

An Empirical Examination of the Dimensionality of the Integration-Responsiveness Framework

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Abstract: Although the pressures of global *integration* and local *responsiveness* have been discussed in the international business literature for more than a decade, empirical validation of these pressures has largely been ignored in this discussion. Our empirical work shows that representing these pressures as two independent and unidimensional constructs is imprecise and potentially misleading. Based on these findings, we suggest an alternative representation of the integration-responsiveness framework that better reflects the contemporary reality observed in multinational firms.

INTRODUCTION

The integration-responsiveness (IR) framework has been used extensively in the international business literature to identify the diverse and often-conflicting pressures confronted by firms as they expand their activities world-wide (e.g., Bartlett and Ghoshal, 1989; Prahalad and Doz, 1987). The framework has been used to study how these pressures affect the performance of multinational enterprises and it has been used to establish how these pressures impact on key decisions. For example, decisions such as the standardization-adaptation of marketing activities and the organizational structure choice of centralization-autonomy (e.g., Johansson and Yip, 1994; Martinez and Jarillo, 1991). Although the IR framework has been developed and applied for more than a decade, there have been few attempts at empirical validation. The objective of this study is to conduct such an empirical validation.

The paper is organized as follows. The next section briefly reviews the integration-responsiveness framework, followed by a discussion of the measurement and structural models tested in this study. Next, we explain the methodology used for data collection and model estimation and present the results of our study. We conclude with a discussion of our findings and directions for future research.

THE INTEGRATION-RESPONSIVENESS FRAMEWORK

The integration-responsiveness (IR) framework grew out of earlier evolutionary theories of the development of multinational enterprises (MNEs) (e.g., Perlmutter, 1969; Stopford and Wells, 1972; Vernon, 1966). Although these various models were popular, their major limitation was that they provide simplistic solutions to complex problems in multinational organizations (Bartlett, 1986). This oversimplification was due, in part, to their neglect of the global business environment—in particular the many technological, market, competitive and governmental factors that impact on the MNE. In response to omission, a number of authors—beginning with Prahalad (1975) and followed by Prahalad and Doz (1987) and Bartlett and Ghoshal (1989)—reformulated the classic differentiation and integration approach of Lawrence and Lorsch (1967) into the IR framework we recognize today.

Initially, Prahalad and Doz (1987) classified the environmental pressures on the managers of MNEs along three dimensions: (1) the need for global integration of activities, (2) the need for global

strategic coordination, and (3) the need for local responsiveness. Because they argued (although did not validate empirically) that the needs for global integration of activities and global strategic coordination were highly correlated, they combined the three into two essential dimensions—global integration (GI, or I) and local responsiveness (LR, or R)—resulting in the IR grid that became so popular (Figure 1). Indeed, the grid became epitomized in the famous phrase ‘think global, act local’—that is, effective managers are those who respond to the twin pressures for global integration and local responsiveness.

The Basic IR Grid

The IR framework has proved useful for mapping the different types of MNEs and their international strategy and organizational structure. The typology leads to a simple categorization of firms into four types: export firms, multidomestic firms, global firms and transnationals.

Export firms operate in an *international* environment characterized by low GI and low LR pressures. These firms export goods from a home production base to different parts of the globe, with minor modifications to suit the needs of overseas customers, and with little coordination between headquarters and foreign markets.

Multidomestic firms operate in a *multinational* environment with low GI but high LR pressures. In these firms, the subsidiaries are treated as autonomous entities, with locally responsive management and little coordination with the MNE headquarters or other subsidiaries. Activities are largely decentralized, although a few functions such as financial controls, marketing brand name, manufacturing technology and engineering know-how, may be coordinated globally from the headquarters. A Multidomestic’s marketing strategy is driven by local adaptation.

Global firms operate in a *global* environment characterized by high GI but low LR pressures. Although most functions in these firms are geographically concentrated in a few key locations, and the decision-making is largely centralized, a few functions may be dispersed worldwide. For example, a global firm may have its R&D and manufacturing in one country, whereas supply and marketing may be dispersed in several countries. Due to high GI pressures, these firms require a high level of global coordination within and between their country subsidiaries. The main advantage of a global strategy is lower costs arising from global standardization together with scale and scope economies.

Transnational firms operate in a *transnational* environment characterized by high GI and high LR pressures. In these firms, the aim is to simultaneously achieve global efficiency, local responsiveness and learning on a worldwide basis. According to Prahalad and Doz (1987), in more and more industries, the balance between the economic imperative of global integration and the political imperative of local responsiveness requires a high level of both in the form of a transnational strategy.

In sum, **export**, **multidomestic**, **global** and **transnational** firms pursue strategies that fit their respective *international*, *multinational*, *global* and *transnational* business environments. Although strategy is shaped by the structural characteristics of the industry, Porter (1986) acknowledges that firms with different strategies can coexist in the same industry. Thus, the nature of international strategy varies widely not only across industries but also among firms competing within the same industry and depends on both the firm's history and its sources of competitive advantage.

EMPIRICAL ANALYSIS USING THE IR FRAMEWORK

Prahalad and Doz (1987) identified the economic, technological, political and competitive factors that create the GI and LR pressures on the diverse businesses and functions in multinational firms. Bartlett and Ghoshal (1989) show that in the increasingly complex international business environment, successful MNEs are those that create a transnational organization with multidimensional capabilities. However, these works are case based and do not address issues of the validity of the IR framework through structured measurement or large samples. *Hence, this early literature does not answer a number of fundamental questions about the IR framework.* For example, are the two dimensions adequate to represent the diverse pressures on MNEs or are more needed? Does empirical data confirm that these dimensions are those postulated by the framework (that is, representing the pressures for GI and LR) or do they reveal other pressures? Are the two dimensions best thought of as independent (orthogonal as indicated by the grid) or are they inter-linked in some way? And how should we best conceptualize the measurement of these pressures—as *reflecting* some underlying and unobservable construct (as implied by the idea of GI and LR) or by simply *forming* some index of the pressures relevant to any particular situation, and without concern for any underlying constructs. These are fundamental questions that need attention if we are to progress.

Subsequent work by Roth and Morrison (1990) and Johnson (1995) supports the existence of three distinct strategic groups of multidomestic, global and transnational firms in international industries. However, in this work they *assumed* (1) that the IR framework was appropriate and (2) that the measures they used represented the IR dimensions. They then used cluster analysis to classify firms on the IR dimensions. Hence, whilst they provide a valuable contribution, we cannot look on these studies as providing a rigorous test of the structure and validity of IR pressures. Furthermore, although the three groups discovered have significant differences in their strategic orientation, interestingly, they do not differ significantly in their performance.

