited perspective and that the global nature of business has rendered such a perspective inept (Hitt, Hoskisson, & Hicheon, 1997). Given the rapid advances being made in technology and the evaporation of long held ideological differences across countries we are increasingly moving toward one globalised market. Based on the changing circumstances in the world, it is imperative that we broaden and redefine our understanding of the diversification construct. From a multinational (market) based view of diversification issues concerning diversifying into new countries and across international borders is becoming an every increasingly important topic in the field of strategy.

Although multinational diversification has attracted more attention over the past decade or so (Eun & Resnick, 1994; Karpik & Riahi-Belkaoui, 1994; Geringer, Beamish, & daCosta, 1989) results have been inconsistent at best. Even though the results have been inconclusive, previous studies unanimously suggest that the multinational (or market) diversification strategy is an important factor in determining a firm's performance. Porter (1990, 1991) strongly argues that the adoption of a global perspective of strategy can become a direct or indirect source of competitive advantage by allowing firms to take their products overseas. Strategies that involve the transference of successful competencies that have been developed domestically to overseas markets are believed to have a greater chance of success when penetrating foreign markets. Therefore, multinational diversification provides an opportunity to outperform domestic industries.

Multinational diversification may very well be the heart of firm performance in the future (Porter, 1990, 1991). Regardless of the findings of past research studies, the importance of such research highlights the increasing frequency in which firms are

engaging in multinational diversification. Given the importance of international markets to the survival of many companies the need to understand more fully the intricacies of multinational diversification can be clearly understood. Therefore, several measures of multinational diversification will be incorporated into the present study.

METHODOLOGY

Sample

The initial sample was drawn from the *Stern Stewart Performance 1,000* for the year 2007. The primary reason for using the Stern Stewart data in forming the initial sample was that both EVA and MVA measures were calculated by Stern Stewart who is widely accepted as the authority on the calculation of EVA and MVA. In addition to using the *Stern Stewart Performance 1,000* as a data source, additional data was collected from Stopford's *Directory of Multinationals and Compact-D Worldscope* (2007). All additional information was collected from company annual reports. Due to incomplete data the final sample was made up of a total of 172 U.S. firms and 102 Japanese firms.

Measurement of Variables

To investigate the impact of firm performance measures across diversification strategies the following measurements were used as proxies for dependent, independent, and control variables. All variables used in the study were calculated as five-year averages. Given that the variables studied in this research will fluctuate from year-to-year, it was decided to use five-year averages. By using five-year averages it was possible to obtain a more stable and hopefully, a more accurate measure of a firm's diversification strategy and its influence on firm performance. The influence of any single year on the results of this study was thereby avoided.

Performance measures

A common characteristic of past empirical studies on diversification is the use of accounting-based performance measures. Although accounting measures of performance have been the measures of choice among scholars of past empirical research (Geringer, Beamish, & daCosta, 1989; Kim, Hwang, & Burgers, 1989), market-based measures of performance have been receiving increasing attention

(Amit & Livnat, 1988; Dubofsky & Varadarajan, 1987; Michel & Shaked, 1984). In an attempt to insure the comparability of the results of the present study across a broad range of research studies in the diversification literature, the decision was made to include both accounting- and market-based measures of performance. First, three measures of accounting-based performance, ROA, ROE and ROS, were included in the study and are measured in the following fashion:

$$\text{ROA} = (\text{Net profit after-tax}) / (\text{Total assets})$$

$$\text{ROE} = (\text{Net profit after-tax}) / (\text{Common stockholders equity})$$

$$\text{ROS} = (\text{Net profit after-tax}) / (\text{Sales})$$

Second, two market-based measures of firm performance, which more fully reflect investor expectations about the future profit of an organisation were included as measures of firm performance. The market-based measures utilised in this study include economic value added (EVA) and market value added (MVA). The market-based measures of performance were obtained from Stern Stewart (2007) and were calculated as follows:

$$\text{EVA} = \text{net operating profit after tax} - \text{cost of capital}$$

$$\text{MVA} = \text{company's total market value (= debt + equity)} - \text{book value of company}$$

Diversification Variables

Two different categories of diversification measures were used in the present study: product- and market-based diversification. Within each of these general diversification types two methods were used to calculate and assess diversification: entropy (Palepu, 1985) and concentric (Montgomery & Hariharan, 1991; Robins & Wiersema, 2003). The inclusion of the concentric index of diversification has been suggested by Robins and Wiersema (2003) to be a more accurate measure of diversification than previously employed measures and therefore, represents the most up-to-date measure available. The extension of the concentric index to incorporate and measure international diversification is unique to the present study and is offered as a potential new way to gain insight into the burgeoning field of international business. In a comparison of continuous measures of diversification, Robins and Wiersema (2003) concluded that the concentric index is a more valid indicator of diversification than previously used proxies. In order to test such a proposition, it was decided to include both variations of the diversification in the research study.

