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An assessment of the measurement of performance in international business research

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Abstract
A sizeable body of international business (IB) research is devoted to building knowledge about the determinants of organizational performance. A key precursor to accurately diagnosing why some organizations succeed in the international marketplace while others struggle is operationalizing performance appropriately. Yet, to date, no systematic investigation has considered how well IB research measures performance. We examine the measurement of performance in 96 articles published in the *Academy of Management Journal*, *Administrative Science Quarterly*, *Journal of Marketing*, *Journal of Marketing Research*, *Journal of International Business Studies*, *Management Science*, *Organization Science*, and the *Strategic Management Journal* between 1995 and 2005. The findings reveal that most studies do not measure performance in a manner that captures the multifaceted nature of the construct. We describe the implications of these results, and offer suggestions for improving future practice.
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INTRODUCTION

Why some firms outperform others in the global arena is a primary research question within the field of international business (IB) (e.g., Hitt, Hoskisson, & Kim, 1997; Tallman & Li, 1996). As a result, performance is a key dependent variable of interest to IB scholars (e.g., Brouthers, 2002; Glaister & Buckley, 1999). However, although a great deal of research has focused on performance, IB researchers lament that the field has "yielded little by way of conclusive results" (Gomes & Ramaswamy, 1999: 173), often drawing "seemingly conflicting findings" (Kotabe, Srinivasan, & Aulakh, 2002) regarding the determinants of performance. Frequently, when a body of findings is equivocal, methodological problems are at issue (e.g., Ferguson & Ketchen, 1999; Lewin & Minton, 1986; Short, Ketchen, & Palmer, 2002). One possible contributor to this lack of performance findings in the IB literature derives from the diverse and complex operationalization of the performance construct (Ariño, 2003; March & Sutton, 1997; Venkatraman & Ramanujam, 1986). While all business disciplines must grapple with performance's multidimensional and multilevel

nature, operationalizing performance in the IB context is particularly difficult (e.g., Ariño, 2003) owing to cross-border variations in accounting standards, the nature of firm boundaries, and the geographic scope of operations (e.g., Fahy, Hooley, Cox, Beracs, Fonfara, & Snoj, 2000).

For example, an investigation by Hult, Ketchen and Slater (2004) of a multinational enterprise's supply chains revealed that the extent to which these chains focus on acquiring knowledge was positively related to subjectively measured cycle time performance, but was not related to objectively measured cycle time performance. In other words, supply chain participants believe that acquiring more knowledge reduces cycle time, but company records suggest that it does not. Had these authors used only the subjective measure of performance from primary data sources, they would have concluded that knowledge acquisition is a key lever for reducing cycle time in global supply chains. Had they relied only on the objective measure of performance from secondary data sources, they likely would have contended that knowledge acquisition matters little in the cycle time context. These results highlight the value of measuring performance via multiple indicators and multiple data sources to enhance the understanding of antecedents of the performance construct (cf. Ariño, 2003; Venkatraman & Ramanujam, 1986).

In this study, we extend Venkatraman and Ramanujam's (1986) performance-measurement framework, which focuses on multiple indicators and multiple data sources, for the international arena by incorporating level of analysis as a third dimension. Level of analysis is included, given:

(1) the increased development of unique strategies used by firms operating in the global marketplace at various operating levels;
(2) the movement of academic researchers toward deconglomeration of strategy in the assessment of performance (e.g., Ariño, 2003; Hult et al., 2004; Robinson & Pearce, 1988); and
(3) the growing importance within IB inquiry of heterarchical organizational structures (Hedlund, 1994).

The specific purpose of our paper is twofold. First, we assess the measurement of performance in IB research relative to three dimensions: *type of data sources* (primary and secondary[1]), *type of measure* (financial, operational, and overall effectiveness), and *level of analysis* (firm, strategic business unit (SBU), and inter-organizational). Next, based on the assessment of the literature related to performance, we offer guidelines for future research that are intended to assist the field in maximizing its potential for building knowledge regarding why some firms outperform others in the global arena. This study therefore follows Hitt, Boyd, and Li (2004), who argue that scholarly endeavors are needed to identify methodological dilemmas and propose remedies in order for fields to advance. The next section outlines the methodology used, followed by the findings, a discussion of the implications that can be drawn, and our conclusions.

METHODOLOGY

To assess performance research in the IB literature, a series of study parameters were established to set the boundaries for the research undertaken in this paper. These study parameters are established to identify clearly what was undertaken, and to bring out possible limitations in a transparent manner. First, for the purpose of this study, IB was defined as a firm-level phenomenon occurring across national borders (Morrison & Inkpen, 1991; Nehrt, Truitt, & Wright, 1970; Ricks, 1985; Ricks, Toyne, & Martinez, 1990; Werner & Brouthers, 2002; Wright and Ricks, 1994). Second, studies examining performance – be it at the level of the firm, the SBU, or the inter-organizational unit – were examined. Third, a time period of examination was established. Given that the "citation half-life" of premier journal articles is approximately 10 years (cf. Cabell, 2004), a conservative approach was undertaken, and an 11-year window (i.e., 1995–2005) was used.[2] This approach follows the argument that the incremental gain of analyzing articles beyond 11 years after publication provides considerably less benefit to the advancement of knowledge (Bergh, Perry, & Hanke, 2006; Chung, Cox, & Mitchell, 2001). This ensures that the majority of research that remains influential is covered in the study.

