

RESOURCE FLOWS WITHIN MULTINATIONAL CORPORATIONS: IMPLICATIONS FOR SUBSIDIARY STRATEGY

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ABSTRACT

Built on the network conceptualization of the multinational corporation (MNC) in the literature, this paper explores three sets of intra-MNC resource flows that facilitate global integration: capital, knowledge, and product flows. By considering both the direction and intensity of the resource flows, this paper presents a framework for analyzing the strategic roles of foreign subsidiaries. We explore this framework with data on U.S. subsidiaries of foreign companies in 46 manufacturing and service industries and 24 MNC home countries. Differences in subsidiary roles are analyzed along two dimensions: the extent to which the subsidiary is a provider of resources to, or a user from, the MNC network. The results provide strong support for differentiated subsidiary roles in relation to the direction and intensity of intra-MNC resource flows. This framework provides managers with better understanding of global integration across subsidiaries.

Key Words: Resource flows, subsidiary strategy

An increasing number of studies have examined the differentiated roles played by MNC subsidiaries (Bartlett and Ghoshal 1986, Jarillo and Martínez 1990, Gupta and Govindarajan 1991, 2000, Birkinshaw and Morrison 1995, Taggart 1997, Birkinshaw, Hood, and Jonsson 1998, Rugman and Verbeke 2001, Frost, Birkinshaw, and Ensign 2002). The literature has discussed the advantages of moving from a system of loosely-connected affiliates towards a global network of integrated entities within the MNC (e.g. Bartlett and Ghoshal 1989). Past studies suggest that the advantage of global integration is limited by possible strong national product preferences and/or national regulatory restrictions (e.g., Prahalad and Doz 1987). Therefore, the strategic

roles of foreign subsidiaries are commonly portrayed as a trade-off between cross-border integration and national adaptation of activities (Kobrin 1991, Dunning 1993a).

Furthermore, intra-MNC relations have been discussed with regard to a number of other issues which include transfer of managers (Edström and Galbraith 1977), structural characteristics of industries (Kobrin 1991), structure of headquarters-subsidiary relationships (Hedlund and Aman 1986, O'Donnell 2000), role of subsidiary strategy (Jarillo and Martínez 1990, Birkinshaw 1997), transfer of technology (e.g. Cantwell 1991, Kogut 1991), transfer of knowledge (Gupta and Govindarajan 1991, 2000), governance of affiliates (Ghoshal and Nohria 1989), and transfer of financial resources (e.g. Lessard 1979). These studies have examined the transfer of capabilities and resources between affiliated organizational units across borders (Kobrin 1991, Gupta and Govindarajan 2000).

However, there are several research issues that remain to be addressed in the literature. First, a common limitation of past studies is the focus on only a single dimension of resource flows within the MNC, e.g., product or knowledge flows. It is clear to us that a study which examines the multiple dimensions of intra-MNC resource flows will provide a more comprehensive analysis of the differentiated roles of foreign subsidiaries and MNC network strategy. Furthermore, the linkages between these resource flows are still poorly developed in the past research. Second, while the literature has mostly examined the degree of global integration with the intensity of intra-MNC resource flows, the direction of resource flows within MNCs has apparently been given little attention (with a few exceptions, e.g. Hedlund and Kogut 1992, Birkinshaw 1997). Most researchers have implicitly looked at the one-way transfer of resources *from* the MNC-center *to* affiliates abroad.

This study is an attempt to respond to these two research issues. First, we examine the multiple dimensions of global resource flows within the MNC network, including products/services, knowledge, and financial capital. Second, we consider both the direction and the intensity of resource flows within the MNC. The intensity and direction of intra-MNC resource transfers are important indicators of global integration. Taking a configuration approach and building on the network conceptualization of the MNC in the literature, this study presents a framework for analyzing the differentiated roles of foreign subsidiaries in a wide range of industries and MNC home countries.

The study makes several contributions to the literature. First, we provide a conceptualization of intra-MNC resource flows. We expand the current frameworks by moving from a one-dimensional/one directional MNC-subsidiary relationship – to one of multiple dimensions and two-way flows of resources. In order to deepen our understanding of the MNC-subsidiary relationship we are able to capitalize on existing research from both international business and strategic management perspectives. Second, this study contributes to the literature by empirically identifying

the existence of a variety of subsidiary roles among foreign MNCs and their U.S. affiliates in 46 manufacturing and service industries and 24 MNC home countries. Differences in subsidiary roles are analyzed along two dimensions: (a) the extent to which the subsidiary is a provider of resources to the MNC network and (b) the extent to which the subsidiary is a user of resources from the MNC. Finally, this study provides managers with better understanding of global integration across subsidiaries.

THE RESOURCE FLOW FRAMEWORK

A typology for subsidiary strategy

The major intra-MNC resource transfers relate to capital, products and knowledge (Bartlett and Ghoshal 1989, Kobrin 1991, Gupta and Govindarajan 2000). Kobrin (1991) focuses on product flows, but he also acknowledges the importance of considering all dimensions of resource flows. Saudagaran (1988) and Modén and Oxelheim (1997) point out how equity issues toward U.S. investors (capital outflow in this paper) help MNCs to become more visible globally as well as more knowledgeable about U.S. customers and suppliers. I.e. capital flows are closely linked to other resource flows. Gupta and Govindarajan (1991, 2000) specifically analyze patterns of knowledge flows and explored differentiated roles for foreign subsidiaries.