Product diversification

Although there are a variety of different measures of product diversification we choose to limit our study to the most commonly used continuous measures of diversification. Therefore, product diversification was operationalised using the entropy index (Palepu, 1985). This measure of product diversification represents the most commonly used continuous measure of diversification in the strategy literature and have been found to be both a reliable and valid measure of diversification. The measure evaluates the relative contribution of the major product/business segments of a firm to overall firm sales. The entropy measure of product diversification was calculated using the following formula:

$$\text{PDVSF-Entropy} = 1 - (\text{SP}_i / \text{TS}_i)$$

where:

SP_i = sales volume of the major product in year i

TS_i = total sales of the firm in year i

The concentric index of product diversification is represented by the equation:

$$\text{PDVSF-Concentric} = \sum_{i=1}^N P_i (1 - \sum_{i=1}^N P_i)$$

where:

P_i = Percentage of sales from industry i by 2 digit SIC code.

The product diversification indexes will equal zero for a firm involved in only one business. Therefore, a zero on product diversification indicates that a firm is not diversified. On the other hand an index greater than zero indicates various levels of product diversification. The greater the index the more diversified the firm.

Market diversification

Market or multinational diversification was measured as the proportion of a firm's sales revenue derived from overseas markets (i.e., global market diversification by export activity). Multinational diversification represents the relative portion of a firm's revenues derived from foreign operations and export volume (Geringer et al.,

1989; Grant, Jammine, & Thomas, 1988; Rugman, 1994; Wolf, 1975). The exact calculation of multinational diversification is reflected in the following equation.

$$\text{MKDVSF-Entropy} = 1 - \text{FS}_i / \text{TS}_i$$

where:

FS_i = international sales volume in year i

TS_i = total sales of the firm in year i

Extending the concentric index of product diversification (Montgomery & Hariharan, 1991; Robins & Wiersema, 2003) to the international arena as a measure of international diversification leads to the following calculation:

$$\text{MKDVSF-Concentric} = \sum_{i=1}^N P_i (1 - \sum_{i=1}^N P_i)$$

where:

P_i = Percentage of international sales from industry i by 2 digit SIC code.

Similar to the product diversification index, the multinational diversification index reflects increasing levels of international sales. Firms with higher multinational diversification and therefore, higher indexes, reflect greater activity in doing business abroad.

Control variables

Since firm performance and diversification can be influenced by a variety of variables outside the scope of the present study it was deemed necessary to control for certain potential confounding variables. Unfortunately, only a limited set of variables could be included in the present study due to data availability. Based on the results of previous research on diversification we included several control variables that have been identified as potentially important variables in explaining firm performance (Chatterjee & Wernerfelt, 1991; Lang & Stulz, 1994; Tallman & Li, 1996). The control variables incorporated in the present study include: firm size (Chatterjee & Wernerfelt, 1991; Tallman & Li, 1994), R&D intensity, capital intensity, and debt leverage. Each of these control variables was operationalised in the following manner:

Firm Size = $\ln(\text{Sales})$

R&D Intensity = $\text{R\&D expenditure} / \text{Total sales}$

Capital Intensity = $\text{Total Assets} / \text{Total Sales}$

Debt Leverage = $\text{Total Debt} / \text{Shareholder's Equity}$

It should be noted that there is a plethora of variables that have been identified as important in the strategy arena. The inclusion of all possible variables would have complicated the issues being investigated in the present study. Therefore, it was decided to concentrate on a few of the more widely accepted variables instead of including a laundry list of all possible variables. It is believed that the variables included in this study represent a wide range of commonly studied variables that have shown significant relationships with diversification and performance.

Statistical Methods

A series of hierarchical regression was used to investigate the relationship between diversification, firm performance among U.S. and Japanese firms. First, the control variables were entered in stage one of the regression. The control variables and their effects on firm performance were separated from the variables being investigated in order to be able to provide a more rigorous test of the central variables under study. By eliminating the effects of the control variables first it is possible to more accurately assess the true impact of diversification on firm performance. Second, the diversification measures were entered in the second stage of the regression. The following two stage hierarchical regression models were estimated separately for U.S. and Japanese firms.