To select the journals to be included in the study, we followed the following process. First, we reviewed the journals associated with the core disciplines of IB (i.e., finance, marketing, management and economics) (Chandy & Williams, 1994). Among this set of journals, we chose only those journals that were considered the top-rated journals in their respective disciplines (e.g., DuBois & Reeb, 2000; Gómez-Mejia & Balkin, 1992; Hult, Neese, & Bashaw, 1997; Tahai & Meyer, 1999; Trieschmann, Dennis, Northcraft, & Niemi, 2000; Werner & Brouthers, 2002).[3] Next, we considered only those journals that had a focus on IB research (Werner &

Brouthers, 2002). Not surprisingly, the final list of journals contained primarily marketing and management journals, given the increasing influence of these two disciplines in the field of IB (Chandy & Williams, 1994). Given these criteria, the journals in our sample were *Academy of Management Journal*, *Administrative Science Quarterly*, *Journal of Marketing*, *Journal of Marketing Research*, *Journal of International Business Studies*, *Management Science*, *Organization Science*, and *Strategic Management Journal*. Lastly, to be included in the study, articles had to measure performance as a dependent variable in an international context at either the firm, SBU, or inter-organizational level of analysis. Using these parameters, 96 articles were identified for inclusion (see Table 1), with *JIBS* as the largest contributor, with 56 articles (58% of our sample).

The data collection proceeded in accordance with content analysis guidelines (cf. Kolbe and Burnet, 1991; Marshall & Rossman, 1989; Patton, 1990). Four scholars participated in coding the articles. The list of articles was divided into two halves, and two scholars independently coded each article within each half. Differences were resolved through discussion (cf. Kolbe & Burnet, 1991). As an additional check, 20 articles were randomly selected (10 from each half) and coded by alternate scholars. Inter-rater reliability (as measured by percentage of agreement) was 92.5%, which is above accepted standards (e.g., Kolbe & Burnet, 1991), and also compares favorably with similar studies (e.g., 93% in Shook, Ketchen, Hult, & Kacmar, 2004).

Each article was categorized by performance type (i.e., financial, operational, overall effectiveness). Financial performance centers on outcome-based indicators assumed to reflect economic goals, inclusive of accounting-based and market-based metrics (cf. Venkatraman & Ramanujam, 1986). In this study, financial performance includes overall profitability (indicated by ratios such as return on investment, return on sales, return on assets, and return on equity), profit margin, earnings per share, stock price, sales growth, growth of foreign sales, and Tobin's Q. Operational performance refers to non-financial dimensions, and focuses on operational success factors that might lead to financial performance (cf. Venkatraman & Ramanujam, 1986). Operational performance includes both product–market outcomes (including market share, efficiency, new product introduction and innovation, and product/service quality) and internal process outcomes (productivity, employee retention and satisfaction, and cycle time). Measurement of overall effectiveness reflects a wider conceptualization of performance, and includes reputation, survival, perceived overall performance, achievement of goals, and perceived overall performance relative to competitors (cf. Lewin & Minton, 1986; Venkatraman & Ramanujam, 1986).

Articles were also coded based on data source (i.e., primary *vs* secondary) (cf. Venkatraman & Ramanujam, 1986), with full documentation on how performance was measured (i.e., cross-sectionally, lagged, or longitudinally). In addition, the level(s) of analysis (firm, SBU, inter-organizational unit) at which performance was measured were assessed. Studies measuring performance using multiple performance types, multiple data sources, or at multiple levels of analysis were coded accordingly.

RESULTS

Types of Data Source

Table 2 presents the results for types of data source used (i.e., primary or secondary, where, following Venkatraman and Ramanujam's (1986) terminology, primary refers to subjective data and secondary data refers to objective data). Of the 96 studies examined, only two studies used both types of data source (i.e., Daily, Certo, & Dalton, 2000; Song, Xie, & Dyer, 2000). Each of the remaining studies used either primary measures (55 studies) or secondary measures (39 studies).

To further assess the data sources used in IB research, the data were examined across time periods. Splitting the sample based upon time resulted in 38.5% of the studies (37/96) being included in the 1995–1999 time period and 61.5% of the studies (59/96) in the 2000–2005 time period.[4] The findings of the time segmentation analysis indicate that the proportion of studies in the overall sample that used primary data to measure performance was 62.1% (23/37) during 1995–1999 and 54.2% (32/59) during 2000–2005.

Types of Measure

Findings related to the types of measure used (i.e., financial, operational and overall effectiveness) are presented in Tables 2–5. Our findings indicate that only seven studies (7.3% of the 96 studies assessed) used all three types of performance measurement. The use of two types of performance measure in a given study was more common, but studies of this sort constituted only 32.3% (31/96) of performance research over the 11-year period (with

Table 1 Studies included in the assessment

Academy of Management Journal (n=10)
Tallman and Li (1996)
Hitt, Hoskisson, and Kim (1997)
Autio, Sapienza, and Almeida (2000)
Aulakh, Kotabe, and Teegen (2000)
Zahra, Ireland, and Hitt (2000)
Delios and Beamish (2001)
Shrader (2001)
Tihanyi, Johnson, Hoskisson, and Hitt (2003)
Wan and Hoskisson (2003)
Lu and Beamish (2004)

Administrative Science Quarterly (n=1)
Luo (2001)

