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MULTINATIONAL CORPORATIONS AS DIFFERENTIATED NETWORKS

Sumantra Ghoshal and Nitin Nohria

June, 1986

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MASSACHUSETTS  
INSTITUTE OF TECHNOLOGY  
50 MEMORIAL DRIVE  
CAMBRIDGE, MASSACHUSETTS 02139



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Sumantra Ghoshal

and

Nitin Nohria

Sloan School of Management  
Massachusetts Institute of Technology  
50 Memorial Drive, Cambridge, MA 02139

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## MULTINATIONAL CORPORATIONS AS DIFFERENTIATED NETWORKS

### ABSTRACT

Multinational corporations are considered as a differentiated network of interorganizational (HQ-subsidiary) relations. Using data from 66 of the largest North American and European multinationals it is shown that four naturally existing clusters of subsidiaries can be found on the basis of the complexity of the external environment faced by the subsidiary and its organizational resources. Centralization, formalization, and socialization are used to characterize the nature of the HQ-subsidiary interaction and a multivariate "fit" between these management processes and each subsidiary type is shown to be a significant predictor of subsidiary performance. A typology of the different subsidiary types within a multinational corporation is proposed based on this "fit".



## MULTINATIONAL CORPORATIONS AS DIFFERENTIATED NETWORKS

### INTRODUCTION

In a classic series of histories on the emergence of the modern business enterprise, Alfred Chandler (1962, 1977, 1985) traces the structural evolution of business organizations from the small family owned and managed enterprise to the most dominant and visible form of modern organization - the large, geographically dispersed, professionally managed multidivisional enterprise. The multinational corporation (MNC) is the quintessential case of the dispersed firm, with individual components located in a number of autonomous political units (Fayerweather, 1978). These organizational sub-units, or subsidiaries, are often embedded in highly heterogeneous environmental conditions (Robock et al., 1977) and have developed under very different historical circumstances (Stopford and Turner, 1985). From the perspective of organizational theory, this suggests that each subsidiary may be treated as an organization itself, and the MNC as a network of differentiated interorganizational linkages between geographically and goal dispersed organizations that nonetheless are bound by a formalized base of interaction (Herbert, 1984).

The concept of differentiation in the large multiunit complex organization is not new to organization theory. It was recognized and placed center-stage almost two decades ago by Lawrence and Lorsch (1967). What is surprising, however is that while fields such as industrial economics (Baumol, Panzar and Willig, 1982; Teece, 1982) and strategy (Salter and Weinhold, 1979; and Rumelt, 1981) have since developed positive (i.e. both normative and predictive) theories, that explicitly focus on the differentiated aspect of multiunit industrial organizations,

the treatment of the subject in the organization theory literature has largely been descriptive (e.g. Scott, 1981; and Pfeffer, 1982), and the boundary has been primarily drawn around the entire organization in the positive theories.

It is our contention that an analysis of complex multi-unit business organizations as a differentiated network of interorganizational linkages affords insights which intraorganizational perspectives obscure. This perspective emerged from an ongoing research project (Bartlett and Ghoshal, forthcoming), that has included in its first stage case studies of the organizational patterns of nine large multinationals (Bartlett and Ghoshal, 1985) and subsequently a detailed network analyses of HQ-subsidiary relations in three of these organizations (Ghoshal, 1986).

In this paper, the third part of the project, this proposition is developed further, based on a large sample survey. The theoretical analysis discusses the existing body of interorganizational theories and shows the usefulness of existing concepts in this domain for the analysis of large multiunit organizations such as the MNC. The empirical examination focusses on the dyadic linkage between the headquarters (HQ) and different country subsidiaries of multinational corporations, as the extensive previous research on HQ-subsidiary relations (Schollhammer, 1971; Stopford and Wells, 1972; Franko, 1976; Bartlett, 1979; Hulbert and Brandt, 1980; Doz and Prahalad, 1981; Hedlund, 1981; Kogono, 1981; Egelhoff, 1982; and Daniels et. al. 1984) suggests significant variation in the nature of the management process, such as the degree of centralization, formalization, and socialization, associated with HQ-subsidiary linkages. Most of these studies have concentrated on one or the other of these attributes and have rarely considered the management process to be a multidimensional gestalt of

different mechanisms. It must be emphasized that the HQ-subsidary relation is a limited aspect of the differentiated network concept. The nature of subsidiary-subsidary relations are also a necessary and important part of the whole network analysis and were included in the project (Ghoshal, 1986), but are excluded from this paper.

#### INTERORGANIZATIONAL THEORIES APPLIED TO THE MNC

In defining the interorganizational field as a focus for investigation, Warren (1967), developed a typology of organizational contexts that distinguishes between the ways in which organizational units interact. These were labeled unitary, federative, coalitional, and social choice. Instead of being discrete categories these contexts were proposed to vary in ordinal fashion, in the direction from one extreme - the unitary, to the other - social choice, along a number of dimensions such as relations of units to an inclusive goal, locus of inclusive decision making and authority, and prescribed collectivity orientation of units.

A number of theoretical perspectives have emerged in the discussion of interorganizational relations, such as the exchange theoretic approach (Levine and White, 1961; Thompson, 1967; Aiken and Hage, 1968; Emerson, 1962, 1975; Cook, 1977), a resource dependency model (Aldrich, 1974; Pfeffer and Salancik, 1976), a political economy perspective (Benson, 1975), and a Marxian dialectical approach (Zeitz, 1980). Despite the general theoretical scope of these perspectives, the empirical examination of these theories has largely been limited to contexts that are in the range from federative to social choice. Thus studies have focussed on such linkages as among social service organizations (Van

de ven and Walker, 1984), federative structures such as the United Way (Provan, 1982, 1983), universities (Pfeffer and Salancik, 1974a, 1974b; Weick, 1976), and local governments (Bacharach and Aiken, 1976). Interaction contexts that range from unitary to federative have largely been excluded from the domain of interorganizational enquiry and placed in the domain of intraorganizational analysis (Cook, 1977). As such, the relation between the subunits and the corporate headquarters (HQ) or the linkages among the subunits of complex business organizations have rarely been examined from an interorganizational perspective.

The problem with treating such interactions from an intraorganizational perspective is that each linkage is theoretically treated as being identical with all others. An overriding assumption is that final authority resides at the top of the structure (the HQ), and that all intraorganizational interactions are structured for the achievement of the inclusive goals of the organization. Differences among individual linkages are not treated as being problematic as they can always be altered by fiat. Yet as Warren (1967) noted in a caveat, "organizational literature is replete with exceptions to this [assumption]; that is, examples of departments or other units within organizations which develop and pursue their own goals even when these are at variance with the goals of the inclusive organization." Therefore to banish all differences among intraorganizational linkages is to fall into what Fischer (1970:172) calls the "reductive fallacy[;] the fallacy of reducing complexity to simplicity, or diversity to uniformity."