Birkinshaw, Morrison and Hulland (1995), in a re-examination of Roth and Morrison's data, show a four-factor structure behind their measure of 'structural forces'—standardized market demand, competitive action, economies of scale and comparative advantage differences across markets. However, it is not clear how these relate to the dimensions of GI and LR and it is unfair to assume that their findings are a test of the IR framework.

Murtha, Lenway and Bagozzi (1998) provide an empirical test of the constructs of integration, responsiveness and coordination—falling back on Prahalad's original (1975) formulation of the IR framework rather than the current version. Although their measures are validated with data from a single, diversified multinational, they conclude that it is important to cross-validate these measures with data from other MNEs. In addition, since the measures they used covered a narrower domain of pressures than that identified in the literature, it is important to include additional measures that reflect this literature.

UNDERSTANDING THE STRUCTURE OF INTEGRATION-RESPONSIVENESS

To our knowledge, there has been no empirical validation of the IR framework that encompasses both a large sample of firms and broad coverage of environmental pressures. Our discussion indicates that the prior investigation that does exist is stifled by a number of limitations. First, there is little empirical examination of which environmental phenomena should be included within a specific dimension. Second, some studies assume the structure of the dimensions rather than confirming that these accurately represent the natural tendencies in the data. Although adding theoretical rigor, such an approach potentially creates a problem of non-independent dimensions.

Third, limited sample sizes, in terms of the range of firms studied, restricts the breadth of phenomena being investigated. Use of multivariate techniques to determine the content of the dimensions can be biased by data with a restricted range, leading to overstatement of small differences. Fourth, there is confusion between the measurement of independent pressures and managerial choices. In other words, it is important to measure the GI and LR pressures confronted by MNEs explicitly, and not confound their measurement with choice of strategy or structure (Devinney, Midgley and Venaik, 2000). *We should separate the pressures in the firm's environment from its chosen response to that environment.*

The approach taken here is to investigate the multi-level structure of the dimensions of GI and LR and only then relate that structure to managerial decisions. The basic logic is shown in Figures 1 and 2. Much of the earlier discussion of GI and LR has assumed: (1) that a single level structure to each of the dimensions exists, and (2) that the dimensions are independent. This may not be the case and needs to be proved conclusively.

Figure 1 shows three forms of single level structures that one might postulate. (In all the figures that follow, UPPER-CASE letters indicate *constructs* and lower-case letters indicate *measures*.) In the case of a single level independent reflective structure we would look on the GI and LR constructs being 'reflected' in specific measures, all of which possess high correlation with the underlying construct (Figure 1a). Analytically this would be determined by factor analysis—an approach originating from psychology and the development of scales. In the case of single level formative structure we look on the construct as being 'formed' by an aggregation of measures (Figure 1b). Analytically this would be determined using a linear modeling technique such as regression analysis—an approach originating from economics and the development of indices. In the case of formative measures, we are concerned that they fit logically under the construct being studied. The final structure we can consider is a single level mixed formative structure (Figure 1c). In this case, measures might be related to more than one construct. This creates problems in the sense that if a number of measures are believed to affect more than one dimension, the separability of the dimensions becomes muddled and we must ask whether the theoretical structure being posited is parsimonious. However, if the number of 'mixed' measures is small, they may not invalidate the independence of the dimensions underpinning the framework.