Journal of International Business Studies (n=56)
*Bird and Beechler (1995)
Birkinshaw and Morrison (1995)
Dussauge and Garrette (1995)
Gencturk and Aulakh (1995)
Johnson (1995)
Lee and Beamish (1995)
Murray, Kotabe, and Wildt (1995)
*Lyles and Salk (1996)
Aulakh, Kotabe, and Sahay (1996)
Holm, Eriksson, and Johanson (1996)
Hooley, Cox, Shipley, Fahy, Beracs, and Kolos (1996)
Makino and Delios (1996)
Anand and Delios (1997)
Dyer and Song (1997)
Gómez-Mejia and Palich (1997)
Katrishen and Scordis (1998)
Luo (1998)
Makino and Beamish (1998)
Mishra and Gobeli (1998)
Morosini, Shane, and Singh (1998)
Gomes and Ramaswamy (1999)
Luo and Peng (1999)
Money and Graham (1999)
Myers (1999)
Pan, Li, and Tse (1999)
Brouthers, Werner, and Matulich (2000)
Fahy, Hooley, Cox, Beracs, Fonfara, and Snoj (2000)
Reuer (2000)
*Luo, Shenkar, and Nyaw (2001)
Fey and Björkman (2001)
Lau and Ngo (2001)
Lenartowicz and Roth (2001)
Li, Lam, and Qian (2001)
Pantzalis (2001)
Peng and York (2001)
*Brouthers (2002)
*Brouthers and Xu (2002)
Buckley, Clegg, and Wang (2002)
Cadogan, Diamantopolous, and Siguaw (2002)
Evans and Mavondo (2002)
Kotabe, Srinivasan, and Aulakh (2002)
Nobeoka, Dyer, and Madhok (2002)
Pothukuchi, Damanpour, Choi, Chen, and Park (2002)
Skarmeas, Katsikeas, and Schlegelmilch (2002)
Ariño (2003)
Buck, Filatotchev, Demina, and Wright (2003)
Capar and Kotabe (2003)
Child, Chung, and Davies (2003)
Contractor, Kundu, and Hsu (2003)
Doukas and Lang (2003)
Hewett, Roth, and Roth (2003)
Zhang, Cavusgil, and Roath (2003)
Choi and Beamish (2004)
Dhanaraj, Lyles, Steensma, and Tihanyi (2004)
Knight and Cavusgil (2004)
Venaik, Midgley, and Devinney (2005)
Cadogan et al. (2002)

Journal of Marketing (n=9)
Bello and Gilliland (1997)
Dekimpe, Francois, Gopalakrishna, Lilien, and Van den Bulte (1997)
Samiee and Anckar (1998)
Capron and Hulland (1999)
Song, Xie, and Dyer (2000)
Hewett and Bearden (2001)
Homburg, Workman, and Jensen (2002)
Zou and Cavusgil (2002)
*Morgan, Kaleka, and Katsikeas (2004)

Journal of Marketing Research (n=2)
Kumar, Scheer, and Steenkamp (1995)
Simester, Hauser, Wernerfelt, and Rust (2000)

Management Science (n=2)
MacDuffie, Sethuraman, and Fisher (1996)
Ettlie (1998)

Organization Science (n=1)
Dyer and Chu (2003)

Strategic Management Journal (n=15)
Arora and Gambardella (1997)
Fiegenbaum, Shaver, and Yeung (1997)
Delios and Beamish (1999)
Daily, Certo, and Dalton (2000)
Geringer, Tallman, and Olsen (2000)
Lu and Beamish (2001)
*Robins, Tallman, and Fladmoe-Lindquist (2002)
Seth, Song, and Pettit (2002)
Vermeulen and Barkema (2002)
Brouthers, Brouthers, and Werner (2003)
Carpenter, Pollock, and Leary (2003)
Goerzen and Beamish (2003)
Dhanaraj and Beamish (2004)
Kim, Hoskisson, and Wan (2004)
Makino, Isobe, and Chan (2004)

Note: The use of measures of all three types – financial, operational, and overall effectiveness – was rare; only 7.92% of the studies assessed these three forms of performance. The studies that did so are marked with an asterisk.

Table 2 Distribution of performance measures: primary versus secondary data

	Financial performance			*Operational performance*			*Overall effectiveness performance*			*Total number of measures*[a]
	Primary	*Secondary*	*Number of measures*[b]	*Primary*	*Secondary*	*Number of measures*[b]	*Primary*	*Secondary*	*Number of measures*[b]	
Firm	14	27	43	10	8	19	8	2	10	54
Strategic business unit	13	6	19	10	3	13	5	1	6	23
Inter-organizational unit	9	4	13	8	1	9	16	1	17	25
Total	36	37	69	28	12	41	29	4	30	

[a]Accounts for financial, operational, and overall effectiveness measures used in studies at firm, strategic business unit, and inter-organizational unit levels. Number of measures does not necessarily sum to total number of measures because some studies used multiple measures of performance across categories and are double-counted.
[b]Primary and secondary figures and number of measures do not necessarily sum to reported totals because some studies used multiple measures of performance across the categories and thus are double-counted in the figures above. See Tables 4 and 5 for details of studies that used multiple measures.
Note: Two studies (Daily et al., 2000; Song et al., 2000) combined both primary and secondary data to examine firm financial performance, and therefore are not included in the counts above.

seven studies measuring overall effectiveness and financial performance, three measuring overall effectiveness and operational performance, and 21 measuring financial and operational performance). With respect to specific measures used within each performance type, Table 5 displays the most common measures by measurement type. For example, for financial performance, 52% used sales-based measures, 29% return on assets and 26% profitability. In addition, an examination of measurement over time indicates that the number of studies using performance measures of a single type was 59.5% (22/37) during the first 5 years of the study period and 59.3% (35/59) during the remaining 6 years of the study period.