The dominant construct in most interorganizational theories is an exchange relation (e.g.  $A_x, B_y$ ) which may be defined as consisting of "transactions



involving the transfer of resources (x,y,..) between two or more actors (A,B,..) for mutual benefit." (Cook, 1977:64) Furthermore, as Cook observes (1977:63) - "Emerson [1972a,b, 1975] explicitly acknowledges the social structural context of exchange processes... In addition the term 'actor' in the theory refers not only to individuals, but also to collective actors or corporate groups [thus making] it uniquely appropriate when organizations or subunits of organizations are used as the primary unit of analysis." HQ-subsidiary relations, then, maybe appropriately treated as dyadic exchange relations involving a series of resource transactions embedded in a structured context (Homans, 1974). In addition, following Benson (1975), organizational interactions may ultimately be explained at the level of resource flows.

This suggests two characteristics of the network as being essential to the analysis: (1) the distribution of resources in the network, and (2) the patterns of the negotiation processes that mediate exchange relations and continually restructure networks (Zeitz, 1980).

Several researchers (Emery and Trist, 1965; Aldrich, 1976) have shown how resource structures constrain organizational action and interaction. Even in "attempt[ing] to exercise 'strategic choice' [...] discretion is limited both by the actual structure of resources, and by [the] perception of possible alternate resources. However resource structures cannot be altered at will, and indeed tend to persist over time." (Zeitz, 1980:76) This resonates with Quinn's (1980) thesis that "incrementalism" is the primary form of organizational adaptation.

The stickiness of resource structures was empirically substantiated by Kogut (1983) for MNCs who found that an overwhelming proportion of additional foreign

direct investment by American multinationals was actually reinvestment by existing locations. This inertia in resource configuration can potentially lead to contradictions in resource distribution. Resources distributed to some local organizations may be inadequate while elsewhere resources are overly supplied. Contradictions in the resource distribution become particularly salient when juxtaposed with the relevant environmental conditions as different parts of the network face different environmental conditions. This is particularly true for the MNC since subsidiaries are located in different countries where local environmental conditions may vary immensely.

In a model synthesizing two dominant competing perspectives, labeled the information and resource perspective, on the exchanges between the environment and the organization, Lawrence and Dyer (1983) proposed two different kinds of uncertainty, resource scarcity and information complexity. They then showed the contradictions that occur under different combinations of the two conditions, particularly high information complexity and high resource scarcity. They further argue that for better organizational performance the organizational strategy (which includes organizational structures and processes) needs to be differentiated to fit the particular combination of exogenous conditions in a way that corrects for contradictions; this process they call "readaptation." In this theoretical formulation, the organization is treated as the unit of analysis, and the possibility of different organizational subunits facing different environmental conditions is not fully considered. Consequently organizational strategy is basically a coherent homogeneous pattern for the entire organization. The mechanisms by which different organizational strategies dynamically correct contradictions and "readapt" is also not developed in detail.

These are serious limitations for the study of MNCs because as Stopford and Turner (1985) argue, multinational organizations face very different contradictions in different subsidiaries. For instance, British multinational investments and hence distribution of resources have historically been concentrated in the Commonwealth, but environmental conditions have changed so dramatically that British MNCs have a lot of organizational resources in environments of low complexity such as Canada, India, or New Zealand, and often very low organizational resources in highly complex environments such as the United States, Japan, Korea, or Brazil. From a HQ perspective, the management tasks are very different in these two contradictory conditions. Logically, the former contradiction requires processes that can reverse inertial trends by moving resources out of existing resource rich locations, whereas the latter requires the creation of resources in currently impoverished locations. However, as identified earlier, the fungibility of resources is highly constrained. This argues for the importance of the second aspect of network characteristics - the patterns of the negotiations that mediate exchange relations and provide insights into the mechanisms that restructure networks.

An exchange analysis of interorganizational relations is particularly useful in that it can be logically extended to understand the processes that underlie the distribution of power in a network. Several researchers have shown the structural and process constraints on the distribution of power in organizational subunits (Emerson, 1962; Blau, 1964; Aiken and Hage, 1967; Thompson, 1967; Pugh et al., 1968, 1969; Blau and Schoenherr, 1971; Child, 1973; Jacobs, 1974; and Pfeffer, 1981). Bacharach and Aiken (1976) distinguish between structural constraints - "morphological analysis of organizations including variables such as

size, vertical and horizontal differentiation, role specialization, and span of control," and process constraints- "patterns of behavior of organizational members.. [such as] work processes, interaction processes, and locus of decision making [including variables such as centralization, formalization, and participation]." They propose that structure is usually appropriately studied at the aggregate level but process at the disaggregated level. A further argument can be made that structure usually constrains the static distribution of power whereas process constrains the dynamic redistribution of power. This suggests the greater utility of the process constraints for the purpose of our enquiry.

Power is the antipode of dependence in exchange formulations. An organization's dependence on another in its task environment increases in proportion to its need for the resources or performance that organization can provide, and in inverse proportion to the ability of other organizations to provide the same resource or performance (Thompson, 1967). The importance of process constraints is the differing impact each has on the locus of power in an exchange relation.

Since the landmark studies of the Aston Group (1968, 1969) centralization and formalization have become central constructs in the analysis of organizational structure. Schein (1971) argued for the importance of socialization as another difficult to conceptualize but empirically discernible organizational process. We contend that these three fundamentally different interactional dimensions, analyzed singly and together, constitute a fairly comprehensive characterization of HQ-subsidiary relations.

Centralization shifts the locus of power in favor of the HQ. By increasing the dependence of the subsidiary on the HQ for both decision making and resource

acquisition, centralization is a mechanism that may be particularly useful when the subsidiary has excess resources in an environment of low complexity. The problem is that centralization is also the most obtrusive process of changing the basis of an exchange relation and at times can lead to severe dissonance if the subsidiary has historically been a powerful (resourceful) actor in the exchange relation (Emerson, 1962). Another problem with centralization is that decisions reflect the competencies of the HQ. Supplementary or complementary competencies of the subsidiary are often underutilized.

Formalization has been interpreted as the routinization of decision making and resource allocation (Nelson and Winter, 1982). It decreases the power of both the HQ and the subsidiary as it reduces mutual dependencies by constraining the exchange relation to an impersonal set of rules that often assume a power independent of the motivations of the actors in the exchange relation (Weber, 1968).