Figure 1. Single Level Integration-Responsiveness Framework Structures

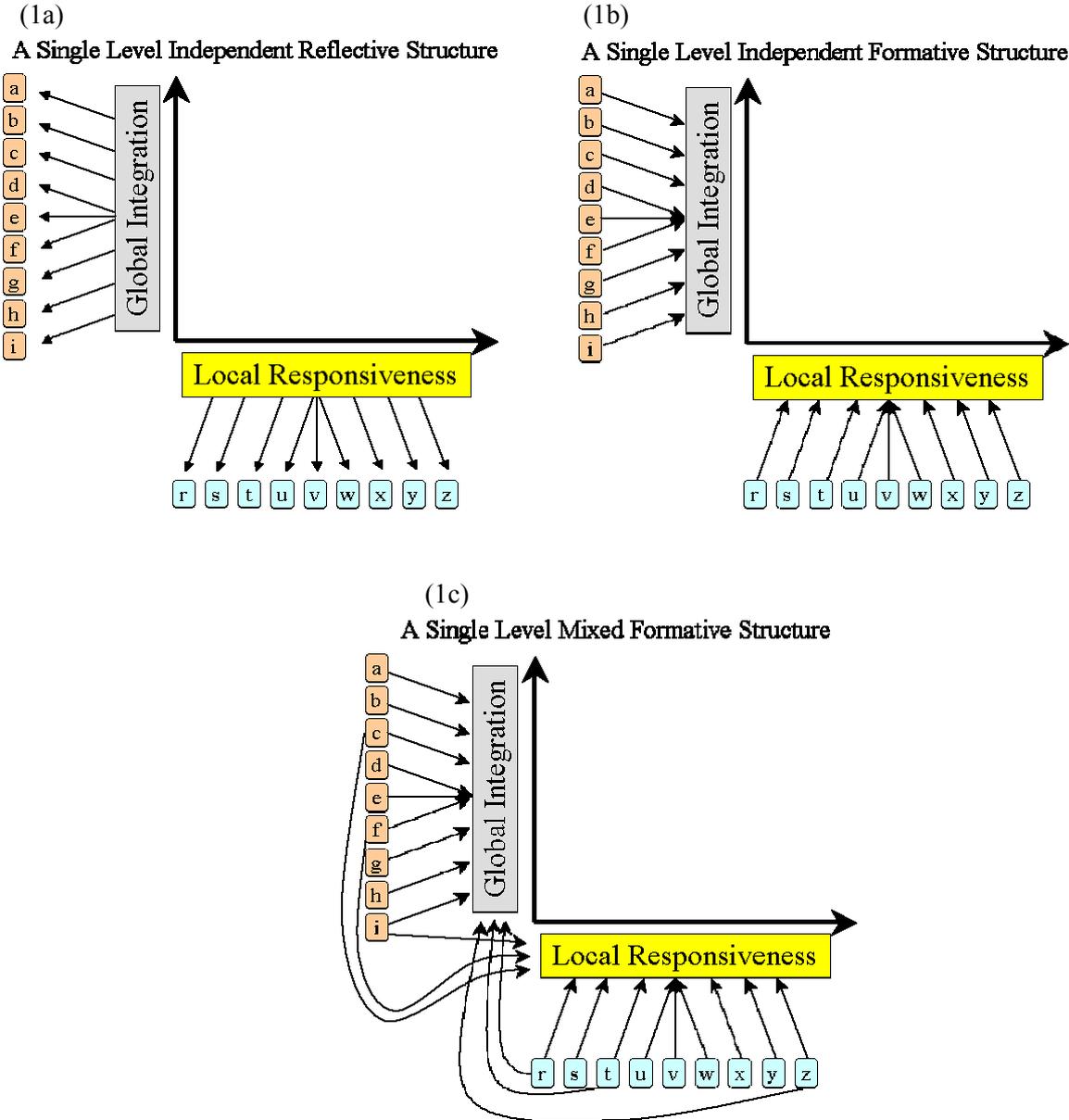


Figure 2. Multiple Level Integration-Responsiveness Framework Structures

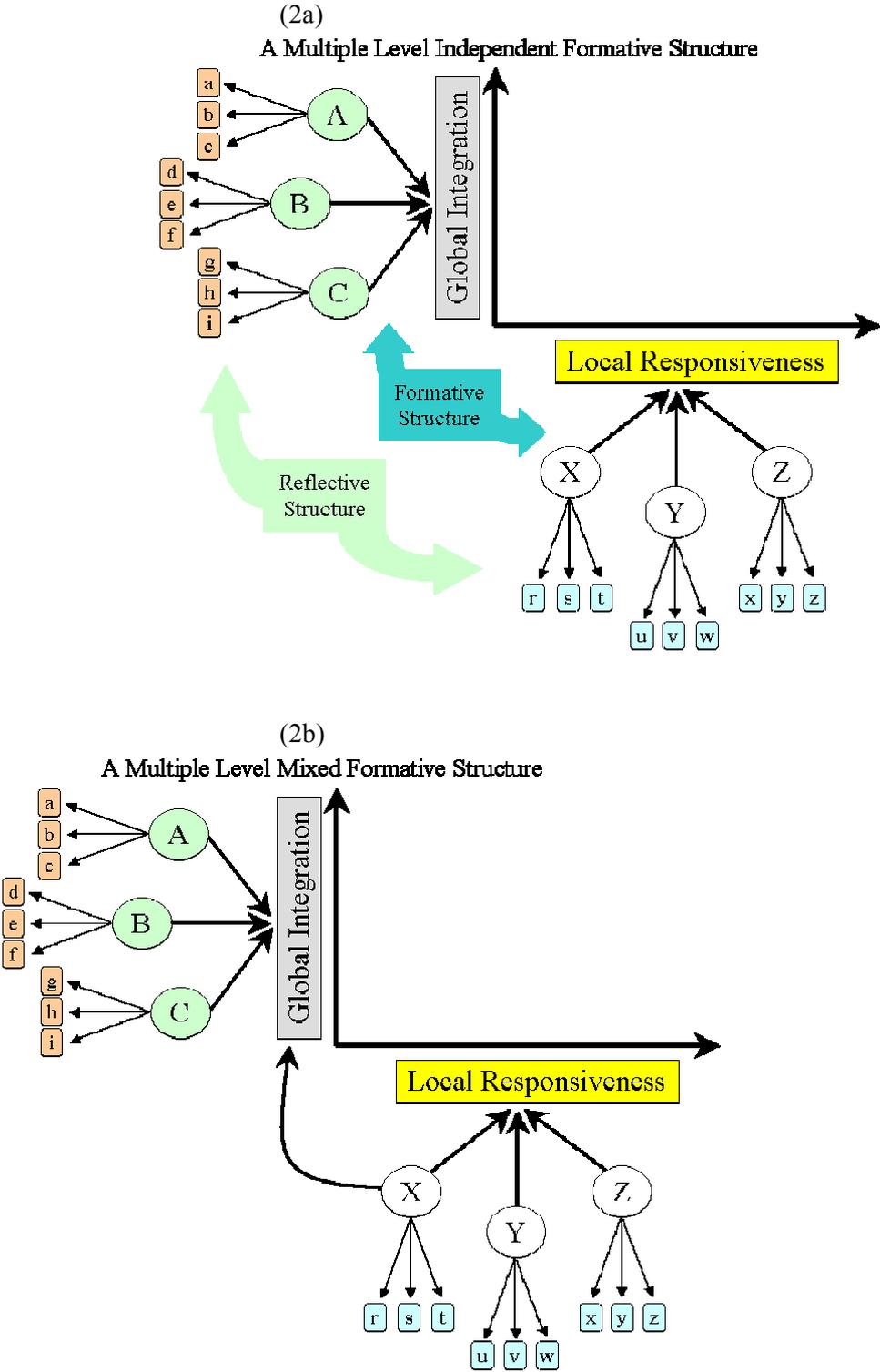


Figure 2 presents two examples of multiple level formative structures.¹ Underlying each dimension might be categories of pressures that need to be aggregated in some fashion. Such measures are formative in the sense that they logically fit under the dimension being studied but do not necessarily tap the same tendencies (as might be evidenced in their correlation matrix). Hence, local responsiveness may be thought of as made up of pressures such as the ‘diversity of consumer wants’ and ‘local government interference in the market’. The two may be uncorrelated but lead to managerial decisions to cater to local tastes. Each of these category constructs themselves may be ‘reflected’ in specific measures. For example, a GI pressure like ‘scale economies’ could be measured using multiple items that capture the extent of the importance of size of production in the industry. The independent multiple level structure (Figure 2a) shows a case where the constructs—A, B, and C are independent of the constructs X, Y and Z. However, this need not be the case. We could, for example, argue convincingly that ‘diversity of consumer wants’ would affect both LR—we need to cater to local tastes—and GI—customer diversity affects product variety and our ability to capture scale economies. This is the example shown in the multiple level mixed formative structure (Figure 2b).

Hence there are a number of possible structures that we might consider in validating the IR framework. We hypothesize a multiple level formative approach, simply because the range of phenomena incorporated within ‘environmental pressures’ appears too diverse for a single level or reflective approach to work well. However, there is little prior theory to guide us and this hypothesis is admittedly speculative. Hence, investigators need to: (1) examine alternative structures by level, (2) focus on the type of constructs being investigated, and (3) if a multiple level structure is appropriate, understand which measures to use in the reflective structure and how to combine the categories formatively. As we will show in the section to follow, the nature of the assumption one makes about structure can have dramatic effects on the actual structure that emerges from empirical analysis.