Performance (five different measures)

Stage One:

- Firm Size
- Capital Intensity
- Debt Leverage
- R&D Intensity

Stage Two:

- Product Diversification (measured using entropy methodology)
- Product Diversification (measured using concentric methodology)
- Multinational Diversification (measured using entropy methodology)
- Multinational Diversification (measured using concentric methodology)

It is noted that the issue of causality is of interest to many strategy scholars within the field of strategy, but was not addressed within the parameters of the present study.

RESULTS AND DISCUSSION

General statistics and correlation coefficients for the variables included in the present study are reported in Table 1 for Japanese firms and Table 2 for the U.S. firms. After reviewing the intercorrelations several interesting relationships become clear. First, with regard to accounting-based performance measures, the U.S. sample reflects a higher degree of positive correlations among profit-based measures than Japanese firms. In general, the results suggest that the accounting-based performance measures tend to reflect a firm's overall profitability.

Second, when market-based measures are employed to measure firm performance MVA seems to be more closely aligned with accounting-based measures for U.S. firms, while Japanese firms exhibit a closer relationship between EVA and accounting-based measures of performance. ROE was positively related with EVA and MVA for both U.S. and Japanese firms. It is interesting that the variable which is the focal point of EVA/MVA, namely, equity and the cost of capital, should be significantly related with ROE, which reflects the relationship between profits and equity. Overall, the interrelatedness of the performance measures used varied depending on the country being studied; suggesting that the basis for calculating profitability measures may not be universal across countries. Whether different accounting procedures lies at the root of the observed differences among performance measures will need to be addressed in the future.

Table 1
Correlation and Descriptive Statistics^a (JAPAN)

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
ROA	0.74	2.47												
ROE	1.98	23.63	0.12											
ROS	0.85	3.07	0.94**	0.23*										
MVA	808,089	192,364	0.18	0.02	0.19*									
EVA	-17,148	45,904	0.27**	0.11	0.29**	0.05								
Firm size	20.94	1.17	0.01	0.09	-0.04	0.31**	-0.23**							
Capital intensity	1.10	0.36	0.04	-0.18	0.10	0.03	0.03	-0.37						
Debt leverage	2.69	5.79	-0.04	-0.61	-0.11	-0.13	-0.15	0.19*	-0.22					
R&D intensity	3.09	2.63	0.25**	-0.02	0.31**	0.32**	0.09	-0.07	0.25**	-0.25**				
PDVSF-Entropy	0.86	0.54	-0.14	-0.12	-0.15	0.01	-0.31**	0.19*	-0.04	0.19*	-0.01			
PDVSF-Concentric	0.18	0.08	-0.04	-0.21*	-0.06	0.15	0.09	0.01	0.17	-0.05	0.21*	0.55**		
MDVSF-Entropy	0.68	0.40	0.22*	-0.01	0.22*	0.40**	0.03	0.04	0.15	-0.08	0.21*	0.01	0.01	
MDVSF-Concentric	0.19	0.08	0.33**	0.03	0.30**	0.13	-0.17	0.11	0.07	-0.04	0.10	0.03	-0.03	0.67**

^a $n = 102$

* $P < 0.05$

** $P < 0.01$

Third, with the exception of ROA, all performance measures were positively correlated with the entropy measure of product-based diversification for U.S. firms, regardless of how product-diversification was measured. The "American perspective" of diversification as product-based (entropy) seems to be in effect among the firms in the sample. However, only EVA was associated with product-based diversification for Japanese firms. It would seem that the countries being studied do not exhibit the same relationships between product-based diversification and firm performance. Given the proposed "American perspective" and its wide acceptance among the U.S. firms it would not be surprising to find such a relationship. However, the more recent concentric measure of product diversification was only significantly related with lower levels of ROS for Japanese firms.

Table 2
Correlation and descriptive statistics^a (the U.S.)

