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GEOGRAPHICAL DISTANCE AND THE ROLE AND MANAGEMENT OF SUBSIDIARIES: THE CASE OF SUBSIDIARIES DOWN-UNDER

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ABSTRACT

Based on a international mail survey covering 169 subsidiaries of MNCs headquartered in the USA, Japan, the UK, Germany, France and the Netherlands, we investigate the impact of geographical distance on the role that subsidiaries play in the MNC network and the way they are managed. To this end, we compare Australian and New Zealand subsidiaries – which provide a significant example of geographically isolation – compared to subsidiaries located in other countries. Referring to the typology constructed by Gupta & Govindarajan (1991), we show that Australian and New Zealand subsidiaries are more likely than subsidiaries in other countries to be Local Innovators rather than Global Innovators. In addition, both intra-company flows and the type of control mechanisms applied by HQ reflect the geographical isolation of Australian and New Zealand subsidiaries. The overall level of capabilities of Australian and New Zealand subsidiaries is equal to that of other subsidiaries, although lower relative capabilities in R&D and production seem to be associated with lower levels of local R&D and production. We discuss the implications of these findings and provide recommendations for management and competitiveness issues in Australia and New Zealand.

INTRODUCTION

In the last two decades a substantial number of studies have focused on the role of subsidiaries in the MNC network (see e.g. Hedlund, 1980; White & Poynter, 1984; Gupta & Govindarajan 1991, 1994; Martinez & Jarillo, 1991; Roth & Morrison, 1992; Birkinshaw & Morrison, 1995; Birkinshaw & Hood, 1997; Taggart, 1997a/b; Nobel & Birkinshaw, 1998; Ambos & Reitsperger, 2004). One of the fundamental characteristics of MNCs is the geographical dispersion of their activities. Even though some of the studies referred to above have looked at countries other than the USA, none

of them specifically investigated the impact that geographical distance has on the roles that subsidiaries play in the MNC network and on the way they are managed. If distance is considered at all as a concept, studies typically focus on cultural distance. The concept of cultural distance and in particular its reductionist measurement through the Kogut & Singh (1988) formula has recently been subject to substantial criticism (see e.g. Shenkar, 2001; Harzing, 2003). Although geographical distance and cultural distance are highly correlated for some country pairs, they are completely unrelated for others. Australia and New Zealand, for instance, are culturally similar to the USA, Canada and the UK, but geographically very distant. Countries within Europe are geographically very close to each other, but culturally very different.

In this paper, we investigate the case of subsidiaries “down-under” (those located in Australia and New Zealand) as the most significant examples of subsidiaries that are geographically (but not necessarily culturally) distant from both their HQ and other subsidiaries. Since most MNCs’ HQs are located in the USA, Europe and Japan, subsidiaries down-under are separated from their HQ by 8,000-16,000 kilometers, a full-day plane journey and a time difference that drastically reduces the opportunity for direct communication. Given the relatively small size of the Australian/New Zealand population and economy, many MNCs only have one or two subsidiaries in the region. It takes eight hours just to fly to Hong Kong or Singapore from Australia and even longer from New Zealand. As a result subsidiaries down-under even tend to be isolated from their sister subsidiaries as well.

This issue is of considerable importance to these regional economies. Foreign direct investments play a major role in the Australian economy (Yang, Groenewold & Tcha, 2000). In 2002-2003 twenty-eight of the one hundred largest companies in Australia were subsidiaries of MNCs. In the manufacturing sector, MNC subsidiaries provide one in five jobs and generally pay higher salaries than local firms do. Foreign MNCs are claimed to re-invest half of their total income earned in Australia (Commonwealth of Australia, 2002). In New Zealand, FDI has risen from \$9.7 billion in 1989 to \$52.5 billion in 2003, while foreign-owned enterprises employ no less than 18%

of New Zealand's workforce. (Scott-Kennel, 2004). Yet the role of foreign subsidiaries in Australia and New Zealand has received scant attention. We are aware of only three studies that have focused specifically on Australian subsidiaries (Thorburn, Langdale & Houghton, 2002; Nicholas, Sammartino & Maitland, 2003; Johnston, 2004) and these studies did not provide a comparison of Australian subsidiaries with subsidiaries in other countries. Hence, this article has both a general theoretical aim, viz., to explore the effects of geographical distance on the management of MNC subsidiaries, and a specific aim related to the position of subsidiaries down-under in their respective MNC networks, and the possible implications for the regional economies.

In the remainder of this article we will provide insight into the relative positions of Australian/New Zealand subsidiaries of MNCs. Specifically, we address the following questions. Does the geographical isolation of the region impact on the functioning of these subsidiaries within their MNC networks, in particular in terms of knowledge inflows and outflows and intra-company flows to and from these subsidiaries? Do subsidiaries down-under have more or less autonomy and are they controlled in different ways? And, finally, how do the capabilities of Australian/New Zealand subsidiaries compare with other subsidiaries and what is their performance relative to other subsidiaries? The reason to ask this last question is that if the geographical isolation of subsidiaries down-under indeed also leads to a relatively isolated position in their respective internal MNC networks, this might have implications for their capabilities. From the point of view of the regional economies, this issue is of practical importance. Given the lack of conceptual and empirical evidence in this area, we will refrain from offering formal hypotheses. However, we will put forward some tentative expectations with regard to the impact of geographical distance on various aspects of the role and management of subsidiaries.

In the next section, we will first discuss one of the main typologies of subsidiary roles: Gupta & Govindarajan's (1991, 1994) typology based on knowledge inflows and outflows. We theorize how the geographical isolation of Australian/New Zealand subsidiaries influences intra-company flows, control mechanisms used, subsidiary capabilities and subsidiary performance. We confront our

theoretical expectations concerning MNC subsidiaries down-under with data from 169 subsidiaries, 59 of which were located in either Australia or New Zealand. Our analysis shows that most Australian/New Zealand subsidiaries, although not closely integrated into the MNC network of *physical* flows (products and components), demonstrate few significant differences with other subsidiaries in terms of *knowledge* flows. Generally, Australian and New Zealand subsidiaries show good performance, but capabilities in production and R&D are somewhat lower than those of other subsidiaries. This is a potential danger, as it appears that the full inclusion of Australian/New Zealand subsidiaries in the MNC knowledge network (as senders as well as receivers of knowledge streams) might be influenced by their capabilities. Upgrading capabilities in production and R&D may be necessary to ensure that these subsidiaries will not in the future become relatively isolated within their MNC networks, not only in terms of physical flows (as is already the case), but also in terms of knowledge flows.