Table 1. Sources of Measures

Bartlett and Ghoshal, *Managing Across Borders*, 1989
Buzzell, *Harvard Business Review*, 1968
Cavusgil and Zou, *Journal of Marketing*, 1994
Cavusgil, Zou and Naidu, *Journal of International Business Studies*, 1993
Douglas and Wind, *Columbia Journal of World Business*, 1987
Ganesh, Kumar and Kotabe, *Academy of International Business Conference*, 1996
Ghoshal and Nohria, *Sloan Management Review*, 1993
Hill and Still, *Harvard Business Review*, 1984
Jain, *Journal of Marketing*, 1989
Johansson and Yip, *Strategic Management Journal*, 1994
Johnson, *Journal of International Business Studies*, 1995
Kobrin, *Strategic Management Journal*, 1991, *Journal of International Business Studies* 1994
Martinez and Jarillo, *Journal of International Business Studies*, 1991
Prahalad and Doz, *The Multinational Mission*, 1987
Quelch and Hoff, *Harvard Business Review*, 1986
Roth and Morrison, *Journal of International Business Studies*, 1990
Samiee and Roth, *Journal of Marketing*, 1992
Sorenson and Wiechmann, *Harvard Business Review*, 1975
Walters, *Journal of International Business Studies*, 1986
Wind, Douglas and Perlmutter, *Journal of Marketing*, 1973

Note: **Fully referenced in an appendix available from the authors.**

MEASUREMENT AND STRUCTURAL MODELS

We investigate these structures by utilizing the data from a large study of MNE marketing managers. Because this database contains a large number of measures from the literature, it is better able to tap the broad domain of the constructs of GI and LR. These measures comprise both single items and what we term ‘components’. Components are multiple item scales with acceptable reliabilities that reflectively measure one category of pressure (such as *global coordination of activities* or *local government influence on business decisions*). The database contains 5 component and 5 single item measures for GI pressures and 4 component and 7 single item measures for LR pressures (together with other measures discussed later). These measures were drawn from the prior literature as listed in Table 1.²

Although measurement is generally regarded as a methodological issue, when a construct is measured with multiple items, or in structural equation modeling where the measurement and the

structural models are estimated simultaneously, issues of measurement and structure are intimately related. And since measures often draw meaning from the structure within which they are embedded, it is appropriate to discuss measurement issues along with the structural model.

Data and Response Sample

A stratified random sample of MNE subsidiaries was selected from the Dun and Bradstreet WorldBase database. To ensure sufficient variance in the data, the sample was selected to include firms operating in manufacturing and services businesses, consumer and industrial product businesses and subsidiaries located in both industrial and developing countries. The heterogeneous sample not only incorporates the required variance for testing validity, but also captures the diversity in the international environment of these firms, thereby enhancing the generalizability of our findings. Additionally, to obtain data from informed respondents, the data was collected by self-administered questionnaire from marketing managers responsible for major business units within the country subsidiaries of multinational firms.

The questionnaire was mailed to 728 subsidiaries and 191 responded. This response compares favorably with those reported in the literature for global mail surveys (Harzing, 1997). The sample encompasses MNE subsidiaries engaged in 84 different manufacturing sectors and 24 different service sectors, with nearly equal numbers operating in consumer and industrial markets. The subsidiaries are located in 36 countries around the globe but their parents are mainly located in three countries, Japan (24%), UK (24%) and USA (40%). These are large MNEs, with the median number of global employees being 22,000 and that in the subsidiary itself being 325.

Preliminary Dimensional Analysis

The IR grid in Figure 1 postulates that environmental pressures are best explained by two orthogonal underlying constructs (that is, GI and LR) that should be reflected in the responses to the questions that we asked our managers. Given this theoretical framework, and the data we have, the appropriate test of validity is a confirmatory factor analysis (CFA). CFA, with its origins in psychology, assumes a common factor model (underlying unobserved constructs) and reflective measures of these factors. CFA allows us to hypothesize how many factors there are and, through an

initial *target* matrix, how each measure should relate to each factor. These initial hypotheses are then tested through maximum likelihood methods. Table 2 shows the results from a CFA of our data.

Table 2. Confirmatory Factor Analysis of Global Integration and Local Responsiveness as Two Orthogonal, Reflective Dimensions

Measures	Rotated Factor Loadings		Squared Multiple Correlations
	GI	LR	
GLOBAL INTEGRATION			
<i>Components</i>			
Extent of Global Competition	0.60*	-0.07	0.37
Intensity of Competition	0.21	-0.04	0.05
Global Coordination of Activities	0.55	0.04	0.30
Sharing of Activities (Scope Economies)	0.25	0.06	0.07
Technological Dynamism of the Industry	0.48	0.04	0.23
<i>Single items</i>			
Large Production Investment Required	0.60	0.15	0.39
Global Dispersion of Production Facilities	-0.02	0.17	0.03
Variation in Production Cost Across Countries	0.17	0.38	0.18
High Transportation Cost	0.16	0.37	0.16
Large R&D Investment Required	0.52	0.03	0.28
LOCAL RESPONSIVENESS			
<i>Components</i>			
Customers Vary Across Countries	0.11	0.14	0.03
Local Government Influence on Business Decisions	0.05	0.29	0.08
Local Trade Barriers	0.02	0.62	0.39
Local Business Infrastructure	-0.26	0.39	0.22
<i>Single Items</i>			
Level of Advertising Necessary in Local Market	0.43	0.16	0.21
Demand Level in Local Market	0.07	0.19	0.04
Local Government is a Customer	0.09	0.03	0.01
Subsidiary Market Importance to Parent Company	0.03	0.09	0.01
Locality of Customers (local versus global)	-0.10	0.17	0.04
Local Market Sales Relative to Parent Company Sales	-0.01	0.02	0.00
Importance of Subsidiary to Local Government	0.18	0.34	0.15

* Bold figures are used to indicate salient loadings following the convention ≥ 0.30 .

At first glance there is some support for the IR framework in this Table. Some measures postulated to reflect global integration load on this dimension, just as some postulated to reflect local responsiveness load on that dimension. However, closer inspection reveals a number of problems. First, several components that others and we would believe to be an important part of environmental pressures (for example, *scope economies and customer heterogeneity*) do not load on either factor. Second, some measures load on the ‘wrong’ dimension (for example, *level of advertising necessary in the local market*). Third, there are few high loadings (≥ 0.60) indicating relatively weak relationships between the measures and underlying dimensions (also seen in the low correlations between measures and factors). But most telling of all are the very poor fit statistics for this hypothesized structure. Indeed, the simple form of the IR framework is rejected (chi-square 307, 168 df, $p < 0.0001$) with a Bentler & Bonnett’s NFI of 0.47 (well below the minimally acceptable index of 0.85). *Thus we can conclude that the single level structures presented in Figure 1 are incorrect ways of viewing the IR framework.* The overall pressures for GI and LR are more likely to derive from a number of different categories of underlying pressures—a multiple level structure in our terminology. This being the case we should investigate: (1) how many more dimensions are needed to account for the environment, (2) the appropriateness of the common factor model for these dimensions, and (3) whether the dimensions are uncorrelated or mixed.