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
ROA	6.38	6.69												
ROE	15.34	18.43	0.61**											
ROS	6.31	8.08	0.84**	0.62**										
MVA	20,420	34,851	0.36**	0.28**	0.35**									
EVA	2,873	10,567	0.11	0.10	0.21**	0.16*								
Firm size	16.33	0.93	0.09	0.11	0.13	0.33**	-0.02							
Capital intensity	1.18	0.69	-0.21**	-0.16*	0.08	0.09	0.21**	0.06						
Debt leverage	1.75	6.10	0.01	-0.03	-0.02	-0.07	0.10	-0.09	-0.01					
R&D intensity	3.30	4.23	0.31**	0.03	0.37**	0.31**	0.04	0.06	0.20**	-0.11				
PDVSF-Entropy	0.85	0.53	0.07	0.21**	0.15*	0.39**	0.38**	0.08	0.10	0.04	0.01			
PDVSF-Concentric	0.18	0.08	-0.03	0.15*	0.03	0.14	-0.02	0.04	0.03	0.03	-0.1	0.56**		
MDVSF-Entropy	0.76	0.36	0.19**	0.16*	0.16*	0.08	-0.03	-0.07	-0.11	-0.11	0.37**	0.02	-0.05	
MDVSF-Concentric	0.21	0.06	0.02	0.04	0.01	0.04	0.01	-0.08	-0.08	-0.09	0.26**	0.01	0.01	0.64**

^a n = 172

* P < 0.05

** P < 0.01

Fourth, only accounting-based performance measures were significantly associated with multinational diversification for the U.S. firms. The U.S. firms did not show any relationship between multinational diversification and performance when measured using the concentric method of calculation. Once again, the overall perspective of entropy or product based rules for determining diversification is evident for the U.S. firms. Japanese firms on the other hand, reported significant relationships between accounting- and market-based measures of performance and multinational diversification, when using both entropy- and concentric-based measures of diversification. It should be noted that only MVA was correlated with multinational diversification for Japanese firms. The most universal and consistent relationship across countries was found between accounting-based performance measures and multinational diversification when measured using the entropy method of calculation.

Lastly, there was a great degree of commonality between the two perspectives for computing product- and market-based measures of diversification. Both multinational-entropy and multinational-concentric, and product-entropy and product-concentric were positively correlated with each in U.S. and Japanese samples. When the derivation of the two alternative proxies of diversification (entropy and concentric) is taken into account a lot of similarities are readily apparent. The finer distinctions between the two measures may not be reflected in the current sample.

R&D intensity was consistently identified as an important factor in explaining firm performance. In addition to R&D intensity, only firm size was significantly correlated with firm performance for Japanese firms. For U.S. firms, size was only correlated with EVA, while capital intensity was more important in explaining a firm's performance.

Results of the hierarchical regressions (Tables 3 and 4) suggest that all measures of diversification were significantly important in explaining a firm's performance, when performance was measured by market-based measures (EVA and MVA). Both measures of multinational diversification were positively associated with EVA and MVA across countries, supporting the contention that multinational diversification may indeed lead to improved performance. It should be noted that causality was not addressed in the study and therefore, no firm conclusions can be drawn on this point.

Although product-based diversification was consistently related with market-based performance, the direction of the relationships varied across countries. First, both U.S. and Japanese market-based performance measures reflected a negative correlation with product-based diversification when measured using the entropy measure. However, U.S. firms report a negative relationship between market-based measures of performance and concentric product diversification, while Japanese firms report a positive relationship. It can be concluded that product-based diversification has an overall negative influence on firm performance when measured as EVA and MVA and that this applies across countries.

Results using accounting-based measures of firm performance yield conflicting and inconsistent findings between countries. ROS was positively correlated with concentric multinational diversification for both Japanese and the U.S. firms, while ROA was positively associated with concentric multinational diversification for Japanese firms, but negatively related in the U.S. sample. However, ROE was positively related to entropy- and concentric-base measures of product diversification

for U.S. firms, but the Japanese sample reports a negative relationship with entropy-based multinational diversification and a positive association with concentric-based multinational diversification. Based on these findings the exact relationship among accounting-based measures of performance and diversification cannot be clearly ascertained.