GEOGRAPHICAL DISTANCE AND THE MNC NETWORK

Increasingly, the MNC is seen as a network of transactions that comprise capital flows, product flows and knowledge flows, the latter of which are argued to be most important (Gupta & Govindarajan, 1991). By distinguishing two aspects of knowledge flows: the magnitude of transactions (the extent to which subsidiaries engage in knowledge transfer) and the directionality of the transactions (whether subsidiaries are the provider or receiver of knowledge), Gupta & Govindarajan (1991) define four generic subsidiary roles: *Global Innovator* (high outflow, low inflow), *Integrated Player* (high outflow, high inflow), *Implementor* (low outflow, high inflow) and *Local Innovator* (low outflow, low inflow).

The Global Innovator (GI) subsidiary can be characterised as a fountainhead of knowledge for other units. It is a role that has become more important in recent times as more MNCs move towards a transnational model in which individual subsidiaries can act as a center-of-excellence for specific product lines (Bartlett & Ghoshal, 1989). Integrated Players (IP) do engage in knowledge transfer to other organizational units as well. At the same time, however, they are at the receiving

end of knowledge flows from HQs and other subsidiaries, making them a very important node in the MNC network. Subsidiaries with an Implementor (IM) role do not typically engage in extensive knowledge creation. As a result they provide little knowledge to other organizational units. On the other hand, they are heavily dependent on knowledge inflows from either HQ or other subsidiaries. Local Innovators (LI) are rather autonomous subsidiaries, who *do* engage in knowledge creation, but do not transfer this knowledge to other organizational units, nor receive knowledge from them. This situation usually occurs when local knowledge is seen as too idiosyncratic to be of much use in other organizational units.

The role a subsidiary plays within the internal MNC network may be influenced by many factors, like the resource profile and/or the local embeddedness of the subsidiary (Birkinshaw & Hood, 1998; Forsgren & Pahlberg, 1992), or internal strategic considerations of the MNC headquarters (Young & Tavares, 2004). In this paper, we focus on a factor that in our view has received insufficient attention in the literature: geographical distance. We expect the geographical isolation of Australian/New Zealand subsidiaries to influence their positions within the internal MNC network, and hence the frequency of occurrence of the four roles distinguished by Gupta & Govindarajan, 1991). In particular, in Australian and New Zealand subsidiaries, we expect to find a higher proportion of Local Innovators and a lower proportion to be Global Innovators and Integrated Players, for the reasons discussed below.

Geographical distance may be expected to first and foremost have an impact on the *physical* flows within MNC networks, for simple reasons of transport economies. We expect subsidiaries down-under to rely more on local inputs than subsidiaries in other countries and to sell more of their output locally than other subsidiaries. However, geographical distance may be expected to influence knowledge flows as well. Ghoshal and Bartlett (1988) found that the ability of a subsidiary to diffuse knowledge to the rest of the MNC is positively associated with what they call “normative integration”. The extent to which a subsidiary is normatively integrated with the parent company and shares its overall strategy, goals and values for Ghoshal and Bartlett (1988: 371) is

associated with practices like “extensive travel and transfer of managers between the headquarters and the subsidiary” and “joint-work in teams, task forces, and committees”. Gupta and Govindarajan (1994) also find that “lateral integration mechanisms” (the use of liaison personnel, temporary task forces, and permanent teams for coordination with sister subsidiaries) and the intensity of corporate-subsidiary and inter-subsidiary communication are important predictors of knowledge outflows and inflows at the subsidiary level. The same authors find that corporate socialization mechanisms influence knowledge inflows and outflows, both to/from headquarters and other subsidiaries (Gupta and Govindarajan 2000). Apparently rich communication media allowing for face-to-face communication, informal interaction, and teamwork help to overcome the “transmission losses” that occur when complex knowledge is transferred (Mudambi 2002; Pedersen, Petersen & Sharma, 2003). All the integration mechanisms mentioned above rely heavily on face-to-face communication. The geographical isolation of subsidiaries down-under renders this kind of interaction more difficult, impeding the transfer of knowledge.

Based on this reasoning we expect the subsidiary roles that require intensive knowledge transfer, in particular Integrated Players and Global Innovators, to be underrepresented in Australia and New Zealand. In contrast, relatively independent subsidiaries with a Local Innovator role may be expected to be overrepresented. We also expect that because of the geographical isolation of subsidiaries down-under, control mechanisms that involve the physical movement of people (e.g. expatriation, inpatriation, international training and international task forces) will be less prevalent in the Australian/New Zealand context. Finally, we would expect HQ to grant a higher level of autonomy to subsidiaries down-under as the geographical distance makes centralised decision-making less appropriate and less feasible.

If subsidiaries in Australia and New Zealand are indeed more likely to fall into the Local Innovator category, we would expect the capabilities underlying any knowledge creation to be idiosyncratic to the local market. Although we have no a-priori reason to expect subsidiaries down-under to have a lower level of capabilities than other subsidiaries, nor to expect significant performance

differences, we will test for these differences, as possible capability/performance gaps would have potentially important implications for the local economies.

METHODS

DATA COLLECTION AND SAMPLE

We collected data for this study by a questionnaire survey. The questionnaire was developed after an extensive review of the relevant literature on headquarters-subsidary relationships. It was subjected to three rounds of pilot-testing with postgraduate students with extensive work experience as well as practising managers from different countries. The final questionnaire had a total of 149 questions, measuring a range of aspects of the headquarters-subsidary relationship.