To explore whether more dimensions are needed we conducted a series of maximum likelihood factor analyses with 2 to 6 dimensions. These again use the common factor model but make no hypotheses as to which items load on which factors. The results confirm that more than two dimensions are needed, indeed they suggest that at least five dimensions are probably necessary (the test of more than 5 factors being needed yielded a χ^2 of 126, 100 df, $p=0.04$). However, whilst this analysis supports the multiple level perspective the resulting solution is not particularly compelling (and is not shown here). As with Table 2 there are items of theoretical interest that do not load on any factor and there are few high loadings. In addition, two items load on more than one factor, making interpretation difficult.

This lack of interpretability suggests that we should question the appropriateness of the common factor model as a way of combining our lower-level pressures. To do so, we conducted a five

dimensional principal components analysis of the same data. The difference between a common factor and a principal component is that whereas the former assumes an underlying construct the latter is simply the linear transformation of observed variables that best explains variance. With our data a principal component analysis represents a multiple level aggregation of reflective components and items. The results of this principal component analysis are shown in Table 3.

Table 3. Principal Component Analysis, Five-Factor Orthogonal Solution, Loadings ≥ 0.30

Measures	Rotated Factor Loadings				
	One	Two	Three	Four	Five
GLOBAL INTEGRATION					
<i>Components</i>					
Extent of Global Competition	0.64				
Intensity of Competition		0.37			
Global Coordination of Activities	0.45	0.45		0.31	
Sharing of Activities (Scope Economies)		0.59			
Technological Dynamism of the Industry	0.66				
<i>Single items</i>					
Large Production Investment Required	0.68				
Global Dispersion of Production Facilities					
Variation in Production Cost Across Countries					
High Transportation Cost			0.58		
Large R&D Investment Required	0.68				
LOCAL RESPONSIVENESS					
<i>Components</i>					
Customers Vary Across Countries		0.39			
Local Government Influence on Business Decisions					0.63
Local Trade Barriers			0.61		
Local Business Infrastructure			0.64		
<i>Single Items</i>					
Level of Advertising Necessary in Local Market	0.32	0.63			
Demand Level in Local Market			0.40		
Local Government is a Customer					0.68
Subsidiary Market Importance to Parent Company				0.56	
Locality of Customers (local versus global)	-0.34	0.44			0.36
Local Market Sales Relative to Parent Company Sales				0.71	
Importance of Subsidiary to Local Government			0.32	0.45	0.36

This is a better solution, particularly in that most items now load on a factor and that there are many more high loadings. It can also be argued that the nature of the dimensions is clearer than in the earlier solutions. Dimension One relates to *competitive scale*, Dimension Two to the *nature of customers* and their impact on coordination, Dimension Three to the *nature of the host country*, Dimension Four to the *importance of the subsidiary* and Dimension Five to *host government influence*. Interpretation aside, this analysis suggests that a formative aggregation might be better than a reflective one and, if this is true, the typical approach to dimensional analysis, i.e. factor analysis, may not be the most appropriate one.

The third issue is whether the dimensions are orthogonal or correlated. In factor analysis this is an issue of interpretation rather than variance explained. Once the number of factors is determined, a judgement as to whether an orthogonal or oblique rotation is better essentially depends on which the investigator believes sheds more insight. We ran oblique rotations on our factor solutions but we do not report these because they are similar to those in Tables 2 and 3. Taken at face value they suggest that a modest correlation between Dimensions 1 and 2 might add to our understanding. Indeed, if we correlate summated scales of the items that load highly on each factor we observe a significant empirical correlation of 0.34 between Dimensions 1 and 2. We also note that some of the dimensions themselves span both GI and LR measures. Thus if we wish to keep the elegance of the IR framework we may need to allow for some modest mixing of constructs. However, there is a good degree of independence between many of the constructs relating to GI and those relating to LR.

The results from Tables 2 and 3 suggest that it is better to look at the overall pressures as a set of multiple level formative structures that are themselves made up of a mixture of reflective components and measures. To do so we need to turn to structural modeling techniques and, in particular, those such as partial least squares (PLS) that can accommodate both formative and reflective measures in a sufficiently flexible manner to capture the complexity of these data. Moreover, we need not just a way of describing the environmental pressures, but also of showing the impact of these pressures on MNEs. PLS allows us to estimate this impact.

PLS Modeling

Here we look at the effects of the GI and LR pressures on the strategy construct of marketing mix *adaptation* and the organization structure construct of *autonomy*. The constructs of adaptation and autonomy are measured with multiple reflective measures and factor analysis of the component measures of adaptation and autonomy indicate that they are reliable measures of the respective constructs.³

The PLS models are shown in Figures 3 and 4 and Tables 5 and 6. The figures contain the structural model results whilst the tables contain the measurement model results. Since the objective of this paper is to validate the IR framework the GI and LR pressures are the explanatory constructs. However, we also control for parent nationality, location, size and age, and business type (consumer vs. industrial) to obtain a clearer picture of the power of GI and LR to explain adaptation and autonomy. In the second model (Figure 4) the construct of adaptation is also used as a control variable—controlling out its impact on autonomy. Finally, because the GI and LR pressures are measured with formative indicators, the effect of these pressures on the dependent constructs is assessed by examining the significance level of the estimated path weights (see Tables 5 and 6).

According to the IR framework, high GI pressures will have a negative effect on adaptation and autonomy, whereas high LR pressures are likely to have a positive effect on these constructs. However, as shown in Table 5, our results show that 1 out of the 4 significant measures of GI pressures and 3 out of the 5 significant measures of LR pressures have effects on adaptation that are *opposite* to that posited by the IR framework. Similarly, in Table 6, it is seen that 2 out of the 5 significant measures of GI pressures and 2 out of the 3 significant measures of LR pressures have effects on autonomy that are opposite to that suggested by the literature.

However, in spite of these contradictory results seen in the measurement models, the results for the structural models shown in Figures 3 and 4 indicate that there are strong and significant effects of the environment on managerial choices. Namely, of both GI and LR pressures on the strategic choice of adaptation and of GI pressures on the structural choice of autonomy. These pressures clearly effect the strategy and structure of MNEs—but in a more complex manner than suggested by the literature.