It is important to note that although the measures listed under financial performance may appear to be secondary measures often found on financial statements, not all studies measured these items using secondary data. Indeed, 33 of the 69 studies using financial measures of performance used primary data. Of those, over 50% used sales-based measures of performance, such as sales growth and return on sales, and approximately 25% used return on investment.

Level of Analysis

Given the interrelated nature of the three performance dimensions investigated, level of analysis issues were examined in relation both to types of data source and to types of measure (see Tables 2 and 5). The data indicate that studies focusing on IB issues have relied to a greater degree on primary rather than secondary measures (93 *vs* 53 operationalizations). Primary measures of performance at the level of inter-organizational units were most often measured by respondents' perceived overall performance (80% of studies). Four of the five studies of interorganizational unit performance using secondary data employed financial measures, although the actual measures varied across studies. Both for studies using primary data and for studies using secondary data, the most common SBU performance measures were sales based: 66% of SBU performance studies using primary data and 75% of those using secondary data employed sales-based measures. Examining the data longitudinally, studies of firm and financial performance were 38.5% (5/13) during 1995–1999 and 30.0% (9/30) during 2000–2005, whereas studies of SBU and financial performance were 75.0% (6/8) during 1995–1999 and 63.6% (7/11) during 2000–2005.

Table 3 Use of multiple measures: financial, operational and overall effectiveness

	Firm	*Strategic business unit (SBU)*	*Inter-organizational unit*	*Total*
Financial and operational performance	9	10	2	21
Financial and overall effectiveness performance	4	3	3	7
Operational and overall effectiveness performance	0	0	3	3
All three	3[a]	1[b]	3[c]	7

[a]Brouthers (2002), Brouthers and Xu (2002), Morgan et al. (2004).
[b]Bird and Beechler (1995).
[c]Luo et al. (2001), Lyles and Salk (1996), Robins et al. (2002).
Note: Rows do not necessarily sum to total because some studies used multiple measures across firm, SBU, and inter-organizational performance types.

Table 4 Use of multiple measures: firm, SBU, and inter-organizational unit

	Financial performance	*Operational performance*	*Overall effectiveness performance*	*Total*
Firm and SBU	2	0	2	2
Firm and inter-organizational	1	0	1	1
Inter-organizational and SBU	1	0	0	3
All three (firm, SBU, and inter-organizational)	1[a]	0	0	1

[a]Shrader (2001).
Note: Rows do not necessarily sum to total because some studies used multiple measures across financial, operational, and overall effectiveness performance types.

Table 5 Commonly used measures by performance type

	Financial performance[a]	*Operational performance*	*Overall effectiveness performance*
Firm	Sales based: 44% Return on assets: 40%	Market share: 47%	Reputation: 30%
Strategic business unit	Sales based: 68% Return on investment: 47%	Market share: 46%	Performance relative to competitors: 50% Perceived overall performance: 33%
Inter-organization unit	Sales based: 62% Profitability: 31%	Productivity: 44% Market share: 33% Product/service quality: 33%	Perceived overall performance: 71%
Total	Sales based: 52% Return on assets: 29% Profitability: 26%	Market share: 44% Productivity: 20%	Perceived overall performance: 47% Performance relative to competitors: 20%

[a]"Sales based" includes sales volume, foreign sales/total sales, sales growth, and growth in foreign sales.

The results for types of measure used across levels of analysis are reported in Tables 2–5. Table 2 indicates that the largest body of studies (44.8% or 43/96) focused on the firm level of analysis and used financial measures of performance. As shown in Table 3, the only studies to combine operational performance and overall effectiveness measures were studies of inter-organizational unit performance. As presented in Table 4, only one study measured performance at all three levels (i.e., Shrader, 2001), six studies (6.3%) measured performance at two levels, and 92.7% (89/96) of studies measured performance at one level. These results suggest a lack of breadth in relation to performance measurement across units of analysis. Table 5 indicates the most frequently used measures by level of analysis and measurement type. The measures most often used for financial performance, regardless of level of analysis, were sales based. Finally, the dominance of measuring financial performance at the firm level was consistent throughout the 11-year period covered in our study. The proportion of studies using financial measures was 70.3% (26/37) during the first period and 72.9% (43/59) in the second period. Additionally, the proportion of studies using firm performance

measures was 48.6% (18/37) in the first period and 61.0% (36/59) in the second period.

IMPLICATIONS

Our findings indicate that five broad issues related to IB performance measurement should be considered in future IB research. Clearly, adhering to all aspects of what Table 6 summarizes in terms of the implications of the findings is unlikely in every IB research project. However, we view the issues in Table 6, which are discussed in this section of the paper, as an "action plan" for improving the measurement of performance within the IB field in the same spirit as the main thrust in the work by Venkatraman and Ramanujam (1986). IB researchers should therefore attempt to incorporate as many of the action items as possible into their research while balancing research rigor with practical relevance.