Questionnaires were mailed in 2002 to the subsidiary managing directors of 2754 subsidiaries of MNCs headquartered in the USA, Japan, Germany, the UK, France and the Netherlands. Subsidiaries were located in more than 50 different countries, but more than 80% were located in developed countries in Europe, North America and Australia/New Zealand. The sample was drawn from the Dun & Bradstreet *Who Owns Whom* database. Four very different manufacturing industries were selected that included MNCs from most of the six home countries: motor vehicles and parts, chemicals, food & beverages and electronics. For each home country 3-5 MNCs were selected, resulting in a total of 82 MNCs. For each MNC, 30-50 subsidiaries were selected, taking care to not select more than 5 subsidiaries in each subsidiary country. Subsidiaries with less than 25 employees were excluded, as were pure service subsidiaries.

Of the 2754 questionnaires, 553 were returned undeliverable. After an initial mailing and one follow-up mailing, a total of 174 questionnaires were returned. Five of them contained more than 15% missing values and were hence discarded, leaving a total response rate of 8%. Although very low, this response is not unusual for multi-country studies with high-level executives as respondents. Harzing (1997) reported that response rates for international mail surveys typically varied between 6% and 16% and key studies in the field (Ghoshal & Nohria, 1989) have been based on response rates of 15%. Ghoshal & Nohria's (1989) data were collected nearly twenty years ago.

Intensification of the pace of business as well as the increasing use of mail surveys are likely to have led to a substantial decline in willingness to respond to mail surveys.

The resulting sample of 169 subsidiaries represented nearly 50 different MNCs, with the number of responses per MNC varying from 1 to 5. Of these 169 subsidiaries, 59 were located in either Australia (46) or New Zealand (13), reflecting the much higher response rate in these countries. Only 6 MNCs were represented by 5 subsidiaries and hence our sample is unlikely to be biased by parent company-specific characteristics. Non-response bias was evaluated in several ways. First, we tested whether responses on the key variables in this study differed systematically between respondents in the original mailing and respondents in the reminder. In this procedure late respondents are treated as a proxy for non-respondents. No significant differences were found for any of the key variables in our study. Secondly, we compared responding and non-responding firms on size (number of employees), age, industry and country of headquarters. No significant differences were found on any of the variables. We can therefore be reasonably confident that non-response bias is not a problem in our study.

MEASURES

Subjective constructs in our study were measured with multi-item scales. Measures of *knowledge flows* were taken from Gupta & Govindarajan (2000). However, given the large number of constructs in our questionnaire, we decided to reduce their seven items to four: (1) product design, (2) marketing know-how, (3) distribution know-how, and (4) management systems and practices. Following Gupta & Govindarajan (2000), the respondent was asked to indicate on a scale from 1 to 7 the extent to which the subsidiary engaged in the transfer of knowledge and skills in the areas above, in each of the following four directions: (1) provides knowledge & skills to HQ ($\alpha = 0.89$), (2) provides knowledge & skills to other subsidiaries ($\alpha = 0.83$), (3) receives knowledge & skills from HQ ($\alpha = 0.71$), and (4) receives knowledge & skills from other subsidiaries ($\alpha = 0.82$).

The *autonomy* measure was developed on the basis of Otterbeck (1981). It asked the respondent to assess - on a five-point scale - the influence HQ would normally have on a range of issues varying from selection of suppliers to design of advertising for the local market. Alpha reliability of this 6-item scale was 0.82. The use of informal integration and coordination mechanisms, which following Harzing (1999) we call *control by socialization and networks*, was measured using a four-item scale measuring the participation of subsidiary managers in international task forces and international training, the extent of informal communication with HQ and other subsidiaries and the level of shared values with HQ. Alpha reliability of this 4-item scale was 0.65. *Formal control* was measured using a three-item scale measuring the level of formalisation, planning and reporting/ERP. Alpha reliability of this 4-item scale was 0.70. The measure for *subsidiary capabilities* was developed on the basis of Holm & Pedersen (2000) and asked the respondents to evaluate their subsidiary's capabilities relative to other subsidiaries on functions ranging from R&D to logistics and human resource management to the management of international activities. Alpha reliability of this 9-item scale was 0.78. The measure for *subsidiary performance* asked respondents to assess their subsidiary's performance on 8 different measures varying from profitability to employee development. A factor analysis separated these 8 measures into three groups: financial performance (market share, profitability, and sales growth), process performance (innovation, product quality, and productivity) and HRM performance (employee development and employee retention).

Intra-company flows were measured by two questions asking respondents to estimate the percentage of their subsidiary's input to and output from five different entities: HQ, other subsidiaries in the same country or abroad and external suppliers (customers) in the same country or abroad. The percentage of HQ or other *expatriates in top management* was measured by asking respondents for the nationality (local, HQ expatriate, other expatriate) of the managing director and eight functional managers and dividing the number of expatriates by the size of the top management team. The *number of inpatriates* was measured by asking how many subsidiary employees had been on temporary assignment at HQ. All items used in this study can be found in Appendix 1.

RESULTS

In the first step of our analysis, we tested for differences between Australian/New Zealand and other subsidiaries in HQ-subsidary geographical distances. Because of the anonymity of our survey responses, we have information concerning the country in which subsidiaries and their HQ are located, but not concerning the exact location within each country. Hence we could only approximate geographical distance in our study. We operationalized geographical distance as the flight distance (in kilometers) between the airports of country capitalsⁱⁱ. This implies that the distance between subsidiaries and HQ in the same country was set to zero. Our operationalization fits with our theoretical reason to expect geographical distance to affect HQ-subsidary relationships, as we expected above all differences in the use of lateral integration mechanisms (in particular international training and international task forces). These mechanisms require extensive (air) travel. In our sample the average geographical distance between a subsidiary and its HQ is 12,594 km for subsidiaries down-under, against only 3,493 km for all other subsidiaries. As this difference is highly significant ($p < .001$) and very substantive, our assumption that subsidiaries down-under are more geographically isolated is warranted.