Jarillo and Martínez (1990) specifically address the issue of subsidiary strategy with a sample of foreign subsidiaries in Spain. They identify three subsidiary roles: “autonomous”, “active” and “receptive” subsidiaries. An “autonomous subsidiary” does most of its activities locally and carries out these activities with relative independence from either its parent company or other subsidiaries within the parent network. An “active subsidiary” also conducts most of its activities locally, but performs these activities in an integrated fashion with the rest of the MNC. A “receptive subsidiary” is highly integrated into the MNC network, but only performs a limited number of activities in the host country.

The intensity and direction of intra-MNC resource transfers are important indicators of global integration. The intensity of integration is reflected in the extent of resource transfers. Rosenzweig's (1993) analysis regarding U.S. affiliates of foreign MNCs suggests that various resource flows represent complementary aspects of global integration. His research looked into the first issue, the intensity of global integration, rather than the possible two-way flows of resources.

The direction of resource flows within MNCs has apparently been given little attention, with a few exceptions (e.g. Hedlund and Kogut 1992, Birkinshaw 1997). Most researchers have implicitly looked at the one-way transfer of resources *from* the MNC-center *to* affiliates abroad. For example, Porter's (1990) home-base concept is

built around the premise that core competencies are first developed “at home” and then transferred abroad, which was certainly true for a number of industries in the 1970s and early 1980s (Dunning 1993a). The transfer of knowledge from a subsidiary to the MNC center, however, is a relatively recent phenomenon. Franko (1976, 162) captured an early stage of this trend concerning European investment in the U.S. when he pointed out that, “... the desire to learn from the stimuli of the high-wage, high-income U.S. market provided the motivation for some spectacular adventures (and misadventures) into American manufacturing.” Dunning (1993a, 39-40) refers to the works of Hedlund and Kogut (1992) and Hedlund and Rolander (1990) as he points out that in “MNCs like IBM, SKF and ICI, in which key resources and capabilities are geographically dispersed, cross-border flows of knowledge, information and ideas are multidimensional, communication is lateral, and there is a strong sense of shared values and mission among the different parts of the organization.”

By analyzing the intra-MNC transfer of resources and the corresponding strategic roles of foreign subsidiaries, we shall examine the global integration within MNCs. We first extend Bartlett and Ghoshal’s organizational typology to multiple resource flows within the MNC. We then discuss the framework developed by Gupta and Govindarajan for analyzing knowledge flows within MNCs. Extending this framework from single resource flows (e.g, knowledge) to the possibility of multiple resource flows, we present a framework for analyzing multiple resource flows within MNCs (Figure 1). This multiple resource flow configuration model is then explored with the empirical data.

Figure 1: Differentiated Subsidiary Roles

Outflow of resources from the focal subsidiary to the rest of the MNC network	High	<i>Global player</i>	<i>Transnational player</i>
	Low	<i>Multi-domestic player</i>	<i>Local implementer</i>
		Low	High

Inflow of resources from rest of the MNC network to the focal subsidiary

Our framework is an extension of Gupta and Govindarajan’s (1991, 1994) research on knowledge flow patterns and subsidiary roles. Gupta and Govindarajan

have specifically identified four generic roles a subsidiary can play within an MNC network, namely: global innovator, integrated player, local implementer, and local innovator. Birkinshaw (1997) provides another significant contribution to our framework. He looked at entrepreneurship in multinational corporations and identified three conceptual kinds of *subsidiary* initiatives: local market initiatives, internal market initiatives, and global market initiatives (However, empirically he also identified a fourth hybrid form of initiatives).

By combining a specific subsidiary's position in relation to the intensity and direction of resource flows, we develop four differentiated subsidiary roles. The "global player" subsidiary (high resource outflows, low resource inflows) serves as an overall resource supplier to the rest of the MNC. This role fits well with what Birkinshaw (1997) labels as global market initiatives, and Gupta and Govindarajan's (1991, 1994) label as global innovator in terms of knowledge. Historically, the host-country subsidiary utilized unskilled or semi-skilled labor in the international market, whereas the knowledge creation took place somewhere else in the MNC-network, e.g., in the home countries of MNCs (Vernon, 1966). However, in the case of the United States as the host country, a large number of Japanese and European high-tech firms may use their U.S. subsidiaries as a source of knowledge generation for the MNC network (Graham and Krugman 1995).

The "transnational player" (high outflows, high inflows) is the typical position of a subsidiary within an MNC that has a transnational strategy. Furthermore, the subsidiary is encouraged to take global market initiatives. The economy of learning - associated with developing, producing, and marketing international products - is one determinant for the levels of inflows and outflows of resources. Pearce (1995) argues that an MNC's dispersion of centers for knowledge creation relates in particular to the way creative assets in different countries enhance the MNC's overall competitiveness. These creative assets are location-specific, such that the MNC needs a significant host-country presence in order to tap into these unique capabilities.