Overcome Reliability Issues with Primary and Secondary Data Sources

Some researchers may be suspicious of the validity of primary data sources, and concerned about bias introduced with subjectivity, but performance research in international contexts indicates that primary data measuring performance can be more reliable than secondary data in certain contexts –

Table 6 Action plan for performance research in international business

Overcome reliability issues with primary and secondary data sources

Use primary data sources in the following conditions:

- When financial measures are likely to be unreliable or are unavailable
- When privately held firms are studied, and secondary data cannot be accessed
- When comparability of different types of firm is difficult to achieve owing to heterogeneous attributes (e.g., firm objectives, culture, context)
- Data concerning specific units of analysis (e.g., SBU) cannot be obtained from secondary sources
- Managers are reluctant to provide secondary data due to competitive or proprietary concerns

Consider these factors when using cross-national financial and accounting data:

- Earnings capitalization, book value, and residual income valuation models
- Accruals and cash accounting structures (e.g., common accounting standards)

Improve international business research by measuring multiple types of performance

To measure performance as a multidimensional/multilevel construct:

- Use measures that capture objective financial, operational, overall effectiveness performance whenever possible
- Measure performance using different units of analysis – firm, SBU, and inter-organizational – as demanded by the research setting studied

Make valid causal inferences with proper longitudinal measures of performance

Use longitudinal data under the following conditions:

- Whenever possible, use performance data taken from a period of $t + n$, where t is the time period when the (primary and/or secondary) antecedent variables were collected, and n equals any time later than the collection of the (primary and/or secondary) antecedent variables (additionally, for each step in a multi-step model, use data taken from a period later than the previous variables for each step, if possible)
- Collect performance data across organizations and over (multiple) time periods whenever possible
- When panel data are unavailable, collect primary performance data at a time later than the data on explanatory variables ($t + n$)

Improve inferential specificity in relation to level of analysis

Utilization of the extant literature

- Empirical findings being drawn for comparison are at similar level of analysis
- Theoretical development based upon arguments established in the extant literature are at the same level of analysis

Resolve concerns with endogeneity and selection

Use two-stage least squares (2SLS):

- When the dependent variable is correlated with the error term in the regression equation
- When criterion variable is nonrandom and level effect impacts only on intercept term

Use "Heckit":

- When the dependent variable is observed for portion of sample. and is nonrandom
- When dependent variable and explanatory variables (intercept as well as independent variables) are nonrandom

such as emerging markets as China (e.g., Lukas, Tan, & Hult, 2001) – where objective measures are often unreliable. Further, the use of primary data for measuring performance in IB is particularly appropriate when the researcher is aiming to identify not only the goals associated with a specific strategy but also the understanding and interpretation of an organization's performance goals by managers (Brouthers, 2002). In situations where firms (and managers) are hesitant to provide secondary financial, operational, or overall effectiveness performance data, collecting primary data provides IB researchers with a better ability to understand the values that a manager may place on specific financial, operational, or overall effectiveness performance measures. In fact, some researchers contend that, given the different goals inherent across firms, secondary measures can be misleading as to the firms' focus on the performance measures analyzed, thus potentially making primary measures more realistic than secondary ones in certain cases (Robinson & Pearce, 1988; Zhang, Cavusgil, & Roath, 2003).

Grounded in the notion that managerial perceptions and actions may influence a firm's responses to its environment (cf. Child, 1972), the premise that perceptions among managers differ across countries was introduced early in the IB literature (e.g., Vogel, 1976). Generally, culture (e.g., national, organizational, professional, group) and national wealth have been found to explain many perceptual differences among managers, across countries, across firms, and across functional areas (Hofstede, Deusen, Mueller, & Charles, 2002; Leung, Bhagat, Buchan, Erez, & Gibson, 2005; Neelankavil, Mathur, & Zhang, 2000). Further, whether analyzing managerial perceptions of short-term financial planning (Gentry, Mehta, Bhattacharyya, Cobbaut, & Scaringella, 1979), influences on a firm's capital structure (Wald, 1999) or external conditions influencing firm operations (Miller, 1993), the institutional environment in which managers function has a fundamental and systematic role in influencing managerial perceptions of risk (Makhija & Stewart, 2002). The sole use of primary measures of performance may therefore not capture the full dimensions of performance (it may also result in single-source bias and common method variance concerns). This leads to the need for secondary (objective) measures of performance in IB research to supplement the limitations that measures of performance based on managerial perceptions may exert in cross-country measurement.

While overcoming some of the limitations of primary measures of performance, the use of secondary measures of performance is not without limitations. Specifically, the influence of differing, and at times competing, accounting standards has been noted to shape how performance is perceived and measured within the IB context (Ashbaugh & Olsson, 2002; Ball, Kothari, & Robin, 2000; Buck, Filatotchev, Demina, & Wright, 2003; Hung, 2000; Kachelmeier & Shehata, 1997). International firms are often subject to multiple institutional contexts, and therefore typically operate under heterogeneous accounting standards (exceptions to this may include exporters who operate from a single country). For example, differences in disclosure standards exist among domestic and foreign firms listed on the New York Stock Exchange and the Securities and Exchange Commission (Huddart, Hughes, & Brunnermeier, 1999). Similarly, in a study spanning 21 countries, Hung (2000) found that accrual accounting negatively affected the value of financial statements in countries with little shareholder protection, but did not have an influence in countries with strong shareholder protections in place. The complications associated with accounting measures in a variety of countries leave some researchers to posit that secondary measures of performance are incomparable (and sometimes misleading) (Brouthers, 2002; Brouthers, Brouthers, & Werner, 1999; Buck et al., 2003; Chandler & Hanks, 1993; Fey & Björkman, 2001).