Socialization (for a theoretical review, see Van Maanen and Schein, 1979) is a process that in an interorganizational network leads to domain consensus and shared values. By pooling into an inclusive goal, the often differing goals of the subsidiaries and the HQ it increases the power of both the HQ and the subsidiary in their exchange relation. Socialization in MNCs is often achieved by mechanisms such as the rotation of personnel throughout the network (Edstrom and Galbraith, 1977).

It must be emphasised that the process constraints in an organizational network are not unidimensional and hence should not be considered in either/or terms. They are more a gestalt of all the processes outlined above and in their various

combinations have a very powerful effect on the distribution of power in the network.

The value of a theory is in its predictive power. It has been argued that performance should be at the core of organizational research (Venkatraman, 1986). Previous research examining the correlation between the performance of subsidiaries and structural features such as centralization of the HQ-subsubsidiary relation has been inconclusive; Youseff (1975), Picard (1977), Garnier (1982), and Gates and Egelhoff (1984) found no correlation or mixed results, while Alsegg (1971) and Hedlund (1980) observed a negative correlation. We believe that this is an artifact of a perspective that treats all HQ-subsubsidiary relations as identical. We further show how an interorganizational perspective that treats an MNC as a differentiated network can predict performance at the subsidiary level.

Several perspectives in organizational theory (Child, 1975; Hannan and Freeman, 1976; Kimberly, 1975; Khandwalla, 1977; Aldrich, 1979; and Schoonhoven, 1981) and strategy (Schendel and Hofer, 1979; Andrews, 1980; Bourgeois, 1980; and Venkatraman, 1986) have argued that certain structural-contextual relationships are more efficient than others. Also labeled "fit", this concept provides a basis for a positive theory of differentiation. in a multiunit organization. If, as the concept suggests, certain organizational structures and management processes more closely "fit" certain objectively determined contextual factors that make up the the organization's environment (Egelhoff, 1982), then the variety of environmental contexts faced by different units of a multiunit organization should be "fitted" with an internally differentiated management process. By logical extension, those subsidiaries that are managed by the "fit" management process should out-perform those that are deviant.

The different elements of the theoretical propositions developed in this paper can now be integrated and subjected to empirical investigation. The fundamental proposition is that analyzing the multinational organization as a differentiated network of interorganizational relations as opposed to a homogeneous structure of intraorganizational relations has greater predictive power in discriminating performance at the subsidiary level. With the dyadic exchange relation between the headquarter and subsidiary being the unit of analysis, each linkage can be differentiated on the basis of two exogenously determined conditions constrained by the total level of resources in the network and the environmental milieu in which it is embedded: (1) the level of organizational resources and (2) the complexity of the external environmental conditions faced by the subsidiary. Similar clusters of linkages will be associated with very different management processes, and a unique gestalt of these processes will discriminate the better performing subsidiaries from the worse. It must be demonstrated that the alternate perspective of internal homogeneity and symmetry in management processes is inadequate in this discrimination.

#### DATA COLLECTION

The data used in this analysis are from 66 usable responses to a questionnaire mailed to the Chairman or CEO of all the North American and European headquartered multinationals in Stopford's (1983) *World Directory of Multinational Enterprises*. Appendix I provides details of the response rate and shows the distribution of the sample by headquarter location, annual sales, number of subsidiaries and industry. The questionnaire was pretested on 10 senior managers with significant international experience for readability and face

validity of the various constructs. The Chairman or CEO was requested to respond personally if familiar with all the issues, or else to direct the questionnaire to the manager responsible for the assessment of all international operations. All the responses obtained were from very senior managers with most titles ranging from Chairman to Vice-President International Operations.

Operationalization and measurement of the variables used in the analysis are described in Appendix II. It must be emphasized that the unit of analysis is each HQ-subsidiary relation; thus 720 cases are obtained from the 66 MNCs. Table 1 shows the intercorrelations for all the variables.

[Insert Table 1 about here]

#### DIFFERENT TYPES OF SUBSIDIARIES

Following Lawrence and Dyer (1983), it was hypothesized that a typology of subsidiaries could be created based on the joint conditions of (1) the local organizational resources of the subsidiary and (2) the degree of environmental complexity faced by the subsidiary. These conditions are largely exogenously determined since, as argued earlier, managers cannot freely exercise "strategic choice" to change them; at least in the short run. A clustering procedure was used to determine the existence of naturally occurring combinations of the two conditions. McQueen's k-means clustering method was employed. The existence of clusters and the number of clusters was determined using Calinski and Harabasz's C-Ratio, as recommended by Milligan and Cooper (1985) who found this to be the best stopping rule among thirty examined. The variation of the C-Ratio with the number of clusters is shown in Table 2.



[Insert Table 2 about here]

The maxima at the 4 cluster solution indicates the existence of four different types of subsidiaries based on these clustering variables (Everitt, 1980). A graphical representation of these types and the cluster centroids are shown in Figure 1.

[Insert Figure 1 about here]

The robustness of the membership in the various clusters was checked by comparing the k-means 4-cluster solution with the solution from Ward's method. 91% of the cases were classified into the same cluster by both methods.

As evident from Figure 1, the four clusters represent very different combinations of local resource and environmental conditions. The resource contradictions theoretically proposed by Zeitz (1980) occur naturally and were clearly evident in cluster 1 (high environmental complexity-low resources) and in cluster 2 (low environmental complexity-high resources). The other two clusters have more balanced configurations of organizational resources and environmental complexity; cluster 3 is low on both conditions while cluster 4 is high on both conditions.

#### DIFFERENTIATED MANAGEMENT PROCESS FOR EACH SUBSIDIARY TYPE

While differences across the clusters are stark for these exogenous conditions they are not as pervasive for the management process variables. The differences in the mean values of all variables across the four clusters appear in Table 3.

Scheffe's Test indicates the types of subsidiaries that do not differ in terms of their management processes.

[Insert Table 3 about here]

A unidimensional comparison of each management process variable across the different types of subsidiaries shows that despite insignificant differences between certain types of subsidiaries, a different management process is dominant in a particular subsidiary type. Centralization is highest in subsidiaries that have both low organizational resources and face a relatively simple environment (defined by membership in cluster 3). Formalization, socialization and coordination oriented communication are all most dominant in subsidiaries that face complex environmental conditions and have high organizational resources to deploy (cluster 4). In sharp contrast these processes are rarely employed to manage the subsidiaries that have diametrically opposite exogenous conditions (cluster 3)

The discussion of management processes so far, still constitutes a descriptive analyses. These are the patterns, on average, of the management processes or the routines (Nelson and Winter, 1982) associated with each type of subsidiary. For a positive theory of a differentiated management process, it must be shown that the top performing subsidiaries of each type are associated with a unique gestalt of management processes that enables them to outperform subsidiaries that are not managed similarly.