Next, we focused on intra-MNC knowledge flows. As in Gupta & Govindarajan's (2000) study, the largest flows take place from headquarters to subsidiaries, while the mean inflow from headquarters is virtually identical in both studies (3.81 vs. 3.75). However, other knowledge flows are all substantially and significantly higher in our study (knowledge outflow to HQ: 3.02 vs. 2.39, knowledge inflow from subsidiaries: 2.86 vs. 2.21, knowledge outflow to subsidiaries: 3.22 vs. 2.36). Even though inflows from HQ are significantly greater ($p < 0.001$) than the other three types of knowledge flows, it would seem that in the decade between the two studies (data for Gupta & Govindarajan's study were collected in 1991) MNCs might have become more interdependent and less hierarchical. The pattern of correlations between the four different types of knowledge flows is very similar to that in Gupta & Govindarajan's study, while the average correlation is virtually identical (0.33 vs. 0.32). The significant, but rather low, correlations confirm Gupta & Govindara-

jan's (1991, 2000) claim that the four types of knowledge flows are related, but they are distinct variables, both conceptually and empirically.

FORMING KNOWLEDGE FLOW CLUSTERS

Following Gupta & Govindarajan (1994), responses for the two types of knowledge inflow/outflow (from HQ and from other subsidiaries) were combined as a composite measure of knowledge inflow/outflow. A K-means cluster analysis was subsequently conducted in order to verify whether a natural empirical pattern would emerge that confirmed Gupta & Govindarajan's theoretical model.

A range of cluster solutions from 2 to 6 clusters was attempted. The 2 and 3 cluster solutions resulted in clusters that were differentiated only by low-high or low-medium-high flows and did not separate inflows from outflows. The 4-6 cluster solutions did provide this separation. The four-cluster solution – that would be consistent with our a-priori theoretical model – reached convergence in a lower number of iterations (5) than the other solutions. It also showed the lowest number of non-significant pair-wise comparisons (12.5%) and hence provided maximum differentiation between the types.

Given two input variables, it is not surprising that a four-cluster solution emerged as the best solution. However, as we can see in Table 1, this four-cluster solution fits the theoretical model very well. As a further test of the validity of the clusters, we examined them for an industry-specific and home-country specific effect. This tests whether the clusters truly reflect the existence of different subsidiary roles within the same MNC, rather than a tendency for specific industries or home countries to have subsidiaries with a high level of knowledge inflows and outflows. We found no significant variation in the proportion of industries (chi-square: 6.081, df: 12, $p = 0.912$) or home countries (chi-square: 12.705, df: 18, $p = 0.809$) present in the four clusters.

Table 1: Knowledge balance (outflow-inflow) with HQ and subsidiaries for different types of subsidiaries

Subsidiary type	Knowledge from HQ	Knowledge to HQ	Knowledge from subs	Knowledge to subs	Knowledge balance from HQ*	Knowledge balance from subs
Implementor	4.70	2.24	3.42	2.24	2.46	1.18
Integrated Player	4.89	4.78	3.92	4.41	.11	-.49
Global Innovator	3.42	3.69	2.71	4.28	-.27	-1.57
Local Innovator	2.88	1.73	1.93	2.03	1.15	-.10

* A positive balance means a subsidiary receives more knowledge than it provides, a negative balance means a subsidiary provides more knowledge than it receives.

SUBSIDIARY ROLES FOR AUSTRALIAN/NEW ZEALAND SUBSIDIARIES

Our subsidiary sample in Australia and New Zealand was very comparable to subsidiaries in other countries on basic descriptive statistics (dimensions). Australian and New Zealand subsidiaries were slightly younger and smaller than other subsidiaries, but these differences were not significant. On average subsidiaries, were established about 40 years ago and had around 500 employees. Industry distribution and entry mode did not differ significantly either. Australian and New Zealand subsidiaries were more likely to have an assembly function ($p < 0.01$), but other subsidiary functions (sales, service, production, R&D, country HQ) did not differ. The only aspect on which Australian and New Zealand subsidiaries differed systematically from subsidiaries in other countries, was the percentage of subsidiaries with a HQ in the USA. This percentage was nearly twice as high for Australian and New Zealand subsidiaries, reflecting the comparative dominance of US foreign direct investment in Australia and New Zealand. As the Australian and New Zealand subsidiaries were not significantly different in other respects, we can be relatively confident that differences between Australian/New Zealand subsidiaries and subsidiaries from other countries are not simply caused by incomparable samples.

Table 2 shows the proportion of the different subsidiary types for Australian/New Zealand subsidiaries compared with subsidiaries in other countries. As predicted, subsidiaries down-under are more likely to be Local Innovators and less likely to be Global Innovators. However, contrary to our expectations, we did not find a lower proportion of Integrated Players. Based on a survey of 270 foreign-owned subsidiaries Nicholas et al. (2003) came to a similar conclusion. In

their sample, active subsidiaries (comparable to our integrated players) accounted for about 20% of the sample. As we contend later in this article, they advocate that this group of subsidiaries can be a crucial source of innovation and growth. It is important to note that the overrepresentation of US HQs in the Australian/New Zealand sample can not explain this difference in subsidiary roles. To the contrary, US MNCs are even more likely than other MNCs to have subsidiaries that are Global Innovators and less likely to have subsidiaries that are Local Innovators. We would therefore expect the predicted pattern to be even more pronounced had subsidiaries of US MNCs not dominated our sample. In the next section, we look at differences in knowledge inflows and outflows in more detail.