However, the movement toward harmonized standards, such as those offered by the International Accounting Standards Board, have diminished differences considerably (Hope 2003). One way to overcome accounting differences in the measurement of performance with secondary data is to restrict samples to firms adopting harmonized standards (although changing exchange rates will still make cross-country comparisons difficult). It is important to note while restricting the sample to firms adopting harmonized standards may introduce selection bias issues: for example, if the population of firms that adopt harmonized standards is fundamentally different from those who do not, researchers must interpret the implications of their findings conservatively. Dropping observations from firms or organizational forms that do not operate under harmonized accounting standards is analogous to dropping country contexts from the sample. The researcher must then decide whether or not the research question is still interesting and meaningful in the absence of

observations from these countries. For example, if the researcher is concerned primarily with entry mode or international expansion, confining analysis to firms with a common parent country and, in turn, the same accounting regime is unlikely to jeopardize the integrity of findings unless the goal is to generalize beyond companies listed in that country. In some cases, country-level fixed effects to control for the differences in accounting standards across countries and allow for a *ceteris paribus* interpretation may work. Thus opting for perceptual or overall measures of performance, as argued by Pothukuchi, Damanpour, Choi, Chen, and Park (2002), may be the most reasonable option. In short, the extent to which differences in accounting standards are a problem depends on the research question, but considering the potential impact of these differences when formulating research questions and study design should be a universal step in the process of IB research.

Overall, using primary or secondary sources of data alone to measure performance does not necessarily capture the entire domain of the construct. It can introduce the possible dilemma of single data source bias and/or lead to inaccurate inferences (as evidenced by the earlier example of Hult et al., 2004). As only two studies in our sample used both types of data, one could conclude that the extant IB research may reveal less about why some firms outperform others than it could if research designs were used that assessed performance via the use of both primary and secondary measures. Thus, to draw conclusions about performance in IB research more effectively, building on prior measurement concerns in the literature (e.g., Dess & Robinson, 1984; Glaister & Buckley, 1999; Harris, 2001), we suggest that IB researchers consider using both primary and secondary sources of data whenever possible in the measurement of firm performance.

Improve IB Research by Measuring Multiple Types of Performance

Our findings indicate that few of the IB studies examined meet the most rigorous standards of specification for performance measurement (cf. Lewin & Minton, 1986; Venkatraman & Ramanujam, 1986). To advance knowledge of how performance is generated in international contexts, and to generate normative conclusions for practitioner use, research should be based on clearly specified measures of type of performance to minimize misleading results. For instance, Gomes and Ramaswamy (1999), by clearly specifying performance types, found the influence of multinationality to be positive with respect to financial performance and negative with respect to an operational performance measure.

Further, although some studies use multiple measures of performance (e.g., Luo, Shenkar, & Nyaw, 2001), these studies often use multiple measures sampled from the same conceptual performance domain (e.g., multiple financial performance measures such as return on assets and return on sales). Thus, rather than examining measures from across the three performance categories (financial, operational and overall effectiveness) to create a multidimensional approach, or to test hypotheses at multiple levels of performance, these studies, much like single-metric studies, provide a narrow perspective of antecedents to performance elements. Such analyses can lead to inappropriate inferences when generalized, as well as not providing the robustness necessary for fully understanding the relationships between antecedents of specified aspects of performance.

The use of a single performance metric (or multiple measures sampled from the same conceptual domain) may help determine the drivers of a specific aspect of performance (Fahy et al., 2000) in relation to a specified research question. These "unidimensional" performance studies are important first steps in understanding certain performance-based relationships. However, as knowledge in the IB field deepens, it is important to use multiple types of performance measures to gain a more complete view of the nature of performance (e.g., Gomes & Ramaswamy, 1999). Alternatively, multiple studies testing the same relationships but using different types of performance measure should become a natural ingredient in IB research to advance knowledge. At the same time, it is appropriate to suggest that researchers should consider using measures of multiple types of performance to comprehend more fully the relationships studied. Research can also benefit from devising measures that are more closely tailored to the particular theory being tested (e.g., Reuer & Tong, 2007; Tong & Reuer, 2007).

Make Valid Causal Inferences with Proper Longitudinal Measures of Performance

Our findings indicate that the IB literature is dominated by studies that measure performance cross-sectionally as opposed to longitudinally or

with time lags. Conclusions regarding causality require an inferential leap of faith when using cross-sectional data (cf. March & Sutton, 1997). These inferences of causality can be considerably strengthened when key variables are measured over time (Kotabe et al., 2002). For example, researchers indicate that past profitability is a better predictor of current profitability than country or industry effects (Haar, 1989; Whittington, 1971). These studies generally regressed average performance over the most recent set of years (e.g., 5 years) on a series of country and industry dummy variables and an average of performance for the time period (e.g., 5 years) immediately following. As an interesting example of studying performance over time, Brouthers (1998) used pooled cross-sectional times-series analysis that regressed profitability at time t on a series of country and industry dummies with interaction and profitability at time $t-1$ for 167 firms over 15 years. With this study design, Brouthers (1998) found the effect of past profitability to be insignificant, indicating that in prior cross-sectional studies averaging of the "lagged" profitability variable picked up differences across firms rather than across time.