## A MULTIVARIATE TEST OF FIT BETWEEN TYPE OF SUBSIDIARY AND A DIFFERENTIATED MANAGEMENT PROCESS

Subsidiaries in the top quartile in terms of performance were selected to determine the management processes associated with them. The distribution of these subsidiaries by cluster membership is shown in Table 4.

[Insert Table 4 about here]

A stepwise discriminant analysis was performed using the four types of selected top performing subsidiaries as the groups and the five elements of management process (centralization, formalization, socialization, control oriented communication, and coordination oriented communication) as the independent variables. The results appear in Table 5.. Only three of the five independent variables had sufficient discrimination power to enter and remain in the discriminant model based on the criterion of producing the largest increase in Rao's V, which is a generalized measure of the overall separation between groups. The standardized discriminant function coefficients indicate the relative contribution of each independent variable to the discriminant function. Only the first two discriminant functions are statistically significant...Centralization has the greatest discriminating power followed by formalization and socialization, in that order.

[Insert Table 5 about here]

The classification results from the discriminant analysis for the best performing subsidiaries are shown in Table 6. In 52% of the cases the discriminant functions based on centralization, formalization, and socialization, correctly predict the actual type of subsidiary. This is significantly better than the random probability of predicting 25% of the cases correctly.

[Insert Table 6 about here]

Table 7 shows the Fischer linear discriminant functions used to classify cases into each group and Table 8 the value of each discriminant function at the centroid of each group. Analyzed together, clearly the first function, which largely measures centralization discriminates most powerfully the subsidiaries with low resources and simple external environment (cluster 3) from the other three. It also discriminates, though to a lesser degree, between the subsidiaries that have resource contradictions. It suggests that for improved performance subsidiaries that face complex environmental demands but have poor local organizational resources (cluster 1) should be managed with greater centralization than those that have high organizational resources but face a less complex environment (cluster 2). This was not evident from the descriptive univariate analysis of the differences in centralization across subsidiary type. The second discriminant function which measures socialization besides centralization, discriminates most significantly, the subsidiaries with high organizational resources facing highly complex environments (cluster 4) from the other three. It also discriminates further between the subsidiaries that have resource contradictions, suggesting that subsidiaries in cluster 1 be managed with greater socialization than those in

cluster 2. The third function plays an insignificant role in discrimination but does indicate that subsidiaries in cluster 4 should also be managed with greater formalization.

[Insert Table 7 and Table 8 about here]

The discriminant analysis results so far have indicated that for better performance at the subsidiary level, management processes of the HQ-subsidiary relation need to be differentiated to "fit" the type of subsidiary being managed. To test this proposition, the method employed by Egelhoff (1982) was extended. The discriminant functions developed for the better performing subsidiaries were used to classify the remaining subsidiaries. Table 9 shows the results.

[Insert Table 9 about here]

42% of the cases were correctly classified and hence have management processes that "fit" their type. The remaining cases were considered deviant. Table 10 shows the mean scores for the performance of the fit and deviant cases. The "fit" cases perform significantly better than the deviant. This provides strong support for the proposed differentiated network model of MNCs.

[Insert Table 10 about here]

It is essential, however, to rule out the rival hypothesis that an analysis that considered the management process as undifferentiated could lead to an equally powerful explanation of performance. This was tested by performing a stepwise

multiple regression analysis with subsidiary performance as the dependent variable and all five management process variables used in the discriminant analysis as the independent variables. The variance in performance explained by this procedure was insignificant ( $R^2=.06$ ). This vindicates the power of the differentiated network model.

#### HOW THE "DEVIANT" DEVIATE FROM THE "FIT" IN EACH SUBSIDIARY TYPE

The discriminant analysis showed how management processes were differentiated across subsidiaries and was used to distinguish the "fit" subsidiaries from the "deviant". It does not however enable one to see differences in the management processes between the fit and deviant cases within each subsidiary type. Table 11 shows the mean values of the management process variables for the fit and deviant cases in each type of subsidiary.

[Insert Table 11 about here]

The high resource-complex environment subsidiaries that are correctly managed (or fit) differ significantly from the deviant by higher formalization and socialization and lower centralization. In sharp contrast, the fit low resource-less complex environment subsidiaries are managed by higher centralization compared to the deviant. High centralization and socialization deviates from the fit management process for subsidiaries of the high resource-less complex environment type. Finally, the fit subsidiaries with low resources facing complex environments differ from the deviant only in terms of much higher socialization

in the management process. These findings are discussed in the following section.

## DISCUSSIONS OF THE RESULTS

Despite the many typologies of organizations (Weber, 1968; Etzioni, 1961; Blau and Scott, 1962; Parsons, 1956; Perrow, 1967, 1978; Burns and Stalker, 1961; Pugh et al., 1969; Hannan and Freeman, 1976; Kanter, 1983; Ouchi, 1980) McKelvey observed that "organization scientists have not developed a widely accepted scheme of classifying observed differences among organizations" (1978:1428). He proposed that "developing organizational systematics could be a major step toward our understanding of organizations" (1978: 1429). We think this difficulty arises because most typologies characterize the entire organization by a dominant organizational process, ignoring the often dramatic and contradictory processes and contextual attributes of different parts of the organization. We have tried in this paper to overcome this limitation for the population comprising one of the most dominant forms of modern complex organizations - the multinational corporation.

The differentiated network model of MNCs proposed in this paper focuses explicitly on the differences in management processes that characterize HQ-subsidary relations within the same organizational boundary. A taxonomy of these types was developed empirically by showing the existence of four distinctly different management processes that "fit" naturally existing clusters of subsidiaries based on the joint contextual conditions of their local organizational

capabilities and the complexity of the environment they face. Figure 2 summarizes the results of the investigation.

[Insert Figure 2 about here]

The choice of the exogenous dimensions used for the initial clustering has strong theoretical support, having been identified by Lawrence and Dyer (1983) as integrating very diverse strands of the organizational literature that address the organizational context. It was reassuring to find that the naturally existing clusters were consistent with the most logical a-priori scheme; the four contextual categories that result from combining high and low conditions of local organizational resources and environmental complexity. The management processes, labeled in Figure 2, that "fit" subsidiaries in each of these contexts are now discussed in turn.