Table 2: Knowledge balance (outflow-inflow) with HQ and subsidiaries for different types of subsidiaries

Subsidiary type	Implementor	Integrated Player	Global Innovator	Local Innovator
Australian/New Zealand subsidiaries	21%	22%	23%	34%
Other subsidiaries	20%	19%	34%	27%

KNOWLEDGE FLOWS AND INTRA-COMPANY PRODUCT FLOWS

Table 3 compares subsidiaries based on knowledge and product inflows and outflows. Knowledge flows cover four different areas: product design, marketing, distribution and management systems & practices. Australian and New Zealand subsidiaries do not differ significantly from subsidiaries in other countries with regard to knowledge inflows. So even though subsidiaries down-under are geographically isolated, they do seem to benefit from knowledge inflows from HQ and other subsidiaries as much as other subsidiaries do. The pattern of inflows for different functional areas is broadly similar for both groups of subsidiaries, too. We find higher inflows for key generic activities such as product design and management systems and practices and lower inflows for locally specific support activities such as distribution. The two groups differ slightly on inflow of marketing knowledge. Although the inflow of marketing knowledge is quite high for subsidiaries in other countries (even slightly higher than inflow of knowledge relating to management systems and practices), for Australian and New Zealand subsidiaries, the inflow of marketing knowledge is

modest. This suggests that it is left to the Australian/New Zealand subsidiaries to decide how best to work their own markets. The reasons for this might be that Australian/New Zealand markets are both very distant from the home country of the MNC and very different from other countries. Some features that make marketing different in these countries are highly concentrated industries (which makes for very tough competition), and a widely dispersed and urbanised population.

Table 3: Detailed comparison of knowledge flows and intra-company product flows for Australian/New Zealand and other subsidiaries

Subsidiary characteristics	Australian/New Zealand subsidiaries	Other subsidiaries	Sign. of difference
Knowledge inflows (7-point scale)	3.25	3.38	.41
• Product design	3.74	3.62	.54
• Marketing	3.11	3.50	.07
• Distribution	2.84	2.96	.55
• Management systems & practices	3.33	3.46	.53
Knowledge outflows (7-point scale)	3.02	3.17	.48
• Product design	3.35	3.27	.75
• Marketing	3.22	3.30	.76
• Distribution	2.78	3.02	.33
• Management systems & practices	2.73	3.10	.16
Inflow-outflow	.23	.21	.92
• Product design	.39	.35	.88
• Marketing	-.11	.20	.28
• Distribution	.06	-.07	.62
• Management systems & practices	.59	.36	.42
Subsidiary inputs (%)			
• Inputs from external suppliers locally	36%	29%	.17
• Inputs from external suppliers abroad	12%	19%	.01
• Inputs from HQ	28%	27%	.91
• Inputs from other subsidiaries locally	2%	5%	.15
• Inputs from other subsidiaries abroad	23%	19%	.31
Subsidiary outputs (%)			
• Outputs to external customers locally	82%	59%	.00
• Outputs to external customers abroad	8%	15%	.01
• Outputs to HQ	4%	9%	.04
• Outputs to other subsidiaries locally	1%	3%	.13
• Outputs to other subsidiaries abroad	6%	13%	.01

Knowledge outflows from Australian and New Zealand subsidiaries are slightly lower in three of the four areas, but none of these differences are significant. It is interesting to note that Australian and New Zealand subsidiaries do not seem as isolated from the rest of the MNC network as we expected. We will come back to this surprising result later in the paper.

Table 3 also compares differences in intra-company product flows. Australian and New Zealand subsidiaries do not differ significantly from other subsidiaries in the extent to which they de-

rive their inputs from HQ or other subsidiaries. Understandably, geographical isolation means that they are more likely to draw inputs from local suppliers than from overseas suppliers. However, the major differences occur on the output side. Australian and New Zealand subsidiaries sell significantly more of their output locally and are also less likely to sell their output to internal customers. They are less connected with both other countries and other organizational units of the same MNC. Hence, the important differences between Australian/New Zealand subsidiaries and subsidiaries in other countries lie in material flows, rather than in immaterial knowledge flows. We will return to the implications of this finding in the conclusion section. First we will in the next section investigate whether there are distinctive features in the way Australian and New Zealand subsidiaries are managed by HQ, and whether their capabilities and performance differ from subsidiaries in other countries.

MANAGEMENT OF SUBSIDIARIES CAPABILITIES AND PERFORMANCE

Table 4 provides a detailed comparison of Australian and New Zealand subsidiaries with other subsidiaries with regard to the level of autonomy, type of control mechanisms applied, the level of local capabilities, local production and R&D, and performance. Few differences are apparent with regard to control mechanisms. Confirming our expectations, Australian and New Zealand subsidiaries are granted a higher level of autonomy than subsidiaries in other countries. However, this difference is not significant for the overall measure of autonomy. Significant differences are found for individual decision areas, although particular decisions relating to the pricing of products for local markets are much more likely to be in the realm of subsidiary decision-making, than to fall in other countries. This finding is in line with the relatively low knowledge inflows pertaining to marketing knowledge. The same is true for the higher level of autonomy with regard to design of advertising.

We find only partial confirmation of our expectation that control mechanisms involving physical relocation of personnel (international training, international task forces and expatriation) are

less likely to be used in Australian and New Zealand subsidiaries. This is true for expatriation (and in particular the use of parent country nationals) and inpatriation, but differences for international task forces and international training are not significant, even given the point that participation in both is lower for managers in subsidiaries down-under.

The difference in the level of informal communication with HQ and other subsidiaries, which is much higher for Australian and New Zealand subsidiaries than for other subsidiaries, is striking. As US HQs are overrepresented in the Australian/New Zealand sample, we investigated whether this might explain the difference. This turned out to be the case since the difference was insignificant when US HQs were excluded. When we limited the analysis to US MNCs, the difference was even more significant (5.00 vs. 4.11, $p < 0.03$). This led us to assume that it might be the shared language (or culture) that increased the likelihood of informal communication. A comparison of the two groups of subsidiaries for UK HQs confirmed this assumption (5.00 vs. 4.19, $p < 0.04$). For the overall sample, a formal test of the difference of informal communication between two groups of subsidiaries – those that share the same language with HQ and those that don't – provided a highly significant difference ($p < 0.003$).