Ideally, longitudinal data should be used to assess the influence of a predictor variable on the criterion variable. The appropriate time lag is of particular importance when using longitudinal research (e.g., 1 year, 3 years, multiple year average). In the case of a time lag, it is critical that researchers match the duration of the lag appropriately with the specified research question and the theoretical nature of the intended effect. For example, Geringer, Tallman, and Olsen (2000), when examining the performance effects of product and international diversification, argue for a 1-year time lag as it is indicative of the typical planning cycle in their sample (i.e., they theoretically tied the lag period to the intended antecedent effect). We suggest that researchers should carefully determine (and report) the theoretical rationale for the selected lag period in relation to the research question (and antecedents) under investigation (cf. March & Sutton, 1997). However, it is important to note that, even with theoretically justified lag effects, causality is often difficult to establish. For example, Cool and Schendel (1987) find that although strategic groups are stable across time periods, performance across time periods related to these groups is not suggestive of the importance of contextual effects.

Unfortunately, although longitudinal data are strongly preferred for establishing causality, limited data availability and the expense and difficulty of data collection make longitudinal studies rare in IB research. To overcome these limitations, researchers can use various methodological solutions. First, when panel data are not available, researchers could estimate "seemingly unrelated regression" (SUR) models with an unequal number of observations, or analyze the data within "structural equation models" (SEM) to draw causal inferences (assuming that solid theory guides the research). Alternatively, researchers could use dynamic regression models, or models with lagged variables. Further, under circumstances of data limitations, IB research might also benefit from attention to the Granger causality test (cf. Greene, 2003; Gujarati, 2003). While this type of causality is by no means the same as theoretical causality, evidence that changes in explanatory variables do consistently precede changes in the dependent variable makes a stronger case for inferring theoretical causality.

In summary, cross-sectional measurement of performance is often insufficient to support the causal inferences that researchers desire to make in performance studies. Ideally, performance and its antecedents should be measured longitudinally. By gathering data across time periods, IB researchers can better infer that findings are not unique to the contextual conditions associated with one specific moment in time. However, when longitudinal data are not available, researchers should consider using SUR models, SEM models, dynamic regression models, or Granger causality testing to enhance causal inferences.

Improve Inferential Specificity in Relation to Level of Analysis

The findings indicate that IB research varies widely in the level of analysis (i.e., SBU, firm, inter-organizational) in which performance is measured. The variability in the unit of analysis of extant IB performance research creates both empirical and theoretical concerns for the advancement of the field.

Empirically, inconsistencies in levels of analysis across studies could partially explain the contradictory findings in the IB literature. For example, a positive influence of antecedent X on performance in study 1 and a lack of effect of antecedent X on performance in study 2 could be attributed to the fact that study 1 focused on the firm level whereas study 2 focused on the inter-organizational level

(when the same type of performance was measured across studies). Examination of the unit of analysis, when comparing empirical findings across studies, therefore becomes an important concern for drawing appropriate inferences.

Arguments made at one level of analysis are not automatically generalizable to other levels of analysis (Klein, Dansereau, & Hall, 1994). An examination of the literature studied indicates that antecedents of performance at one level of analysis are often used to establish similar theoretical linkages at other units of analysis. Issues of theoretical generalizability abound when extrapolating the theoretical arguments from one unit of analysis to another (Klein et al., 1994). The issue of mixed units of analysis in the operationalization of a model is widely criticized, but mixing theoretical levels of analysis in drawing inferences between antecedents and consequences from one study to another is often overlooked. For example, although a specified antecedent may be positively related to operational performance at an SBU level, the generalization of that relationship to the inter-organizational level may be inappropriate, given differences in the boundary parameters of the initial study.

We therefore argue that scholars, reviewers, and editors carefully examine the level of analysis used in the theoretical development of hypotheses and empirical generalization in relation to IB research focused on performance. This is not to say that all constructs have to be at the same level in a research study; it is very plausible that SBU antecedents can have an effect on firm-level performance (especially if the SBU is of significant size within the firm). However, critically, through diligence in theoretical development and application of extant empirical findings, the alternative explanation embodied by mixed levels of analysis in relation to performance antecedents can be overcome.

Resolve Concerns with Endogeneity and Selection

Endogeneity and selection are important problems for IB performance researchers; however, these issues have received limited attention in the IB performance literature (Brouthers, Brouthers, & Werner, 2003; Heckman, 1979; Shaver, 1998). Following Shaver (1998), who demonstrated the importance of appropriately applying selection correction models to account for self-selection in entry mode research, IB research has recently begun to address endogeneity problems formally (e.g., Brouthers et al., 2003). While issues of endogeneity and selection are not directly related to the measurement of performance in isolation, they are issues that IB researchers universally face in the course of modeling performance, and therefore are deemed relevant to this discussion.