A "local implementer" (low outflows, high inflows) subsidiary role typically fits in with an MNC with an emphasis on global strategy. In fact, in the early history of many MNCs the host-country subsidiaries usually served as implementers (Gupta and Govindarajan 1994). Such a subsidiary needs to emphasize capability exploitation, and entrepreneurship within the subsidiary usually takes the form of local market initiatives.

The "multi-domestic player" (low outflows, low inflows) subsidiary fits well within an MNC with a multi-domestic strategy. Such a subsidiary might take significant local initiatives or innovations, but with limited potential for transfer to the rest of the MNC network. The four subsidiary roles (Figure 1) should provide further insight on developing effective strategies for MNC subsidiaries.

Our conceptualization of intra-MNC resource flows as one of multiple

dimensions and two-way flows of resources thus provides a framework for a more comprehensive analysis of the differentiated roles of foreign subsidiaries and global network strategy. We now attempt to test this framework empirically with data on U.S. subsidiaries of foreign companies in 46 manufacturing and service industries.

RESEARCH METHOD

Data

We utilize a major database on foreign direct investment in the U.S. to explore resource flows within MNC networks. The data was obtained from the 1992 Benchmark Survey of Foreign Direct Investment in the United States conducted by the U.S. Department of Commerce (*Bureau of Economic Analysis* 1995). The survey presents detailed data on the financial structure and operations of U.S. affiliates of foreign direct investors, on the foreign direct investment position in the United States, and on balance-of-payments transactions between U.S. affiliates and their foreign parent companies. Benchmark surveys are conducted every 5 years and are the most comprehensive surveys in terms of both the number of companies covered and the amount of information gathered. The survey covered all U.S. affiliates of foreign direct investors that had assets, sales, or net income of more than US\$ 1 million. Due to the confidentiality requirement in data disclosure, the measures for cross-border resource flows between subsidiaries of foreign firms in the U.S. and their foreign parents (or sister subsidiaries) are aggregated at the three-digit (SIC) industry level.

We analyze intra-MNC resource flows for U.S. affiliates of foreign firms in 46 manufacturing and service industries. Two related types of data for U.S. affiliates of foreign companies are reported: (1) financial and operating *flows* and (2) direct investment *positions*. The data allows us to make cross-industry analysis of global integration, whereas most previous research has been industry or case-specific, as pointed out by Kobrin (1991) and Doz (1987). However, by using industry categories, as well as the lack of measures for firm-specific effects, a considerable limitation is implied. Therefore, the data represents an industry aggregation of subsidiary resource flows. Future research is needed to explore the framework with more fine-grained measures of resource flows and data at the firm and subsidiary level.

The published data allows us to calculate an index of product, knowledge, and capital flows for the 46 industries at the three-digit SIC level. Since the transfer of resources between a foreign parent network and its U.S. affiliate can occur in both directions, we are considering both the intensity and direction of the intra-MNC resource flows. From the U.S. affiliate's perspective, an inflow is the transfer of resources from the foreign parent group, including the foreign parent firm and other subsidiaries within the parent network, to the U.S. affiliate. An outflow is the transfer

of resources from the U.S. affiliate to the foreign parent and other subsidiaries within the parent network. Therefore, the U.S. affiliate serves as the focal point from which we examine the direction and intensity of resource flows.

The published data also allows us to analyze intra-MNC resource flows by MNC home country. We conducted the country-level analysis with US affiliates of MNCs from 24 home countries, and also calculated an index of product, knowledge, and capital flows at the home country level in the analysis.

Product Flows

Product flows are operationalized through intra-MNC trade between the focal U.S. affiliates and their foreign parent networks (see Kobrin 1991). Product inflows are measured as the total imports (e.g. raw materials and components) from the foreign parent network (the parent and other subsidiaries), adjusted for the subsidiary size. Similarly, product outflows are measured as the exports (e.g. components and finished products) from the U.S. affiliate to the foreign parent group, again adjusted for the subsidiary size.

Goods shipped by U.S. affiliates accounted for 22 percent of total U.S. merchandise exports (Zeile 1994). For two major product categories—food products and petroleum products—affiliates accounted for more than one-half of total exports. Goods shipped to U.S. affiliates accounted for 34 percent of total U.S. merchandise imports; affiliates accounted for about one-half or more of the imports of beverages and tobacco, chemicals, road vehicles and parts, and metal manufactures. More than two-thirds of the imports by affiliates were goods for resale without further manufacture by the affiliates, reflecting the large share of imports that was accounted by wholesale trade affiliates.

Knowledge Flows

Knowledge transfers within MNCs include transfers of know-how (e.g. technology, marketing and management skills), brand names and people. Therefore, knowledge flows are operationalized in two parts: 1) royalties and license fees; and 2) fees for management services between the U.S. affiliate and its foreign parent group. Royalty and license payments and receipts are fees for the use or sale of intangible property or rights, such as patents, industrial process, trade marks, copyrights, franchises, designs, know-how, formulas, techniques, manufacturing rights, and other intangible assets. Investment service fees consist of charges for services—such as management, professional or technical services—rendered between U.S. affiliates and their foreign parents or other subsidiaries within the parent groups (*Bureau of Economic Analysis* 1995).