Intra-MNC knowledge transfer may be assumed to be affected by the level of participation in international training and task forces, and the level of informal communication. Although the participation of Australian and New Zealand subsidiary managers in the two former was slightly, but not significantly lower, the level of informal communication was much higher. In subsidiaries of Anglophone (UK, USA) HQ MNCs, total knowledge flows are virtually identical for both groups of subsidiaries (Australian/NZ and other), but for non-Anglophone HQ subsidiaries, knowledge flows to and from Australian/NZ subsidiaries are lower than for other subsidiaries. As indicated above informal communication would seem to require a shared language. The same might be true for participation in international training and task forces. An analysis comparing HQs from Anglophone countries with HQs from other countries, showed that Australian and New Zealand subsidiaries having an Anglophone HQ had a significantly higher participation in both interna-

tional training and task forces, while no such effect was present for other subsidiaries. As the majority of Australian and New Zealand subsidiaries in our sample had Anglophone HQs, this might explain why knowledge transfer to and from subsidiaries down-under is not as low as expected. Language proximity might compensate for geographical distance.

Table 4: Comparison of control mechanisms, capabilities and performance for Australian/New Zealand and other subsidiaries

Subsidiary characteristics	Australian/New Zealand subsidiaries	Other subsidiaries	Sign. of difference
Autonomy (5-point scale)	3.83	3.63	.15
Accepting price increases from suppliers	4.05	3.63	.03
Design of advertising for the local market	4.19	3.85	.04
Pricing of products for the local market	4.42	3.85	.001
Control by socialization & networks (7-point scale)	4.19	4.22	.88
• Shared values	5.37	5.15	.35
• Informal communication	4.71	4.29	.05
• Participation in international training	3.59	3.67	.77
• Participation in international task forces	3.20	3.65	.12
Formal control (7-point scale)	4.76	4.88	.53
• Formalisation	4.04	4.39	.15
• Planning	4.76	4.80	.89
• Reporting & ERP	5.49	5.45	.85
Expatriation (%)			
• PCNs in top management	8%	13%	.06
• TCNs in top management	7%	7%	.98
• Managing Director expatriate	35%	44%	.25
• Number of inpatriates	1.02	1.38	.07
Capabilities (7-point scale)	4.38	4.32	.61
• Capabilities in IT	4.63	4.07	.01
• Capabilities in marketing	5.15	4.77	.06
• Capabilities in production	3.64	4.11	.09
• Capabilities in R&D	3.14	3.49	.19
Level of local production			
• % of sales manufactured by HQ	28%	18%	.06
• % of sales manufactured by this subsidiary	33%	50%	.02
Level of local R&D			
• % of R&D in sales performed by HQ	53%	44%	.17
• % of R&D in sales performed by this subsidiary	26%	33%	.28
Performance (7-point scale)	5.13	4.98	.22
• Financial performance	5.06	4.95	.57
• Process performance	5.23	5.07	.27
• HRM performance	5.10	4.88	.18

The overall level of capabilities relative to other subsidiaries is not significantly different between Australian/New Zealand subsidiaries and other subsidiaries. However, Australian/New Zealand subsidiaries seem to have higher levels of relative capabilities in support functions such as IT and marketing and a lower level of relative capabilities in primary functions such as production

and R&D. The relatively high level of marketing capabilities can easily be understood in the light of our finding that HQ interferes relatively little in the marketing activities of Australian/New Zealand subsidiaries. In terms of IT skills, a recent study by the research company, Meta Group, shows that US IT executives rank Australia and New Zealand second in the world (after India), as a location for IT outsourcing (www.business.nsw.gov.au).

The lower level of production and R&D capabilities is also reflected in the lower level of local production and local R&D performed by subsidiaries down-under. This confirms the results of Nicholas et al. (2003). They found low levels of R&D spending and R&D staff, and few subsidiaries acted as centers of excellence in this area. It is important to note that the difference in R&D/production capabilities and local R&D/production is not caused by a differential distribution in subsidiary functions. As indicated above, the Australian and New Zealand subsidiaries in our sample are as likely to have an R&D or production function as subsidiaries in other countries. Even though subsidiaries down-under have been formally assigned these functions, apparently the level of local R&D/production and subsidiary capabilities in these areas do not match those of other subsidiaries. Years of under-investment in R&D in Australia and New Zealand in comparison to other OECD countriesⁱⁱⁱ might explain the lower level of capabilities in this area. Although Australia has moved up in the IMD World Competitiveness Ranking to the 4th place overall in 2004, anxiety over the threat of relocation of R&D facilities (and to a lesser extent production facilities) outside the country is rather high. The Miles report warns Australia must improve its performance as an innovative country or face a future as a “branch office economy” (Miles, 2000). Our results support such a contention. Finally, with regard to performance, we find no significant differences between Australian/New Zealand subsidiaries and other subsidiaries in our sample.

CONCLUSIONS

This study shows that geographical distance has an impact on the role and management of subsidiaries. As the most significant representatives of geographically isolated subsidiaries, subsidiaries

down-under differ from other subsidiaries in their role in the overall MNC network. They are more likely to be Local Innovators and less likely to be Global Innovators. Their levels of knowledge inflows and outflows do not differ significantly from other subsidiaries and hence geographical isolation does not seem to prohibit knowledge flows. Following Ghoshal and Bartlett (1988), Gupta and Govindarajan (1994, 2000) and Pedersen, Petersen & Sharma (2003), we argued that face-to-face informal interaction is of crucial importance for knowledge transfer. The fact that we did not find geographical isolation to inhibit knowledge transfer for the subsidiaries down-under may be due to the increasing availability of new communication technologies in combination with language proximity. We found that the level of informal communication with other subsidiaries and HQ was significantly higher for subsidiaries down-under. However, we also showed that this was likely due to the overrepresentation of subsidiaries from HQ's located in countries that share the same language (US and UK).