**Unitary** (*Low organizational resources - Low environmental complexity*)

Centralization is the dominant management process that characterizes HQ-subsidiary relations in this context. The level of centralization is significantly higher than in any of the other three contexts, and is the major variable that differentiates this category from the others. Even among the subsidiaries within this context, the "fit" were much more centralized when compared to the deviant. The level of formalization and socialization in the HQ-subsidiary relations for this context was much lower than in any other context and didn't matter between the fit and the deviant in this context. These processes closely resemble hierarchies (Williamson, 1975, Ouchi, 1980), with their overwhelming



emphasis on centralization and asymmetric concentration of influence in the HQ. In keeping with Warren's typology of organizational interaction we have labeled this management process, a **unitary** type of HQ-subsidiary relation.

**Federative** (*High organizational resources - Low environmental complexity*)

The existence of high local resources in an subsidiary facing low environmental complexity is a resource contradiction that is often the legacy of history. As mentioned earlier, these are often the older subsidiaries of a multinational that owe their resource concentration to historical processes of accumulation. This resource concentration is usually also associated with a high local organizational capability. The HQ-subsidiary relations in these conditions are much more symmetric than in the unitary type as is evident by the much lower level of centralization. Attempts by the HQ to increase centralization or socialization, processes that increase the influence of the HQ in the relation, results in departures from the processes that "fit" this context for the high performing subsidiaries. This is evident from the significantly lower levels of these variables in the "fit" subsidiaries compared to the deviant subsidiaries in this category. This can be understood from an exchange theoretic perspective as the outcome of the dissonance that may occur in an exchange relation if the headquarter attempts to change the terms of its relationship with a powerful subsidiary (high local organizational capability) in its favor (Emerson, 1962). The management processes for these subsidiaries are further differentiated from the unitary type by higher formalization. This suggests that the HQ-subsidiary interaction is based more on routines and systems than centralization or shared values. The high autonomy (low centralization) and non-inclusive goals (low shared values and

socialization) that characterize these subsidiaries coupled with their higher levels of formal coordinative systems resembles federated interorganizational networks such as the United Way described by Provan (1983). These processes were also observed by Franko (1976) in his description of the "mother-daughter" HQ-subsubsidiary relationship in European multinationals. To maintain consistency with Warren's typology we label the HQ-subsubsidiary interaction processes in this context as **federative** in their character.

#### **Clan** (*Low Organizational Resources - High Environmental Complexity*)

These subsidiaries have the opposite resource contradiction compared to the federative type. Their histories are also quite different. These subsidiaries are often either very young and established recently or represent contexts where local organizational resources have not kept pace with rapidly changing external conditions. These are usually the subsidiaries that are in the greatest crisis; they represent the only cluster in which the average performance is significantly lower than some of the other clusters (see Table 3) The "fit" management process for this type differs from the subsidiaries (unitary) that have similar organizational capabilities but face much lower complexity primarily in terms of a much higher level of socialization in the HQ-subsubsidiary relation though the level of centralization is much lower. Interestingly, they are discriminated from the federative type by a much higher level of centralization. This empirical finding is theoretically expected (Cook, 1977) based on the critical dependency of the subsidiary on the HQ for resources to survive in an extremely complex environment. The key management process that differentiates the "fit" from the deviant within this subsidiary type, however, is a significantly higher level of

socialization in the HQ-subsidary relation. Socialization, as argued theoretically earlier, increases bilaterally the influence of both actors in an exchange relation. It thus enhances the resources that the HQ-subsidary dyad can bring to bear on a common crisis, in terms of pooling resources and information relating to the context and adopting decisions that can be implemented easily since they are arrived at mutually. Similar management processes, though centralization is not identified as being important, have been described by Ouchi (1980) for Japanese corporations and have been differentiated from hierarchies and markets and labeled **clans** .

**Integrative** (*High organizational resources - High environmental complexity*)

The management process that "fits" subsidiaries in this context is extremely complex. While similar to Burns and Stalker's (1961) organic type, it most closely resembles the process that Kanter (1983) calls **integrative**. It is characterized by significantly higher socialization and formalization but significantly lower centralization compared to the unitary, federative, or clan contexts. The only exception is the comparable level of centralization with the federative type. Within this context the "fit" are differentiated from the "deviant" by their ability to achieve more extreme levels of the same processes. Low centralization is to be expected for the same reasons as the federative case; the dissonance associated with centralization of the HQ-subsidary relation in these organizationally resourceful subsidiaries can only be more dysfunctional than the federative case as the interdependencies are much higher and critical given the complexity of the environment. These interdependencies are more symmetric than those in clans where the subsidiary is more dependent and less powerful

because it is wanting in organizational resources. The level of co-optation (socialization) is therefore much higher in the integrative type of relation since this increases the influence of both the HQ and the subsidiary by pooling the interdependencies in their exchange relation. At the same time to manage this high degree of interchange, especially since the units are often separated by substantial geographic, cultural, and communication distances the "fit" process requires the existence of coordination systems and formal integrating management processes to meet the overwhelming information processing requirements ( Lawrence and Lorsch, 1967; Galbraith, 1977; Egelhoff, 1982). This accounts for the very high level of formalization in these relations at the same time as low centralization and high socialization. To achieve this multidimensional balance in managing different processes in an **integrative** manner can be difficult and demanding.

*Putting the parts together: the MNC as a differentiated network*

The unit of analysis so far in this paper has been the dyadic HQ-subsidary relation. The construct, however derives its meaning from a model that has as its unit of analysis the multinational corporation. The two levels of analysis are logically related to each other by constituting the MNC as a network of differentiated interorganizational relations. The focus on differentiation within the boundary defined by the MNC necessitates examination at a deconstructed level of analysis. The results of this examination at the deconstructed level clearly demonstrate important differences in the nature of HQ-subsidary relations and vindicate the usefulness of thinking of large multiunit complex organizations as differentiated networks. The fuller implications of this model,

however, can only be revealed by putting the parts together. We suggest some of these implications at this aggregate level of analysis without any claims to having demonstrated them conclusively, either empirically or theoretically, in this paper.

Differentiation at the intraorganizational level is the most obvious logical outcome. Organizational subunits are differentiated both in terms of their context and contingent upon the context the way in which they are managed. Furthermore, for a positive theory of differentiation it can be shown that for each context a particular dominant management process is "fit" and leads to better performance of the subunit. While this is broadly a restatement of the contingency perspective, that has been a well accepted tradition in organizational theory for about two decades, there are important incremental implications for both management and middle range organizational theories.