From the U.S. affiliate's perspective, knowledge inflows are measured by the payment of royalties and license fees as well as service charges by the U.S. affiliate to the foreign parent group (the parent and other subsidiaries). Knowledge outflows are measured by the receipt of such fees and charges by U.S. affiliate from its foreign parent group. Our measure for knowledge flows is naturally restrained by the fact that we only measure explicit flows.

Capital Flows

Equity capital inflows are the net increases in a foreign parent group's equity in its U.S. affiliates, whether incorporated or unincorporated. Equity capital inflows to U.S. affiliates can result from a foreign parent group's establishment of new U.S. affiliates, from its initial acquisition of 10 percent or more ownership interests in existing U.S. business affiliates, and from capital contributions to its U.S. affiliates.

Equity capital outflows, conversely, can result from the parent group's liquidation of U.S. affiliates, from partial or total sales of ownership interests in U.S. affiliates, and from the return of capital contributions. Equity capital outflows also include liquidated dividends, which are returns of capital to foreign groups. These measures of capital inflows and outflows are then adjusted for the total equity of the affiliates.

Our dataset does not consider the large capital flows from U.S. investors - particularly institutional investors - directly towards foreign firms. A significant number of these companies are also listed on U.S. stock exchanges and have made equity issues targeting U.S. investors (Useem 1998). Since our data only consider the indirect capital flows through the U.S. affiliate, this study systematically understates the size of the capital outflow from the U.S. to the foreign MNC.

RESULTS AND DISCUSSION

Table 1 shows patterns of resource flows between the U.S. affiliates and their foreign parent groups in the 46 industries, including 26 in manufacturing, seven in professional and business services, nine in wholesale trade, and four in retail trade. The total sales of U.S. affiliates in these 46 industries in 1992 were US\$ 1,048 billions, with a total of 23,045 affiliates reporting the data (an average of 500 affiliates per industry). The average size of the affiliate is US\$ 45.5 million. The intensity and direction of resource flows are measured on three dimensions: product, knowledge and capital. Among the resource flows, only knowledge inflows and outflows are highly correlated with each other.

Table 1: Patterns of Resource Flows

Industry	Total Sales	No. of US Affiliates	PI (%)	PO (%)	KI (%)	KO (%)	CI (%)	CO (%)
Petroleum manufacturing	62,457	365	3.94	1.10	0.17	0.14	1.12	0.01
Other petroleum	50,204	573	14.99	2.34	0.41	1.83	0.01	0.87
Beverages	6,618	271	8.73	1.59	0.16	0.15	1.50	0.46
Other foods	40,411	820	2.91	1.97	0.71	0.23	1.59	0.17
Industrial chemicals	67,657	981	7.52	7.60	0.47	0.38	1.33	0.08
Drugs	27,939	320	9.83	3.60	3.35	0.37	1.54	0.92
Soap, cleaners	15,898	188	1.40	1.91	1.79	0.01	2.34	0.01
Other chemicals	12,046	318	12.00	4.59	0.85	2.24	2.77	0.90
Ferrous metals	18,146	336	6.10	0.55	0.38	0.08	2.02	0.70
Nonferrous metals	14,614	313	12.41	3.62	0.25	0.07	2.12	0.01
Fabricated metals	21,227	665	5.71	1.58	0.44	0.26	1.03	0.51
Office and computing	8,558	142	27.34	13.13	1.15	0.70	19.51	0.02
Other machinery	27,801	1,041	14.15	5.01	0.58	0.28	3.26	0.49
Audio/video equipment	21,318	231	25.50	7.16	1.29	0.85	7.57	0.98
Electronic components	7,960	326	24.21	10.44	0.69	0.96	5.42	0.13
Other electronic	22,811	512	9.94	5.29	0.71	0.83	2.60	0.03
Textiles	8,262	381	4.26	2.06	-	-	3.42	0.57
Lumber	3,657	151	10.91	2.65	0.30	0.03	1.18	0.17
Paper	10,849	274	4.29	3.96	0.33	0.06	2.78	0.01
Printing	16,507	643	0.56	1.36	0.73	0.30	-	-
Rubber	11,348	119	15.39	6.57	0.18	0.35	-	-
Plastics	5,106	286	8.91	1.51	1.04	0.24	4.17	0.25
Stone, clay, glass	17,616	675	4.00	1.84	0.48	0.05	-	-
Transportation equipment	22,858	419	22.84	4.11	0.78	0.39	5.80	0.54
Instruments	15,238	671	6.01	7.04	0.66	0.34	2.85	0.65
Other manufacturing	6,777	248	5.46	7.44	-	-	3.40	0.60
Wholesale-motor vehicles	97,245	330	29.68	5.72	0.43	0.53	-	-
Wholesale-comm supplies	22,706	377	50.00	4.14	0.56	0.87	5.09	0.07
Wholesale-metals	37,134	474	18.27	20.64	-	-	3.92	0.10
Wholesale-electrical	42,387	938	48.14	3.99	0.54	0.88	1.69	0.02
Wholesale-machinery	38,602	828	20.00	22.01	0.14	0.38	2.35	0.14
Wholesale-other durables	52,079	797	11.65	3.83	0.63	0.39	2.05	0.15
Wholesale-groceries	19,688	418	7.34	6.85	0.12	0.08	6.18	0.47
Wholesale-farm product	35,746	227	2.75	18.98	-	-	0.65	0.10
Wholesale-other non-durables	29,813	1,105	22.08	5.73	0.60	0.49	-	-
Retail-general stores	2,376	129	1.77	0.25	0.04	0.00	29.75	0.15
Retail-food stores	48,443	345	0.01	0.01	-	-	0.86	0.20
Retail-apparel stores	7,839	342	2.60	0.04	0.56	0.12	2.58	0.52
Retail-other	23,402	981	2.99	0.85	0.41	0.05	6.36	0.12
Services-hotels	6,554	925	0.02	0.01	0.63	0.46	4.95	0.08
Services-business	15,613	1,106	0.80	0.88	1.71	2.06	3.06	0.66
Services-motion pictures	10,499	579	0.51	0.32	0.50	0.42	5.02	0.01
Services-engineering	5,572	438	0.66	0.33	0.47	1.56	-	-
Services-accounting	1,805	315	0.83	0.22	4.43	21.05	7.71	0.12
Services-health	1,430	134	0.00	0.00	0.98	0.07	0.07	0.15
Services-other	5,050	988	0.65	0.16	1.23	0.85	-	-