For managers of subsidiaries situated in Australia and New Zealand, this finding is somewhat comforting, as it suggests that local subsidiaries can play an integral role in their MNCs despite their relative geographical isolation, at least as it concerns MNCs based in Anglophone countries. The geographical isolation of subsidiaries down-under was more clearly reflected in the level of intra-company product flows. Australian and New Zealand subsidiaries are more likely to source from local suppliers and sell more of their output externally. Control mechanisms applied by HQ to some extent also reflected geographical isolation, with higher autonomy in some areas, and some mechanisms requiring physical relocation less likely for Australian and New Zealand subsidiaries.

Overall, subsidiaries down-under showed a level of capabilities equal to that of their counterparts in other countries. They had relatively higher capabilities in support functions such as IT and marketing, but lower capabilities in primary functions such as R&D and production. This trend was also reflected in the lower level of local R&D and local production in Australia and New Zea-

land. We did not find significant performance differences between subsidiaries down-under and other subsidiaries.

Our study was based on the typology, roles and types of flows identified in the work of Gupta and Govindarajan (1991, 1994). To their typology, we added the important consideration of geographical isolation, or geographical distance as being a contributor to the role and activities a subsidiary undertakes. This analysis contributes to our conceptual understanding of subsidiaries and provides further support that a differentiated view of subsidiary roles and functions is essential. Our finding that knowledge flows between subsidiaries have increased substantially in the last decades points to a need to direct our research attention to lateral interactions as opposed to hierarchical interactions. Finally, our analysis also provided some first indications of the role of language in the interaction between HQs and subsidiaries.

From the analyses we report in this study, we can draw two general conclusions with regard to management and competitiveness issues in Australia and New Zealand. First, even though Australian and New Zealand subsidiaries are as likely to have a production and R&D function as other subsidiaries, their relative capabilities in these areas do not compare favourably with other subsidiaries. This is also reflected in a relatively low level of local R&D and production. Investment in upgrading capabilities in these areas might therefore be seen as a priority for subsidiaries in Australia and New Zealand. This is particularly important because of the shift towards stronger intra-company knowledge flows which we have observed comparing our findings with data collected in 1991 (Gupta & Govindarajan, 2000). Otherwise the danger of becoming isolated not only in terms of physical flows, but also knowledge flows looms large. Of course, even then local R&D and production might take a while to follow local capabilities, as – once established in a particular location – these facilities are typically not easily redeployed (White & Poynter, 1984). Furthermore, development of strong capabilities takes time. Our data showed that Australian and New Zealand subsidiaries were generally younger (although not significantly so) than subsidiaries in other countries. They also show a positive correlation between age and capabilities in both R&D ($r = .242, p$

= 0.065) and production ($r = 0.280$, $p = 0.032$) for subsidiaries down-under.^{iv} Finally, it is important to realise that the development of a subsidiary role is dependent on several factors: subsidiary choice, headquarters assignment and environmental determinism (Birkinshaw & Hood, 1998). Enhancement of subsidiary capabilities is a necessary, but not sufficient condition, for a subsidiary to acquire a more important role within the MNC network (Hood & Taggart, 1999).

Second, as Hood and Taggart (1999) indicate, a critical element in creating a more significant role for a particular subsidiary is the quality and persistence of its local management. This would need a continued investment in management education in the host country as development of subsidiary initiative is unlikely to be a major priority of central MNC human resource development programmes (Hood and Taggart, 1999). However, the latter might still play a role in developing subsidiary capabilities. Interestingly, although managers in Australian and New Zealand subsidiaries are less likely to participate in international training and international task forces, the relationship between participation in these activities and subsidiary capabilities is stronger and more significant ($r = .251$, $p = 0.056$) for subsidiaries down-under than for other subsidiaries ($r = .164$, $p = 0.088$). At the level of individual capabilities participation in these development programmes, leads to a higher level of capabilities in marketing and sales, and the management of international activities, for both groups of subsidiaries. For Australian and New Zealand subsidiaries participation in international training and task forces is also significantly related to higher capabilities in HRM and R&D. Subsidiary managers down under might therefore do well to lobby HQ to allow them to increase their participation in these activities in spite of their geographical isolation. Thorburn et al. (2002) have also emphasised the importance of MNCs to expose Australians to global training and skills development.

Our study's limitations are shared with those of most other international mail surveys. Its cross-sectional design does not allow us to draw conclusions with regard to causality. For instance, it is unclear whether it is a higher of knowledge outflow that leads to higher performance, or whether a higher level of performance leads to a higher level of knowledge outflow. In any case, the very

strong relationship between performance and knowledge outflows is interesting, as it seems to be unique for Australian and New Zealand subsidiaries.

Our data was self-reported from single respondents. This leaves our study vulnerable to common method variance. However, a factor analysis of all interval variables in this study resulted in nine factors with an eigenvalue above 1 and a first factor that accounted for only 21% of the variance. If a large amount of common method variance were present, then either a single factor would emerge or the first factor would account for the majority of variance in the variables (Podsakoff & Organ, 1986). The results indicate that common method variance is not likely to be a major concern in this study. An interesting extension to this study would be case study research in which a number of Australian and New Zealand subsidiaries are studied in detail to address such questions as why particular subsidiaries show high levels of knowledge inflow and outflow in spite of their geographical isolation and how knowledge flows are linked to performance. Case study research would also allow us to provide more insights into the *process* of knowledge transfers and would alleviate both the problems associated with causality and with common method variance.

Another limitation relates to the way we have investigated geographical isolation. Ideally, an investigation of the impact of geographical isolation would look at the level of isolation within *specific* MNCs and compare the treatment of isolated and non-isolated subsidiaries within the *same* MNC. Even so, we feel that our comparison of Australian/New Zealand subsidiaries as a group with other subsidiaries provides a good example of the impact of geographic isolation.

In spite of its limitations this study has, as far as we are aware, provided the first systematic investigation of the impact of geographical distance on the role and management of subsidiaries through a comparison of Australian and New Zealand subsidiaries with other subsidiaries worldwide. We hope that this study will provide an impetus for further research in this area in order to provide an increased understanding of the determinants and consequences of both lateral and hierarchical knowledge transfer in multinational corporations.