Figure 3. Model and Estimated Results: Effect of GI and LR Pressures on ADAPTATION

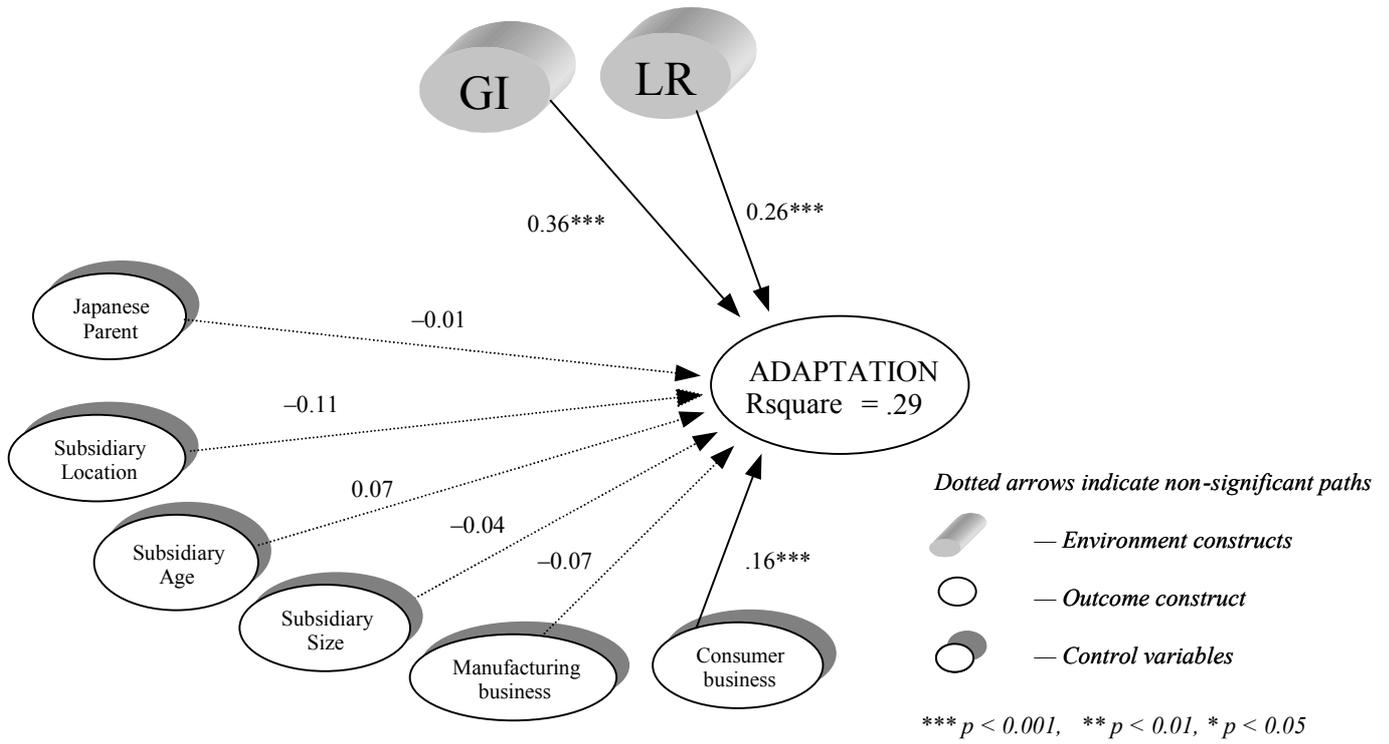


Figure 4. Model and Estimated Results: Effect of GI and LR Pressures on AUTONOMY

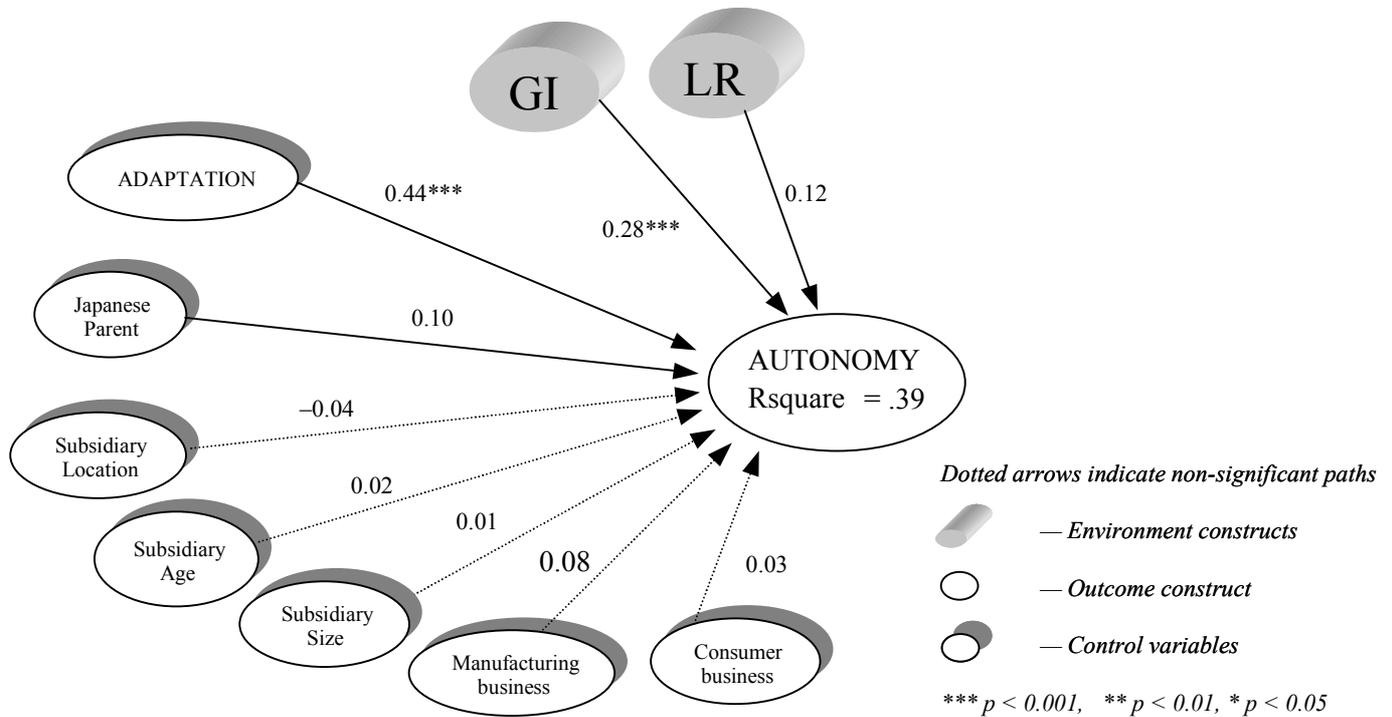


Table 5. Measurement (outer) Model Results: Effect of GI and LR Pressures on ADAPTATION