Source: Foreign Direct Investment in the US, Benchmark Survey, U. S. Department of Commerce, 1995

Note: PI: product inflows, PO: product outflows

KI: knowledge inflows, KO: knowledge outflows

CI: capital inflows, CO: capital outflows

- : data missing.

We analyze different strategic roles for foreign subsidiaries by examining the patterns of intra-MNC resource flows. A combination of hierarchical and nonhierarchical methods was used in the clustering analysis (Hartigan 1975, Punj and Stewart 1983, Hair, Anderson, Tatham, and Black 1992, Ketchen and Shook 1996). We first used the hierarchical average linkage procedure. Our examination of the dendrogram, changes in the clustering coefficient, and plot of the clustering coefficient vs. number of clusters suggested a four-cluster solution. We then used a non-hierarchical cluster algorithm (Fastclus) with 3-5 cluster solutions and the seed points identified in the hierarchical analysis (Hair et al. 1992). Nonhierarchical methods allow the switching of cluster membership as the clusters evolve thereby minimizing the problem of data ordering and outliers. We tried three, four, and five cluster solutions using the combinations of the methods indicated above. The results suggest a four-cluster solution for most analyses (Table 2).

Table 2: Clustering analysis: Direction and intensity of intra-MNC resource flows

2A. Product flows: Cluster means

Cluster	Frequency	Outflow	Inflow	Subsidiary role related to product flows
P1	1	18.98	2.75	Global player
P2	11	9.35	21.31	Transnational player
P3	2	4.06	49.07	Local implementer
P4	32	2.34	4.83	Multi-domestic operation

Pseudo F =60.2

Expected R^2 =0.84

2B: Knowledge flows: Cluster means

Cluster	Frequency	Outflow	Inflow	Subsidiary role related to knowledge flows
K1	6	1.56	0.99	Global innovator
K2	1	21.05	4.43	Transnational player
K3	2	0.19	2.57	Local knowledge user
K4	32	0.33	0.51	Local innovator

Pseudo F =611.7

Expected R^2 =0.90

2C. Capital flows: Cluster means

Cluster	Frequency	Outflow	Inflow	Subsidiary role related to capital flows
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C1	10	0.28	5.83	Global capital provider
C2	2	0.51	29.75	Transnational player
C3	2	0.01	19.51	Local capital user
C4	17	0.23	2.30	Multi-domestic operation

Pseudo F =272.2

Expected R^2 =0.95

Product Flows

Based on the framework in Figure 1, we have identified four different subsidiary roles related to product flows: global player (high outflow, low inflow), transnational player (high outflow, high inflow), local implementer (low outflow, high inflow), and multi-domestic operation (low outflow, low inflow). The results of the clustering analysis identified these four clusters in subsidiary roles (Table 2a).

The transnational player (high outflow, high inflow) role in cluster P2 is represented by 11 industries, such as office and computing machines, audio/video equipment, electronic components, and transportation equipment, as well as wholesale trade in motor vehicles, machinery, metals and minerals, and other durable goods. The international economies of scale and scope involved in producing such equipment make global specialization necessary. At the same time the international dispersion of creative assets motivates MNCs to seek strategic assets in a number of countries (Dunning 1993b). Subsidiaries in one industry-wholesale trade in farm-product raw materials- were identified to have the characteristics of the global player, with high outflows and low inflows in terms of products and services (cluster P1).

The local implementer (low outflow, high inflow) role in cluster P3 is associated with two industries, mainly wholesale trade in professional and commercial equipment and supplies and electrical goods. The subsidiaries in cluster P4 have the role of being multi-domestic operation with meager intra-MNC product flows (low inflow, low outflow). This cluster includes subsidiaries in 32 industries such as soap/cleaners, food products, paper, building materials, and ferrous metals in manufacturing, most of the retail industries, as well as some business and health services. These industries provide limited opportunities for international economies of scale and scope produced by significant intra-MNC product flows. Subsidiaries in the multi-domestic operation group also show how globalization can be significantly limited by the need for national localization.