The primary reason why differentiation is problematic, is that for organizational effectiveness it must be accompanied by integrative processes (Lawrence and Lorsch, 1967). Limits on differentiation are necessitated by the limits of the coordinative capacities of any organization. Coordination is a difficult, time consuming and costly exercise. Thus, while there are benefits of enhancing the variety of organizational processes in an organization (Burgelman, 1983, 1984), there are limits that are determined by the costs of allocating limited coordinative resources. Our analysis suggests that in large multiunit organizations this requisite balance is achieved by a complex simultaneity of variety enhancing and variety reducing management processes. We further

suggest that this differentiation is not random but has a consistent logic in the more effective organizations.

This logic is driven by the simultaneous consideration of the potential cost/benefits as well as the need for coordination that vary enormously for different parts of the network. Clearly, the greatest benefits of coordinative resources accrue if they are deployed where the organization has high local resources and faces a complex external environment. This would enable the organization to pool all its available resources to address its most critical environment. The resource dependency of the HQ on the subsidiary influences the cost of coordination. Coordination is problematic if the subunit is powerful, has strong local capabilities and often non-inclusive goals, because of the extreme dissonance that may result by any unilateral attempt to alter the nature of the exchange relation. Coordination in these instances involves processes such as socialization which are far more time consuming than processes of fiat such as centralization, or the establishment of rules such as formalization. Thus in terms of the exogenous dimensions that were used to categorize the subsidiaries in our analysis, along the dimension of environmental complexity the benefits of coordination increase with greater complexity, but along the dimension of local resources both the benefits (the pooling of resources) and difficulties of coordination (costly mechanisms such as socialization to avoid dissonance) increase with greater local resources. The need for coordination, however varies differently. It is basically proportional to the dependency of the subsidiary on the HQ. It therefore decreases with increased local resources, and increases with greater environmental complexity.

The pattern of management processes that "fit" each type of subsidiary, therefore, seems logical at the aggregated level of the entire organization. Integrative processes that are variety enhancing and costly in terms of coordinative resources are employed for those subsidiaries that face the most complex environment and have the greatest local resources. These are the set of HQ-subsidiary relations that consume the greatest coordinative resources. In sharp contrast subsidiaries that face benign environments but have high local capabilities are managed by an almost hands-off federative approach (low centralization and socialization, modest formalization). This is perhaps due to the high cost of coordination coupled with the lower benefits and need to coordinate. While coordinative resources must be deployed for the subsidiaries that have low local capabilities, the processes used, principally high centralization, are variety reducing and result in lowered complexity and cost of coordination. The high need for and benefits of coordination for subsidiaries that face complex environments and have low resources explains the differentiated management process we have called clans. The simultaneously high socialization and centralization suggests a complex coordinative process to pool potentially beneficial local knowledge of the environment (by socialization) and address the inadequacy of local resources (by centralization). While complex, clans require less coordinative resources than the integrative subsidiaries as in the latter the ability to exercise fiat (a less costly coordinative mechanism) is constrained by the greater resource interdependencies and more symmetric distribution of power and influence in the HQ-subsidiary relation.

The above analysis, reveals a logic at the level of the network for the differentiation in management processes that "fit" each type of subsidiary. The logic rests crucially on an analysis of each of the various parts of the network as well as the constraints imposed by their being a part of the whole. For organization theory, the power of the differentiated network model lies in its ability to focus attention on these interlinkages and levels simultaneously. It must be emphasized that the processes we have described so far are based on a general model of the MNC as a differentiated network of interorganizational relations. These may not be the "fit" processes for the particular case and don't constitute normative guidelines for managerial practice, though we believe they do represent useful guidelines for managerial reflection.

At an even higher level of analysis networks may be seen as being embedded in larger networks of external constituents. The resource dependencies of different parts of the focal organizational network on the external constituents that constitute its "action set" (Aldrich and Whetten, 1976) and the relations among these external constituents may also affect significantly the patterns of behavior within the network (Pfeffer and Salancik, 1978), but that is a level of complexity we leave the readers to ruminate upon.



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TABLE 1: Correlation Matrix for Selected Variables (N=650-720)

	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
1. Technological Dynamism	.49	.88	.55	-.30	.28	.31	.08	.29	.05
2. Competition		.85	.30	-.12	.18	.10	.04	.18	.15
3. Environmental Complexity			.50	-.24	.27	.24	.07	.27	-.04
4. Local Resources				-.32	.30	.32	.12	.34	.13
5. Centralization					-.25	-.20	.20	-.29	-.12
6. Formalization						.36	.18	.34	.05
7. Socialization							.27	.49	.26
8. Control Communication								.32	.03
9. Coordination Communication									.15
10. Performance									-

TABLE 2: Determination of the Number of Clusters (Calinski and Harabasz, 1974)

Number of Clusters	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
C - Ratio	600	473	656*	571	610	560	544

\* This maxima suggests an optimal 4-cluster solution

Note: C-Ratio =  $[\text{trace}(B)/(k-1)]/[\text{trace}(W)/(n-k)]$ , where  $n$  and  $k$  are the total number of items and the number of clusters in the solution respectively. The  $B$  and  $W$  terms are the between and pooled within cluster sum of squares and cross product matrices.

TABLE 3: Differences in the Mean Values of Selected Variables Across Clusters

<u>Test*</u>	<u>Cluster Membership</u>				<u>Scheffe's</u>
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	
1. Technological Dynamism	3.3	2.1	2.1	3.8	(2,3)
2. Competition	3.9	2.4	2.8	4.0	(1,4)
3. Environmental Complexity	3.6	2.2	2.5	3.9	
4. Local Resources	2.7	3.3	1.6	4.4	
5. Centralization	3.0	2.7	3.5	2.3	(2,4)
(1,2)					
6. Formalization	3.0	3.2	2.7	3.7	(1,2)
7. Socialization	3.4	3.4	2.9	4.0	(1,2)
8. Control Communication	3.1	3.1	3.0	3.2	all
pairs					
9. Coordination Commn.	3.2	3.2	2.6	3.7	(1,2)
10. Performance	2.7	3.2	2.8	3.0	all
except					
(1,4)					(1,2)
<u>Number of subsidiaries</u>	216	69	177	241	

\* Only those pairs of clusters that do not differ at the 0.01 level of the Scheffe's Test are indicated.