Measure	Path weight	t-value	Sig. level
GLOBAL INTEGRATION			
<i>Components</i>			
Extent of Global Competition	-0.69	-4.32	***
Intensity of Competition	+0.09	+0.53	ns
Global Coordination of Activities	-0.50	-2.53	**
Sharing of Activities (Scope Economies)	+0.10	+0.53	ns
Technological Dynamism	-0.10	-0.60	ns
<i>Single Items</i>			
Large Production Investment Required	+0.04	+0.16	ns
Global Dispersion of Production Facilities	-0.30	-1.80	*
Variation in Production Cost Across Countries	+0.39	+2.29	(*)
High Transportation Cost	+0.15	+1.00	ns
Large R&D Investment Required	+0.21	+1.19	ns
LOCAL RESPONSIVENESS			
<i>Components</i>			
Customers Vary Across Countries	+0.53	+3.37	***
Local Government Influence on Business Decisions	+0.24	+1.33	ns
Local Trade Barriers	+0.05	+0.27	ns
Local Business Infrastructure	+0.13	+0.73	ns
<i>Single Items</i>			
Level of Advertising Necessary in Local Market	-0.44	-2.26	(*)
Demand Level in Local Market	-0.10	-0.59	ns
Local Government is a Customer	-0.50	-3.19	(***)
Subsidiary Market Importance to Parent Company	-0.25	-1.46	(ns)
Locality of Customers (local versus global)	+0.39	+2.18	*
Local Market Sales Relative to Parent Company Sales	-0.23	-1.17	ns
Importance of Subsidiary to Local Government	-0.38	-2.04	(*)

Note: All tests are one-tailed. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, ns – not significant; (*) implies opposite of expected direction

Table 6. Measurement (outer) Model Results: Effect of GI and LR Pressures on AUTONOMY

Measure	Path weight	t-value	Sig. level
GLOBAL INTEGRATION			
<i>Components</i>			
Extent of Global Competition	-0.53	-3.03	**
Intensity of Competition	+0.04	+0.29	ns
Global Coordination of Activities	-0.76	-3.97	***
Sharing of Activities (Scope Economies)	+0.09	+0.53	ns
Technological Dynamism	+0.22	+1.19	ns
<i>Single Items</i>			
Large Production Investment Required	+0.49	+2.80	(**)
Global Dispersion of Production Facilities	-0.30	-2.16	*
Variation in Production Cost Across Countries	+0.34	+2.56	(**)
High Transportation Cost	-0.11	-0.69	ns
Large R&D Investment Required	+0.01	+0.07	ns
LOCAL RESPONSIVENESS			
<i>Components</i>			
Customers Vary Across Countries	+0.03	+0.11	ns
Local Government Influence on Business Decisions	+0.43	+1.95	*
Local Trade Tariff Barriers	-0.21	-0.95	ns
Local Business Infrastructure	-0.07	-0.31	ns
<i>Single Items</i>			
Level of Advertising Necessary in Local Market	-0.18	-0.82	ns
Demand Level in Local Market	-0.24	-1.22	ns
Local Government is a Customer	-0.52	-2.56	(**)
Subsidiary Market Importance to Parent Company	-0.01	-0.04	ns
Locality of Customers (local versus global)	+0.31	+1.39	ns
Local Market Sales Relative to Parent Company Sales	-0.65	-2.80	(**)
Importance of Subsidiary to Local Government	-0.09	-0.36	ns

Note: All tests are one tailed. *** p < 0.001, ** p < 0.01, *p < 0.05, ns – not significant; (*) implies opposite of expected direction

DISCUSSION

We are addressing two questions with this research. First, are the GI and LR pressures independent, unidimensional constructs represented uniquely by their respective facets? Second, how do GI and LR pressures affect MNE strategy and structure?

Our preliminary analysis shows that the GI and LR pressures are clearly not unidimensional though we cannot reject the contention that they are substantively independent. If these pressures were unidimensional, the diverse measures of the GI and LR pressures would *reflect* a simple two-dimensional structure with GI measures loading on one dimension and LR measures on the other. Instead, factor analysis indicates that: (1) the measures of the GI and LR pressures load on at least *five* dimensions, and (2) principal components may represent these data better than common factors. This is an argument for a multiple level formative structure where our lower-level reflective items and components are formatively combined into facets of GI and LR and these facets in turn drive overall pressures on the MNE. An argument that is further supported by the fact that several of the dimensions load on measures from both domains. However, these five dimensions appear themselves to be substantively independent with only a modest degree of mixing. Thus although we can give some support to the overall IR framework posited by Prahalad and Doz (1987) we cannot confirm that its finer grain structure operates as hypothesized. Indeed, the PLS analyses of adaptation and autonomy indicate that several individual measures have effects opposite to those suggested by this literature.

There could be a number of plausible explanations for these contradictory findings. First, Prahalad and Doz (1987) identified the GI and LR pressures based on observations of a small sample of MNEs using qualitative, case-based research. Because of their simplicity, the concepts of the GI and LR have been extensively used in the literature but this has not been followed up by attempts to validate them empirically. Instead, scholars have *assumed* that globally integrated firms confront high GI pressures and that locally responsive firms face high LR pressures. To validate GI and LR pressures empirically, we believe it is important to first identify and measure the underlying facets of these pressures in a formal manner. Only when this has been achieved should we empirically examine the linkages between these facets and the MNE's choice of strategy and structure. Our empirical

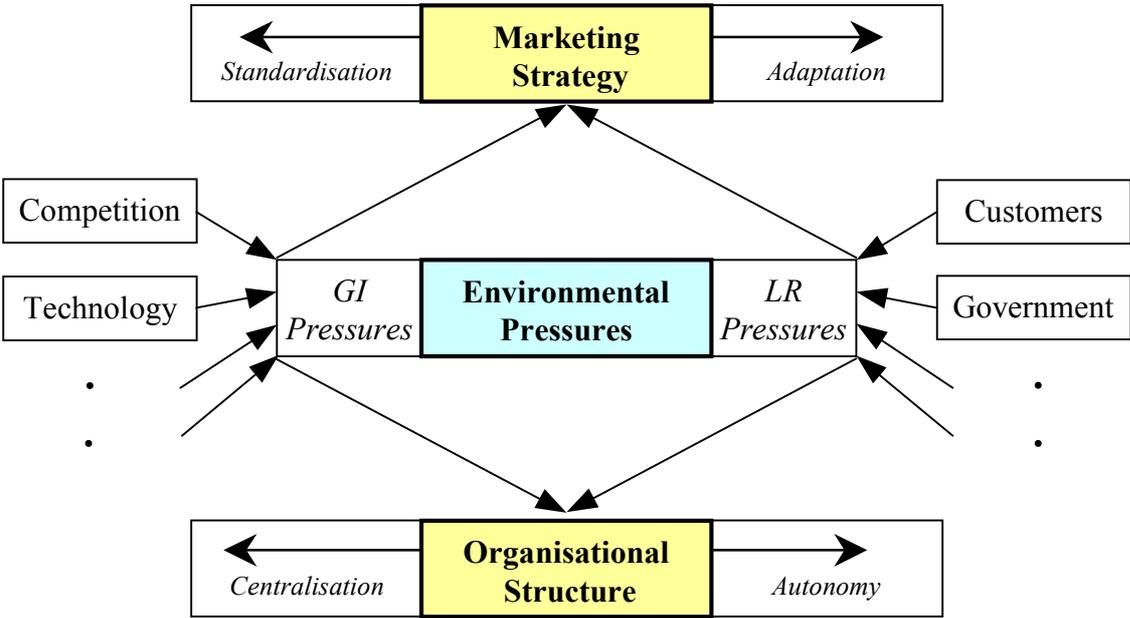
analysis using factor analysis and structural equation modeling shows only limited support for classifying the many environmental pressures into the GI or LR dimensions in the way originally proposed by Prahalad and Doz (1987).