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APPENDIX 1

KNOWLEDGE FLOWS

To what extent does this subsidiary engage in transfer of knowledge and skills (K&S)? Please circle one on each row (7-point scale, 1 = not at all, 4 = average 7 = very much)? Areas: product design, marketing know-how, distribution know-how, management systems & practices.

- **Provides** K&S to **HQ**
- **Provides** K&S to **other subsidiaries**
- **Receives** K&S from **HQ**
- **Receives** K&S from **other subsidiaries**

AUTONOMY

How much influence would your HQ normally have on the decisions given below? Please circle one on each row (5-point scale, 1 = Subsidiary alone, 3 = Both equal, 5 = HQ alone, n/a = not applicable).

- Development of new products for the local market.
- Customisation of existing products for local needs.
- Selection of new suppliers.
- Accepting price increases from suppliers.
- Design of advertising for the local market.
- Pricing of products sold on the local market.

CONTROL BY SOCIALIZATION AND NETWORKS

International task forces Some MNCs make extensive use of committees and task forces made up by executives from HQ and different subsidiaries. These committees deal with issues such as new product ideas; resolution of internal conflicts etc. To what extent have executives in this subsidiary participated in international committees or task forces in the past three years? Please circle one. (7-point scale, 1 = no participation at all, 7 = very high participation)

International training Some MNCs make extensive use of **international** management training programs in which executives from HQ and different subsidiaries follow courses that deal mostly with the transfer of company-specific knowledge. Please indicate to what extent this subsidiary's executives participated in this kind of programs in the past three years? Please circle one. (7-point scale, 1 = no participation at all, 7 = very high participation)

Informal communication Some MNCs have a high degree of informal communication among executives of HQ and different subsidiaries. Such informal communication takes place through personal contacts and relationships, rather than through more formalised channels. What is the extent of informal communication between this subsidiary and HQ and other subsidiaries. Please circle one. (7-point scale, 1 = very little informal communication, 7 = very much informal communication)

Shared values Some MNCs create a strong corporate culture in order to ensure that all subsidiaries know and share the main goals of the firm and the values of top management, and to avoid different subsidiaries having their own sub-goals and values. To what extent are executives in this subsidiary aware of and act according to the goals and values of top management of your HQ? Please circle one. (7-point scale, 1 = few shared values and objectives, 7 = fully shared values and objectives).

FORMAL CONTROL

Planning Some MNCs co-ordinate subsidiaries' activities using a comprehensive planning system, including strategic plans, functional area plans, production plans, consolidated budgets, etc. How comprehensive is the planning system that your HQ uses towards this subsidiary? Please circle one. (7-point scale, 1= Very limited planning, 7 = very comprehensive planning).

Formalisation Some MNCs have a high degree of formalisation in the relationship between HQ and subsidiaries. This is apparent in very clear definitions of policies, rules, job descriptions, etc., and in manuals that define standard operating procedures to be followed. How much formalisation does your HQ use towards this subsidiary? Please circle one. (7-point scale, 1= Very little formalisation, 7=Very much formalisation).

Reporting and ERP Some MNCs co-ordinate their subsidiaries' operations by means of a continuous evaluation of the results of subsidiaries, based on detailed written reports or ERP (Enterprise Resource Planning) data on financial positions, sales, inventory, expenses, personnel, etc. How much reporting or data does your HQ require from this subsidiary? Please circle one. (7-point scale, 1 = very limited reporting requirements, 7 = very comprehensive reporting data).

SUBSIDIARY CAPABILITIES

How would you evaluate this subsidiary's capabilities relative to other subsidiaries in the multinational corporations? Please circle one on each row. (7-point scale, 1= Far below, 4 = Average, 7= Far above). Areas: Research & Development, Purchasing, Production, Marketing & sales, Logistics, Human resource management, Financial management, IT/Information Systems, Managing international activities.

PERFORMANCE

How would you evaluate this subsidiary's performance in comparison to other companies operating in the same industry (7-point scale, 1 = far below, 4 = average, 7= far above)? Please circle one on each row. Categories: product quality, innovation, productivity, market share, sales growth, profitability, employee development, staff retention, corporate image.

INTRA-COMPANY FLOWS

Please give your best estimate of the **percentage** of this **subsidiary's outputs** (including parts & semi-manufactured articles) that are **supplied to**: HQ/subsidiaries in the country of HQ, other subsidiaries in this country, other subsidiaries abroad, external customers in this country, external customers abroad.

Please give your best estimate of the **percentage** of this **subsidiary's inputs** (including parts & semi-manufactured articles) that are **received from**: HQ or a subsidiary in the country of HQ, other subsidiaries in this country, other subsidiaries abroad, external suppliers in this country, external suppliers abroad.

EXPATRIATES IN TOP MANAGEMENT

What is the nationality of the following persons? Please tick one on each row. (Local national, Home country expatriate, Third country expatriate, No such position) Managing director, Head of R&D, Head of purchasing, Head of production, Head of marketing, Head of logistics, Head of human resources, Head of finance, Head of IT/IS.

INPATRIATES

How many of this subsidiary's employees have ever been on temporary assignment to HQ (i.e. have been inpatriates)? Please tick one. Categories: none, 1-2, 3-5, 6-10, more than 10.

ⁱ We were not able to completely balance the sample frame as the Netherlands has no MNCs in the motor vehicles and parts industry and few MNCs in the electronics industry and Germany has few MNCs in both the electronics and food & beverages industry.

ⁱⁱ Exceptions were the Netherlands (Amsterdam Schiphol airport) and Hong Kong (Hong Kong International airport).

ⁱⁱⁱ A report by the group of eight universities in Australia (2002) benchmarked Australia's investment in R&D with that of other OECD countries and shows Australia's R&D expenditure as percentage of GDP has fallen well short of OECD average over the past decade. Australia ranked 20th and New Zealand 24th in terms of R&D intensity. [This ranking included selected non-OECD countries such as Israel, Singapore and Taiwan.] Later figures are not available, but it is unlikely that this picture has changed drastically.

^{iv} No significant relationship was found for capabilities in other areas.