Knowledge Flows

We have identified four clusters of knowledge flows (Table 2b) that are parallel to the differentiated subsidiary roles, consistent with Gupta and Govindarajan's study (1991, 1994).

The global innovator role (high outflow, low inflow) includes subsidiaries in six industries such as audio/video equipment and professional business and engineering services (cluster K1). In these industries non-U.S. companies are drawn to the U.S. because of the competencies of the American workers, the sophistication of its customers, and the competitiveness of its supplier industries. The global economies of scale in these industries make cross-border knowledge transfers a necessity.

The transnational player (high outflow, high inflow) is represented by only one industry – international accounting and management-related services (cluster K2). This industry is particularly knowledge-intensive, and involves mobility of personnel on a global scale. In fact, access to country-specific assets has been a major motivating factor behind FDI to the U.S. (Graham and Krugman 1995).

The local knowledge implementer role (low outflow, high inflow) includes subsidiaries in two industries: drugs and other chemical products (cluster K3). The knowledge generation in this industry is highly scale-sensitive and the U.S. affiliates of global drug companies heavily utilize technology from their parent network. The subsidiary strategy of local implementer (low outflow, low inflow), shown by cluster K4, is to produce knowledge for national market needs. Industries in this category are, among others, lumber, paper, ferrous metals, and industrial chemicals, as well as most industries in retail and wholesale trade. These also represent industries with relatively low levels of knowledge content, as indicated by the relatively low R&D expenditures in these industries. The four subsidiary roles related to knowledge flows provide further insight in order to develop an effective subsidiary strategy.

Capital Flows

The four Clusters in Table 2c represent the four subsidiary strategies related to capital flows. The “capital provider” role (high outflow, low inflow) (cluster C1) includes subsidiaries in ten industries such as electronic components, audio/video equipment, motor vehicles, plastics, services such as international accounting, hotels, and entertainment, and wholesale trade in professional and commercial equipment and supplies and groceries and related products. This partly reflects the capital intensive nature and/or the mature stage of some of these industries.

The high capital outflow of the “capital provider” industries also reflects the attractiveness of the U.S. as a source of funding. Past studies have shown how non-U.S. MNCs have reduced their cost of capital by listing their equity in the U.S. and by making stock issues (high outflow of capital) in the U.S. (Stulz 1996, Modén and Oxelheim 1997, Rajan and Zingales 1998). This capital is then commonly funneled back to the U.S. subsidiary, or provides the means to equity companies in the U.S. This also provides the U.S. subsidiary with a partial protection from being acquired by another firm that already enjoy a competitive cost and availability of capital (Useem

1998). For example, a well-published illustration of the attractiveness of the U.S. capital market is Daimler-Benz's (now DaimlerChrysler) 1993 decision to attain listing on the New York Stock Exchange. Daimler-Benz's objective was to lower the cost and availability of capital and pave the way for an U.S. expansion.

The transnational player (high outflow, high inflow) role in cluster C2 consists of industries such as general merchandise stores and other petroleum manufacturing. These industries tend to be rather mature and characterized by a modest amount of capital intensive innovations. The local capital user (low outflow, high inflow) role in cluster C3 includes industries such as office and computing machines and petroleum manufacturing. These represent industries with significant firm-specific know-how, and a considerable capital expenditure. The large amounts of capital from abroad to the U.S. affiliates reflect the advantages associated with internalizing capital, i.e. reducing financial agency costs by using funds from the MNC-parent (Oxelheim, Randøy, and Stonehill 2001).

The multi-domestic subsidiary role (low outflow, low inflow) in cluster C4 consists of industries such as lumber, industrial chemicals, and paper, as well as wholesale trade in farm products, metals and minerals, and other durable goods. The low capital flows associated with these subsidiaries might reflect the mature state of these industries and the opportunities to tap capital domestically (in the U.S.). The capital-intensive innovations in these industries do not permit the MNC to transfer considerable amount of cash from the U.S. affiliates.

Home Country Analysis

We have also analyzed the data by the home country of the U.S. affiliates. Several studies (Porter 1990, Thomas and Waring 1999, Thomsen and Pedersen 2000) argue that the national institutional environment – that includes corporate governance and culture - causes strategy differences across firms from different countries. This makes it then logical to analyze international business strategy with respect to home country as the unit of analysis.

Table 3 presents the patterns of intra-MNC resource flows for U.S. affiliates from 24 home countries. The total sales of U.S. affiliates from these 24 home countries in 1992 were US\$ 1,157 billions, with a total of 33,796 affiliates reporting the data. The average affiliate size was US\$ 34.2 million. In terms of the total sales and number of U.S. affiliates, Japan, United Kingdom, Germany and Canada were the four largest investing countries in the United States, followed by France, Netherlands, and Switzerland. Table 4 shows the results of cluster analysis of the three types of intra-MNC resource flows. While the preliminary analysis provides insights on subsidiary strategies by MNC home country, caution is advised in interpreting the results.