An explanatory variable is endogenous when it is correlated with the error term in the regression equation. Perhaps the most common form of endogeneity that arises in performance research occurs when an individual or organization's choice of behavior or strategy is nonrandom (or "self-selected"). For example, strategic choice may depend in part on a firm's corporate culture, organizational capabilities, or some other factors that are difficult to measure and cannot be included in the model. Thus the strategic choice construct will be correlated with the error term, and OLS estimation will produce biased parameter estimates. The usual econometric response to this problem is two-stage least squares (2SLS) estimation. Alternatively, selection occurs when there is incidental truncation, that is, where the dependent variable is observed for a portion of the sample only, and is nonrandom. The usual econometric response to this problem is a selection correction technique similar to that used in Shaver (1998), which was adapted from Heckman (1979) and is now increasingly referred to as the "Heckit".[5]

It is easy to confuse the issues of endogeneity and selection when there is an endogenous binary (dummy) variable. As is the case in the entry mode literature, Shaver (1998) and subsequent papers (e.g., Brouthers et al., 2003) argue that choice of entry mode is nonrandom. In this situation, the researcher must decide whether there is an endogeneity problem, a selection problem, or both. One may conclude that this is an endogeneity problem only because performance is observed, regardless of the choice of entry mode. Yet the issue is not quite as clear as the definitions of endogeneity and selection might imply. When acquisition is chosen, acquisition performance is observed but the performance of a greenfield project may not be observed. The situation could be reversed as well, when a new factory constructed in a greenfield venture is chosen as the unit of analysis instead. In other words, incidental truncation may exist.

Practically, if the researcher believes that entry mode choice is nonrandom but that the choice of entry mode has a level effect only (i.e., influences the intercept term in the performance model only and not the coefficients on other key explanatory

variables), then a 2SLS estimation strategy for entry mode choice is appropriate. However, if the researcher believes that choice of entry mode should influence both level of performance and other explanatory variables on performance (different intercept and difference slopes), a selection correction model such as Heckit is appropriate.

Performance research in the IB literature often seeks to explain a phenomenon that is part of a rich system of causal linkages that is sometimes less than clear. Identification for any model related to this stream of IB research is indeed formidable. However, IB by definition examines business phenomena in an international context. This implies that the phenomena of interest often occur under differing policy regimes and macroeconomic conditions. If the researcher can identify a "treatment" group of organizations (for which a policy change or macroeconomic occurrence can be argued to be a source of exogenous variation in key explanatory variables) and a "control" group (which did not experience the same change, and has at least two periods of data for these two groups, one before and one after the change), divergence in differences estimation is possible (cf. Snyder & Evans, 2006).

In summary, we argue that although IB research may be limited by data availability, statistical tools can often be used to address complications related to endogeneity and selection. As a value-added element, IB researchers should consider and report issues of endogeneity and selection in their studies to allow future research the possibility to more fully explore such issues.

LIMITATIONS AND CONCLUSION

Although our research provides a number of new insights, it is not without its limitations. First, in this study we used the data categorization scheme put forth by Venkatraman and Ramanujam (1986), where primary data are considered subjective and secondary data are considered objective. Although this categorization was used to maintain consistency with the framework driving our study, it is important to recognize that this approach is limited by the fact that both primary and secondary data can be both subjective and objective. It is therefore important that IB scholars carefully consider the subjective and objective nature of both primary and secondary research when examining performance. Second, we were unable to discern whether there are country-specific patterns in the use of data sources. It would be interesting, for example, to discover whether studies focused on US-based firms rely more on secondary data than studies focused on firms from other countries.

Third, although our findings offer a general assessment of the measurement of performance in IB research, it is important to recognize that the assessment is limited by the complexity of the phenomena under study. This means that the guidelines we provided in Table 6 and discussed in the implications section must be necessarily flexible to allow for the most appropriate study design for the research questions posed. For example, while we recommend multiple types of performance measurement to comprehend more fully the implications of antecedent factors, we also believe that is important that researchers: (1) measure performance in line with their theoretical model, which is driven by the primary research question under investigation; and (2) build parsimonious models. The former may restrict the necessary types of performance to be measured, and the latter may restrict both antecedents and performance constructs included for the sake of obtaining, for example, high-quality data. We therefore recommend that IB scholars carefully consider the appropriateness of each type of performance measure for their specified research question as well as clearly specify their type of performance measure and its appropriateness.

In conclusion, improving the effective measurement of performance is central to advancing the IB literature. This study sought to contribute to this advancement by examining the current status of IB performance measurement. Although limited by its scope (e.g., we did not examine mediators and levels that run between individual decisions and performance), our study provides an assessment of types of data, types of measure and level of analysis of performance measurement in the IB literature. The assessment revealed that performance has been studied in a manner that often overlooks its multidimensional and multilevel nature. While these issues are often mentioned as limitations within the extant literature, we suggest that researchers move toward more effective measurement of performance and greater specification and justification of its measurement. To this aim, we offer a set of guidelines for the advancement of effective performance measurement (Table 6). However, it is also important to note that the primary driver of the measurement of performance is the basic research question posed, and so our prescriptions for strengthening IB research

should be viewed as foundational guidelines, and not as the specified standards to be applied to all IB studies.

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NOTES

[1]In this study, to be consistent with the extant literature, we use Venkatraman and Ramanujam's (1986) terminology, where "primary" refers to subjective data and "secondary" refers to objective data.

[2]This time period was also selected based upon the initial discussions of measurement invariance in the IB literature initiated by Mullen (1995) and Singh (1995).

[3]Although the *Journal of Consumer Research* is considered influential in the marketing field (Werner & Brouthers, 2002), its primary unit of analysis is the consumer, not the firm. Also, no articles in *Marketing Science*, another important marketing journal, were found to be within the domain of our analysis.

[4]Based on a reviewer's comment, we also examined the data using two 5-year periods. The findings were substantively the same: thus we report findings that draw on all 11 years of data.

[5]See Heckman (1979) for a full explanation of the selection correction procedure, or Shaver (1998) for the adaptation to entry mode research.

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