TABLE 4: Distribution of Best Performing Subsidiaries

	<u>Cluster Membership</u>			
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
<u>Number of Subsidiaries</u>	36	23	28	73

TABLE 5: Multiple Discriminant Analysis of Process Variables Selecting for the Best Performing Subsidiaries in Each Cluster

	Standardized Canonical Discriminant Function Coefficients			
	<u>Func 1</u>	<u>Func2</u>	<u>Func3</u>	<u>Wilk's L</u>
1. Centralization	-.58	.80	.20	.74*
2. Formalization	.48	.28	.85	.60*
3. Socialization	.55	.57	-.61	.53*
<hr/>				
Canonical Correlation	.65	.24	.10	
Wilk's Lambda	.53**	.93**	.99	

\* p < .001

\*\* p < .05



TABLE 6: Classification Results from Discriminant Analysis for the Best Performing Subsidiaries

<u>Actual Membership</u>	<u>Predicted Membership*</u>			
	1	2	3	4
1	<u>13</u>	8	10	8
2	4	<u>10</u>	7	2
3	3	6	<u>18</u>	2
4	15	7	8	<u>46</u>

Note: \* Percentage of cases correctly classified = 52%

TABLE 7: Classification Function Coefficients for Each Cluster<sup>1</sup>

	<u>Cluster Membership</u>			
	1	2	3	4
1. Centralization	5.2	4.7	6.1	4.3
2. Formalization	4.0	3.9	3.8	4.9
3. Socialization	4.3	3.7	3.7	5.0
(Constant)	-22.2	-18.8	-22.6	-25.6

Note: 1. Fischer's Linear Discriminant Functions

TABLE 8: Canonical Discriminant Functions Evaluated at the Cluster Centroids of the Best Performing Subsidiaries

<u>Cluster Membership</u>	<u>Discriminant Function</u>		
	Func. 1	Func. 2	Func.3
1	.25	-.10	-.36
2	-.13	-.63	-.39
3	1.01	-.67	-.60
4	-.47	.51	.53

TABLE 9: Classification Results for the Remaining Subsidiaries Using  
Discriminant Functions Developed for the Best Performing  
Subsidiaries

<u>Actual Membership</u>	<u>Predicted Membership*</u>			
	1	2	3	4
1	<u>30</u>	28	73	26
2	8	<u>8</u>	12	12
3	9	26	<u>92</u>	2
4	26	19	35	<u>67</u>

Note: \* Percentage of cases correctly classified = 42%

TABLE 10: Relationship Between Performance and "Fit"

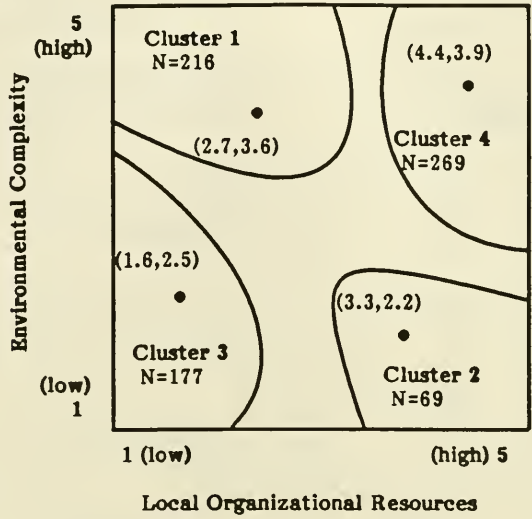
	<u>Good Fit Cases</u>	<u>Deviant Cases</u>	<u>T-test</u>
	N= 274	N=343	
<u>Subsidiary Performance</u>	Mean = 3.03	Mean = 2.77	t =
3.21			
	S.D. = 0.96	S.D. = 1.00	p <
.001			

TABLE 11: Mean Values of Management Processes for "Fit" (F) and "Deviant" (D) Cases in Each Subsidiary Type

	Subsidiary Type							
	<u>1</u>		<u>2</u>		<u>3</u>		<u>4</u>	
	<u>F</u>	<u>D</u>	<u>F</u>	<u>D</u>	<u>F</u>	<u>D</u>	<u>F</u>	<u>D</u>
Centralization	3.0	2.9	2.0*	3.0	3.9*	2.5	1.7*	3.0
Formalization	2.9	3.0	3.1	3.2	2.7	2.8	4.1*	3.2
Socialization	4.3*	3.1	2.6*	3.7	2.8	3.0	4.5*	3.5
N=	43	153	18	45	110	48	113	110

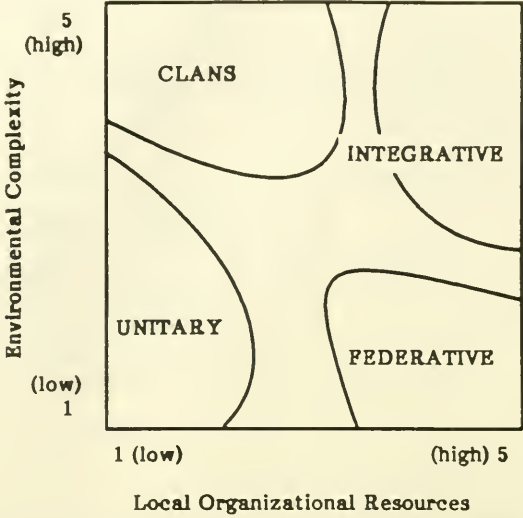
\* T-test for differences between fit and deviant cases significant ( $p < .01$ )

**FIGURE 1: Clusters of Subsidiaries Based on Contextual Conditions**



Note: (x,y) represents the value of the local organizational resources 'x' and the environmental complexity 'y' at each of the cluster centroids shown.

FIGURE 2: Management Process Typology Based on Subsidiary Context





APPENDIX I:

RESPONSE PATTERN

1. Total Questionnaires mailed <sup>1</sup>	438
2. Returned due to wrong mailing address	31
3. Respondents declining participation <sup>2</sup>	50
4. Respondents who completed the questionnaire	76
5. Total number of responses used for the analysis <sup>3</sup>	66

DISTRIBUTION OF SAMPLE COMPANIES FOR SELECTED CHARACTERISTICS

1. <u>Location of HQ</u>	<u>North America</u>		<u>Europe</u>	
	36		30	
2. <u>Annual Sales (billions)</u>	<u>&lt; 1</u>	<u>1 - 5</u>	<u>5 - 10</u>	<u>&gt; 10</u>
	4	43	8	11
3. <u>Number of Subsidiaries</u> <sup>4</sup>	<u>1 - 5</u>	<u>6-10</u>	<u>11-15</u>	<u>16-20</u>
	10	19	25	12
4. <u>Major Industry</u> <sup>5</sup>	<u>Aerospace</u>	<u>Building</u>	<u>Chemicals</u>	<u>Drink</u>
Electricals/		<u>Products</u>		<u>&amp; Food</u> <u>Electronics</u>
	2 (7)	3 (18)	7 (43)	7 (62) 3 (34)
	<u>Health</u>	<u>Industrial</u>	<u>Metals</u>	<u>Motor</u> <u>Office</u>
	<u>Products</u>	<u>Equipment</u>		<u>Vehicles</u> <u>Equipment</u>
	3 (28)	9 (43)	11 (55)	3 (27) 2 (13)
	<u>Paper</u>	<u>Petroleum</u>	<u>Rubber</u>	<u>Textiles</u> <u>Others</u>
	<u>&amp; Wood</u>	<u>Products</u>		
	2 (25)	7 (34)	2 (9)	2 (8) 3 (32)