Table 3
Results of hierarchical regression analysis: JAPAN^a

Variable	ROA		ROE		ROS		MVA		EVA	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Firm size	0.018	0.219	0.126	0.128	-0.003	-0.023	0.381***	0.371***	-0.240	-0.178
Capital intensity	-0.010	-0.039	-0.267***	-0.228**	0.024	0.013	0.084	0.027	-0.99	-0.137
Debt leverage	0.025	0.064	-0.533***	-0.551***	0.020	0.013	-0.110	-0.085	-0.106	-0.028
R&D intensity	0.266**	0.248**	0.126	0.082	0.288	0.288	0.287**	0.205**	0.072	0.017
PDVSF-entropy		-0.169		0.121		-0.138		-0.112		-0.462***
PDVSF-concentric index		0.023		-0.040		-0.019		0.357***		0.216*
MDVSF-entropy		-0.052		-0.247**		-0.036		0.214**		0.362**
MDVSF-concentric index		0.360**		0.203**		0.289**		0.231**		0.242*
R ²	0.067	0.192	0.336	0.375	0.097	0.195	0.224	0.353	0.074	0.260
Δ R ²		0.125		0.039		0.099		0.129		0.186
F	1.742	2.760**	25.546***	14.359***	2.593*	2.816**	6.984***	6.336***	1.946	4.090***
F change in R ²		3.592**		2.349*		2.846*		4.639**		5.845***

^an = 102 ("listwise" deletion). Values are standardised regression coefficients. * P < 0.05, ** P < 0.01, *** P < 0.001

Table 4
 Results of hierarchical regression analysis: U.S.A. ^a

Variable	ROA		ROE		ROS		MVA		EVA	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Firm size	0.090	0.080	0.118	0.109	0.108	0.094	0.308***	0.277***	-0.020	-0.050
Capital intensity	-0.286***	-0.039	-0.181*	-0.178*	0.006	0.008	0.020	0.023	0.208**	0.152
Debt leverage	0.053	0.048	-0.018	-0.019	0.028	0.021	-0.005	-0.026	0.016	0.109
R&D intensity	0.370***	0.349***	0.051	0.016	0.258**	0.340**	0.278***	0.284***	0.106	0.083
PDVSF-entropy		0.131		0.186*		0.149+		-0.419+		-0.467***
PDVSF-concentric index		0.176+		0.231*		0.0171+		-0.207*		-0.195*
MDVSF-entropy		-0.067		0.058		-0.026		0.184*		0.345***
MDVSF-concentric index		-0.189*		-0.125		0.280**		0.242**		0.190*
R ²	0.186	0.223	0.045	0.125	0.144	0.186	0.187	0.327	0.055	0.270
Δ R ²		0.037		0.080		0.042		0.139		0.215
F	9.548	5.839***	1.960	2.914**	2.593*	2.816**	9.612***	9.882***	2.437	7.539***
F change in R ²		1.919		3.739**		2.100*		8.439***		11.998***

^an = 172 ("listwise" deletion). Values are standardised regression coefficients.
 *P < 0.05, **P < 0.01, ***P < 0.001

The overall results do suggest that international differences do exist when it comes to the diversification and the various methods of operationalisation. In general, market-based measures of performance are more strongly and consistently associated with various measures of diversification. Evidence clearly points to the strength of utilizing the market-based measures of EVA and MVA in conducting research studies on the subject of diversification. The preponderance of the results supports the contention that multinational or market-based diversification tends to outperform product-based diversification, especially when it comes to U.S. firms. However, Japanese firms are able to derive positive benefits from product-diversification when operationalised by the concentric index. Such differences between countries highlight the notion that international differences do, in fact exist when engaging in diversification. Understanding the rationale for these differences may serve as a key to unlocking the mystery of international diversification.

Of the covariates used in the models firm size was helpful in explaining firm MVA across countries, although it was not significant in any other model. This supports the contention that larger firms are more profitable and create more value, as defined by MVA, than smaller firms. R&D on the other hand, was found to exert a positive

effect on performance when measured as ROA, ROS, and MVA for U.S. and Japan. Capital intensity seemed to play a greater role in U.S. firms than in the Japanese sample, while debt leverage was negatively related in the Japanese sample for ROE.

In general, the research findings suggest that market-based measures of firm performance, EVA and MVA, may more accurately reflect the benefits and liabilities of diversification strategies than traditional accounting-based measures. The use of EVA and MVA measures of firm performance were more consistent and significant in the present study than the more traditional accounting-based measures. Accounting-based measures did not show any consistency across the various diversification measures or countries used in the present study. The evidence suggests that accounting-based measures of performance may not be the most comprehensive method for evaluating the effects of diversification on firm performance. Some of the differences observed in the results are primarily accountable to two things: different measures of performance and different measures of diversification. In addition, the assumption of generalisability of diversification indexes across countries can be risky at best and downright dangerous when it comes to comparability with previous studies. The contention that the strategy of diversification is universal across countries has not been supported.

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