Second, GI and LR pressures may not be temporally stable. Early research suggested that firms go international in order to exploit home-based advantages across multiple locations (Dunning, 1988). However, recent research (e.g., Birkinshaw, Hood and Jonsson, 1998) shows that the MNE subsidiaries are increasingly regarded as the sources of innovations that the firm can leverage on a global basis. Thus, the pressure of technological change that is regarded by Prahalad and Doz (1987) as a global integration pressure resulting in standardization and centralization is probably now a pressure for local responsiveness resulting in decentralization. That is, rapid technological change may be resulting in greater autonomy for the MNE subsidiaries in order to provide the incentives for their managers to create globally competitive innovations.

It may be useful to state here that the issue of wrongly classifying environmental pressures as GI or LR is not related to the question of mobility of businesses from a state of high GI pressures to a state of high LR pressures. The latter is concerned with the issue of the dynamics of businesses on the IR dimensions, which has been discussed extensively by Prahalad and Doz (1987). Our data covers many sectors of business and shows that the problem of misclassification of pressures into GI or LR—and hence the appearance of ‘contradictory’ empirical effects on MNE strategy and structure—arises *irrespective of the MNE’s business*.

It would be remiss of us to simply criticize the IR approach without offering a basis for constructive modification. Based on our findings, we propose an alternative representation of the IR framework that is consistent with our observations about MNE business environment, international strategy and organizational structure. Since both GI and LR pressures are multidimensional constructs, representing these constructs on a two-dimensional IR framework may be imprecise and misleading. Thus, in Figure 5, the GI and LR pressures are shown along with their facets to better reflect their multidimensional characteristics. Because there is some possibility of mixing in the measures of both the GI and LR pressures, we believe that these pressures should be combined into a single block called the environmental pressures.

Figure 5. An Alternative Representation of the IR Framework



Our alternative representation of the IR framework is likely to be more useful from a managerial standpoint. Ultimately, MNE managers are less interested in the labels used to describe overall pressures and more interested in how the different underlying facets of these pressures affect international strategy and organizational structure.

In sum, since both the GI and LR pressures are complex, multidimensional aggregates of a plethora of environmental pressures that affect MNEs, they may not be theoretically meaningful or managerially useful in their current aggregated form. Theoretically, temporal changes in the nature of the environmental pressures may result in the misclassification of the pressures into the GI and LR dimensions, thereby reducing the ability of these aggregate constructs to explain MNE strategy and structure. Managerially, it may be more useful to study in detail the diverse facets of MNEs’ complex, multidimensional business environment rather than as aggregated GI or LR pressures.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Although we hope our study makes important theoretical and methodological contributions, it has limitations. The following are some of these limitations and directions for future research.

The internalization of firm advantages is an important managerial issue, especially for MNEs operating in countries with poor property rights protection. Additionally, in their pursuit of global competitive advantage, MNEs are frequently confronted with decisions about conducting their activities in-house versus outsourcing. Devinney, Midgley and Venaik (2000) show how these pressures will affect a firm's strategy, structure and performance, and incorporate them into a new environmental pressure dimension called transactional completeness. Future research may wish to include these additional pressures.

MNEs belonging to different strategic groups such as global or multidomestic compete within an industry as well as across industries. Studies by Johnson (1995) and Roth and Morrison (1990) found no significant performance differences between firms belonging to different strategic groups. This indicates that it may be more appropriate to explain performance differences between firms within each group, rather than between the groups, and by using alternative methodologies such as stochastic frontier analysis (SFA) (Bauer, 1991; Devinney, Midgley, Roth and Venaik, 2000). In SFA, separate performance frontiers are estimated for each group, and the distance of firms from their respective group frontiers are explained on the basis of their strategy and structure variables.

Finally, the topic of measure equivalence in cross-national research has been extensively discussed in the international business literature (e.g., Mullen, 1995; Singh, 1995). One of the key issues is whether the measures are universal for all countries or unique for each country? This would clearly be an issue in interviewing consumers from less-developed countries. However, as we surveyed managers of global firms we feel that their responses are more likely to be universal than unique. These managers are university educated, speak English and are exposed to business concepts such as those incorporated in our scales.

Nonetheless, we did check the equivalence of our scales through a simple procedure. First we computed Kogut and Singh's (1988) cultural distance measure for each location. This measure is an index of the difference between the location and the USA on Hofstede's four cultural dimensions. For

example, a subsidiary located in Great Britain has a smaller cultural distance to the USA than one located in Thailand. Second, we ranked and grouped our subsidiaries by cultural distance (low, medium and high distance). We then computed mean comparisons between the high and low groups for our twenty-one components and items. Univariate comparisons indicated significant differences in five means ($p \leq 0.05$). However, after correction for the known bias in multiple comparisons these probabilities become non-significant (stepwise permutation method). It is therefore unlikely that scale equivalence problems have biased our factor or PLS analyses to any major extent.

In summary, our empirical work shows that representing GI and LR pressures as independent, unidimensional constructs is imprecise and potentially misleading. Based on these findings, we suggest an alternative representation of the IR framework that better reflects the contemporary reality observed in multinational firms. Although a small beginning, it is hoped that this work brings to the fore a greater understanding of the importance of empirical validation in developing international business theories.

ENDNOTES

1. It is also possible to postulate multiple level reflective structures (as in second order factor analysis) but for the sake of brevity we do not include these in Figure 3.
2. A technical appendix is available from the authors. This describes the measures and reliability statistics, and provides full references to the sources of these measures.
3. These constructs are also described in the technical appendix available from the authors.

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