NOTES

1. This includes all the 261 North American and 177 European multinationals in the *World Directory of Multinational Enterprises* which describes the 500 largest

industrial corporations in the world that had significant international investments during 1981. A minimum test of multinationality was met by satisfying one of the following criteria: (a) the firm had 25% or more of the voting equity of manufacturing or mining companies in at least three foreign countries; (b) the firm had at least 5% of its consolidated sales or assets attributable to foreign investments; and (c) the firm had at least \$ 75 million sales originating from foreign manufacturing operations. The *Directory* does not constitute a census of all large multinationals. Nevertheless, it is estimated that the 500 parent companies together control well over 80% of the total stock of foreign direct investment.

2. The reasons offered by the declining respondents can be subdivided into:

(i) Undergoing major reorganization (16%); (ii) Questionnaire not suited to scope of organization's international operations (32%); (iii) Company policy to decline (46%); and (iv) Other reasons (6%).

3. The distribution of the respondents title by actual number is as follows:

(i) Chairman/CEO (14); (ii) Vice-Chairman/Executive Vice-President (8); (iii) Director/Vice-president of International Operations/Corporate Planning (28) (iv) General Manager (5); and (v) Corporate staff (11).

4. These represent the number of countries of the 19 specified in the questionnaire in which the parent reported wholly owned subsidiaries. These countries were Argentina, Australia, Brazil, Canada, Colombia, France, Italy, Ireland, Japan, Malaysia, Mexico, New Zealand, Singapore, Taiwan, Thailand, United Kingdom, United States, West Germany, and Venezuela. These countries were chosen for their large stocks of foreign direct investment.

5. These industry classifications are also based on the World Directory of Multinational Enterprises. The number in parentheses represent the total number of companies in each industry in the population to which the questionnaire was mailed.

## APPENDIX II

### OPERATIONALIZATION AND MEASUREMENT OF CONSTRUCTS

Almost all the constructs were operationalized by single variables measured on a five-point interval scale. This was necessary to keep the questionnaire of manageable length, since even in its present form the questionnaire required some of the respondents to answer as many as  $15 \times 19 = 195$  questions if they possessed subsidiaries in all the 19 pre-specified countries (listed in Appendix I). All measures represent the perceptions of the headquarters for all the subsidiaries. Our clinical research shows that these perceptions are fairly consistent across the organization and are shared by the subsidiaries. Furthermore the nature of the data requested required intimate comparative knowledge of the context and management process applicable to each subsidiary, since our focus was on differentiation within the organization. The emphasis on performance further required the respondent to be someone responsible for such comparative evaluation of subsidiary performance. It is therefore reassuring for the credibility of the data that in 50 of the 66 companies the respondent was the corporate vice-president directly responsible for such assessments or someone with even greater responsibility such as the CEO or Chairman (for the distribution of respondents see Appendix I). Face validity was the key criterion in designing this questionnaire, though multiple measures were developed and employed to test the constructs in the network analysis of three organizations (Ghoshal, 1986).

*Environmental complexity* is an additive 5-point scale consisting of two equally weighted variables, *local competition* and *technological dynamism* (Cronbach's  $\alpha = 0.7$ ). These variables were proposed by Lawrence and Dyer (1983) as important constituents of environmental information complexity. *Competition* was measured by - "On a scale of 1 [not much competition] to 5 [extremely intense competition], rate the intensity of competition your company faces in each of the following markets. (This was followed by a list of 19 countries, with a 5-point scale associated with each and the option of specifying the non-existence of a subsidiary in each case. The same pattern was adopted for all the other questions). *Technological dynamism* was measured by - "On a scale of 1 [very slow] to 5 [very rapid], indicate the relative rate of product and process innovations [for the industry as a whole] that characterizes each of the following markets."

*Local organizational abilities/resources.* This was measured by - "Some national organizations in your company may have relatively advanced physical resources [such as technology, capital] and managerial capabilities. Some others in contrast may not have such resources to the same extent. On a scale of 1 [low] to 5 [high], rate the overall level of resource availability in your national organizations in each of the following countries."

*Centralization.* This was operationalized as the opposite of autonomy measured by - "Different national organizations in your company may enjoy different levels of autonomy for deciding their own strategies and policies. On a scale of 1 [very low] to 5 [very high], rate the extent of local autonomy by each of the following national organizations."

*Formalization.* This was measured by - "The extent to which policies and systems are formalized may vary within the company, being different for different national organizations. On a scale of 1 [low formalization] to 5 [high formalization], rate the extent of formalization of policies and systems [through instruments such as manuals, standing orders, standard operating procedures, etc.] in each of the following national organizations."

*Socialization.* This was measured by - "Some of your national organizations, compared to others may be relatively more in tune with the overall goals and management values of the parent company. Let us call this the extent of shared values. On a scale of 1 [low shared values] to 5 [high shared values], rate each of the following national subsidiaries."

*Control oriented communication.* This was measured by - "Communication between headquarter and subsidiary managers can take place for a variety of reasons. We would like to focus on two important types of communication: (i) communication through which headquarters set directions and control the performances of subsidiaries, and (ii) communication through which headquarters and subsidiary managers coordinate their activities by exchanging information and sharing ideas.

Consider the first kind of communication consisting primarily of flow of directions and performance feedback. On a scale of 1 [low] to 5 [high], rate the average level of such communication with the headquarters for each of the following national organizations of your company.'

*Coordination oriented communication.* "Now consider the other kind of communication, i.e. the communication aimed more at coordination and information sharing than at control. On a scale of 1 [low] to 5 [high], rate the average level of such communication with the headquarters for each of the following national organizations of your company" - was the follow-up question used to measure this variable.

*Performance.* This subjective measure was based on the following question - "Please evaluate the average overall performance over the last three years (based on financial, strategic and other considerations, that you feel are relevant) of each of the following national organizations. rate each organization on a scale of 1 [much lower than expected] to 5 [much better than expected]." In a review of previous studies (Venkatraman, 1986) claims they have shown that managerial assessments correspond closely to internally obtained performance indicators and externally obtained secondary data.

Perceptions of strategic importance, governmental regulation, impact of budgetary reductions, innovativeness, and ease of innovation adoption, were also obtained but are not useful in this study.

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