Table 3: Patterns of Resource Flows by MNC Home Country

Country	Total Sales	Number of Affiliates	PI(%)	PO(%)	KI(%)	KO(%)	CI(%)	CO(%)
Canada	112,419	4,840	7.13	3.71	0.65	0.37	1.28	0.18
Austria	2,219	167	17.94	3.88	0.86	0.09	3.38	0.03
Belgium	17,207	389	2.92	0.81	-	0.14	2.01	0.05
Denmark	3,613	187	12.90	1.94	1.02	10.32	-	-
Finland	6,573	298	7.85	2.82	0.33	0.37	4.47	0.25
France	92,665	2,274	6.23	5.64	0.39	0.46	2.07	0.40
Germany	120,888	2,866	13.25	2.98	0.48	0.83	1.47	0.31
Ireland	6,055	182	3.62	1.26	-	-	-	-
Italy	14,205	472	12.68	6.18	-	-	4.25	0.61
Netherlands	77,934	1,855	6.59	2.43	-	-	1.92	0.32
Norway	2,664	211	10.02	3.08	0.41	0.26	1.79	0.25
Spain	927	116	12.19	1.51	1.29	0.32	4.66	0.41
Sweden	30,139	615	13.32	2.46	0.39	0.45	2.38	0.60
Switzerland	74,032	1,893	5.37	2.22	0.77	0.30	1.33	0.01
United Kingdom	200,826	7,557	3.64	1.49	0.68	0.39	1.89	0.19
Brazil	2,201	107	32.08	17.45	0.09	1.27	1.14	0.03
Panama	4,377	226	0.78	7.79	0.11	1.46	1.21	0.09
Australia	30,817	825	2.22	0.68	0.18	0.08	2.85	0.57
Hong Kong	4,885	983	11.87	0.59	-	-	4.80	0.94
Japan	336,016	7,053	21.42	9.53	0.43	0.60	1.95	0.13
Korea, Republic of	9,800	140	39.38	13.37	0.08	0.19	2.20	0.04
New Zealand	2,570	208	18.44	0.39	0.08	0.00	3.10	0.10
Singapore	724	144	6.91	6.49	0.28	0.28	4.20	0.31
Taiwan	3,427	188	20.16	6.54	0.26	0.20	2.22	0.26

Source: Foreign Direct Investment in the US, Benchmark Survey, U. S. Department of Commerce, 1995

Note: PI: product inflows, PO: product outflows

KI: knowledge inflows, KO: knowledge outflows
 CI: capital inflows, CO: capital outflows
 -: data missing.

Table 4: Clustering analysis: Direction and intensity of intra-MNC resource flows by MNC home country

4A: Product flows: Cluster means

Cluster	Frequency	Outflow	Inflow	Subsidiary role related to product flows
P1	2	15.41	35.73	Transnational
P2	10	3.60	15.42	Imports from foreign MNCs
P3	12	3.20	5.27	Multi-domestic operation

Pseudo F =58.1 Expected $R^2 = 0.79$

4B. Knowledge Flows: Cluster Means

Cluster	Frequency	Outflow	Inflow	Subsidiary role related to knowledge flows
K1	10	0.29	0.28	Multi-domestic operation
K2	5	0.29	0.85	Local knowledge user
K3	3	1.19	0.23	Global innovator
K4	1	10.32	1.02	Transnational

Pseudo F =439.5 Expected $R^2 =0.94$

4C. Capital Flows: Cluster Means

Cluster	Frequency	Outflow	Inflow	Subsidiary role related to product flows
C1	3	0.23	3.11	Local capital user
C2	5	0.50	4.48	Transnational
C3	14	0.20	1.78	Multi-domestic operation

Pseudo F =77.5 Expected $R^2 =0.88$

Product flows: Three clusters were identified in terms of product flows (Table 4a). Cluster #1 includes subsidiaries from Brazil and Korea, with a high intensity of two-way product flows between the U.S. affiliates and their MNC home countries (imports

and exports). We suggest this reflects that the U.S. affiliates are both a sales channel, and a production center for high technology products. Cluster #3 includes subsidiaries from 12 countries such as Australia, France, Netherlands, Switzerland, and United Kingdom. These countries are among the early entrants to the U.S. market. We suggest that the limited potential for global integration when these affiliates were established still reflects their subsidiary role. The subsidiary strategy role in this cluster represents the multi-domestic operation, with a low intensity of two-way product flows between the U.S. affiliates and their MNC home countries. Cluster #2 includes subsidiaries with high inflows and low outflows of products, where the U.S. affiliates serve mainly as the global sales platform. Countries represented in this category include Germany, Japan, Sweden, and Taiwan. We suggest that this reflects the high level of scale economy of the strongest industries from these countries (auto, computers, and pharmaceutical).

Knowledge flows: The results show four clusters in terms of knowledge flows between the US affiliates and their MNC networks by home country (Table 4b). The subsidiaries in cluster #1 represent a multi-domestic operation, with a low intensity of two-way knowledge flows. Ten countries are falling into this category, including Australia, Finland, France, Japan, Korea, Singapore, and Taiwan. Cluster #2 includes subsidiaries with a relatively high intensity of knowledge inflows from home country. The countries in this category include Canada, Switzerland, and United Kingdom. Cluster #3 is a net knowledge exporter from the US affiliates to their parent MNC network, including subsidiaries from Brazil, Germany, and Panama. Cluster #4 includes subsidiaries from only one country, Denmark, with a high intensity of two-way knowledge flows between U.S. affiliates and their MNC network.

Capital flows: Three clusters were identified in terms of capital flows (Table 4c). Cluster #1 includes subsidiaries from three countries: Austria, Australia, and New Zealand, with a high inflow of capital into the U.S. affiliates. This indicates the local capital user role for the U.S. affiliates. Cluster #2 includes subsidiaries from five countries, including Finland, Hong Kong, Italy, Singapore, and Spain, with a high intensity of two-way capital flows. The subsidiaries in cluster #3, including 14 countries, represent the subsidiary role of multi-domestic operations in terms of capital flows.

CONCLUSIONS AND FUTURE RESEARCH

By examining the empirical data on the cross-border resource flows between foreign MNCs and their U.S. subsidiaries in 46 manufacturing and service industries and 24 MNC home countries, this study has analyzed global resource flows and MNC network integration. The results provide strong support for differentiated subsidiary

roles in relation to patterns of intra-MNC resource flows in products, knowledge, and capital. Furthermore, we have identified distinct industry groups related to the *direction* and *intensity* of resource flows. This framework provides managers with better understanding of the economic and strategic factors that drive global integration across subsidiaries.

Our differentiated strategic roles for foreign subsidiaries are also consistent with Bartlett and Ghoshal's (1989) typology of four types of MNC organizations: multinational, global, international, and transnational organizations. The transnational strategy reflects a high intensity of two-way resource flows taking place between foreign subsidiaries and their parent MNC network. The "transnational player" subsidiaries seek to be globally competitive through multinational flexibility and worldwide learning capabilities. MNCs with a global strategy centralize production, marketing, and R&D activities in a few locations whereby most resources are being transferred or coordinated. Therefore, "global player" subsidiaries should be highly centralized to utilize scale advantages.

The multinational and international MNCs transfer knowledge, capital and products, usually from their headquarters. This is shown from the low intensity of outflows of resources from subsidiaries to the parent network. MNCs that pursue an international strategy try to create value by transferring valuable skills and products to foreign markets. Therefore, the "local implementer" subsidiaries are shown to leverage heavily the competencies and resources of parent networks (high resource inflows).

The multinational strategy reflects a decentralized organization with dispersed resources and delegated responsibilities. Subsidiaries in multi-domestic MNCs are largely autonomous and show relatively low intensity of inflows and outflows in resource transfers with the parent network. Such a subsidiary should also exploit local opportunities, and develop and retain knowledge suitable to its national market.

Limitations and Future Research

There are several limitations of the study that should be addressed in future research. First, by addressing the two-way cross-border flows of multiple resources in different industries, we are able to examine the existence of broad subsidiary roles. Therefore, future research should examine the framework with more fine-grained firm-level data on resource flows to enhance the micro-level understanding of these differentiated subsidiary roles.

Second, in this study we relied on primarily secondary data in examining the multiple dimensions of resource flows. While this is the first step in exploring this complex research issue, future research should collect primary data to fully explore the intra-MNC resource flow framework. Therefore, we advise caution in interpreting the results of this study. We are pleased to see recent studies using primary data to

examine single dimensions of resource flows (e.g., Gupta and Govindarajan 2000, for knowledge flows). We expect that using primary data to measure multiple dimensions of resource flows will be the next logical step in contributing to the literature in this area.

Finally, our data does not allow a test of factors determining global integration. Therefore, another logical next step is to consider firm-specific resources and capabilities directly (e.g., Rumelt, Schendel, and Teece 1991, Kogut and Zander 1993, Birkinshaw and Hood 1998). This is especially relevant since Kogut (1991) argues that country capabilities, embedded in the national firm and its institutional relationships, are difficult to diffuse over national borders, except through intra-MNC transfers. Another limitation of this study is the fact that we only address this study with empirical data from one host country (U.S.). Future research should also consider the effects of both host and home countries.

APPENDIX: MEASURES OF RESOURCE FLOWS BETWEEN FOREIGN MNCs AND THEIR U.S. AFFILIATES

The unit of analysis is the three-digit industry

- X1, total sales
- X3, export to foreign parent
- X4, export to foreign affiliates
- X6, imports from foreign parent
- X7, imports from foreign affiliates
- X8, total equity
- X9, royalties and license fees, payments to parent
- X10, royalties and licensing fees, receipts from parent
- X11, service charge-payment to parent
- X12, service charge-receipt from the parent
- X13, equity increase-in the U.S. affiliates
- X14, equity decrease-in the U.S. affiliates
- X15, number of U.S. affiliates

Operationalization of resource flows

- Product INFLOWS = $(X6+X7)/X1$;
- Product OUTFLOWS = $(X3+X4)/X1$;
- Knowledge INFLOWS = $(X9+X11)/X1$;
- Knowledge OUTFLOWS = $(X10+X12)/X1$;
- Capital INFLOWS = $(X13)/X8$;

Capital OUTFLOWS = (X14)/X8

Average affiliate SIZE =(X1/X15)

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