Multinational Exploration of Acquired R&D Activities

Jens Gammelgaard
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Department of Management, Politics and Philosophy
Copenhagen Business School
The Center for Knowledge Governance
Blaagaardsgade 23 B
DK-2200 Copenhagen N
Denmark
Phone +45 3815 3630
Fax +45 3815 3635
E-mail: ckg.lpf@cbs.dk
www.cbs.dk/ckg

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JENS GAMMELGAARD

Copenhagen Business School

Department of International Economics and Management

Howitzvej 60,1st floor

2000 Frederiksberg, Denmark

jg.int@cbs.dk

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Abstract

This paper presents the results of a survey of 54 Danish multinational corporations that have acquired activities abroad. The role of the acquired R&D units was the focus of the survey, particularly with respect to the schism between basic and applied R&D, and the schism between autonomous and network R&D. This paper establishes the connection between a multinational corporation that follows a capability-motivated acquisition strategy and the R&D role new subsidiaries should play in order for the acquired resources to be utilized corporation-wide. Statistical findings reveal the need to follow a combination of basic and network-oriented R&D activities when focusing on capability development.

Keywords: Acquisition; Research and Development (R&D), Basic R&D, Applied R&D, Autonomy, Network, Capabilities.

Introduction

Is it possible to advance capability-creating processes in a multinational corporation (MNC) through the acquisition of another firm's R&D activities? The MNC's awareness of the acquired firm's R&D activities and subsequent use of integration strategies influence the utilization and exploration of the acquired resources. Awareness reflects an acquiring MNC's initial intention to explore the acquired firm's capabilities instead of following other strategic goals, such as market access. Integration indicates the MNC's choice among possible roles for its new R&D units, including the need to address the schism between autonomy (a situation where the R&D unit does not cooperate with other MNC R&D units) and a network model (a situation which emphasizes interdependencies among different MNC R&D units). The nature of the R&D activities is also topical in terms of capability development. The strategic possibilities are again two-fold, since the acquired R&D unit can be assigned to applied R&D activities, i.e. modifications of existing products, or it may create *new* products or processes, a strategy that approaches basic research. The purpose of this paper is, therefore, to analyse whether the initial strategic wish to gain access to another firm's capabilities, and the subsequent strategies concerning integration and the acquired firm's R&D role are related.

The architecture of the arguments is as follows. The following section briefly treats acquisition motives and emphasizes the importance of access to the acquired firm's R&D activities as a reason for acquisition. The subsequent section stresses the different roles an acquired R&D unit is allowed to play in an MNC. Discussions of methods and measurements are followed by the presentation of results from a survey that covered 54 Danish acquisitions abroad in the period from 1994 to 1998. Finally, conclusions are presented.

Acquisition Motives

Cisco Systems gained access to specific R&D capabilities within the Internet server and communication equipment fields through acquisitions. Corporations like Intel, General Electric and Nestlé all initiated technology-driven acquisitions during the 1990s as a vehicle to develop capabilities (Bower, 2001; Mitchell & Capron, 2002; Ranft & Lord, 2002). However, Gammelgaard (2004) found that earlier surveys of mergers and acquisitions (M&A)

motives were restricted to include only resource exploitation strategies: investigating the direct outcome effect such as increased market shares, cost reductions and risk minimization through diversification. Wernerfelt (1984) extended this approach by using the resource-based view of the firm to put an emphasis on the acquired firm's resources and their exploration. Here, acquiring firms followed a long-term oriented goal of creating value from utilising and improving the resources and capabilities of the acquired firm in a corporate-wide setting. In this respect, resources can be defined as anything tangible or intangible controlled by the firm that enables it to conceive of and implement strategies that strengthen or weaken its ability to create, produce and offer goods and services to a market (Wernerfelt, 1984; Barney, 1991; Sanchez *et al*, 1996). Christensen (2000) defined capabilities as functional, operational or technical superior capacities that may be further subdivided into specific individual skills or specialised team-based resources. Through acquisitions, the acquiring MNC gains access to the skills of the employed R&D engineers (see Nelson & Winter, 1982) and organisational learning processes, i.e. the social interaction of R&D engineers that results in new knowledge and products (Teece *et al*, 1997).

The M&A literature seldom stressed access to the acquired firm's R&D activities as a main motive. Different surveys investigating M&A motives clearly pointed to the growth of the firm through the extension of existing markets or the entering of new markets as the dominant motive (Newbould, 1970; Baker *et al,* 1981; Lindgren, 1982; Hunt *et al,* 1987; Suverkrup & Hauschildt, 1990; Davis *et al,* 1993; Norburn & Schoenberg, 1994). Furthermore, Ansoff *et al* (1972) found the completion of product lines through M&A, which made it possible to offer customers a full line of services, to be momentous. Additionally, Chakrabarti *et al* (1994) saw cost reductions through scale or scope economies as an important motive. Chakrabarti *et al* (1994) did highlight the capability perspective as among the most important motives. Finally, Belderbos (2003) established that a major motive for Japanese manufacturing MNCs to acquire abroad was to gain access to R&D capabilities at a faster pace.

Presumably, firms tend to focus on the capabilities embedded in the acquired firm. According to Serapio *et al* (2000, p. 2), MNCs now accelerate their direct investments in overseas R&D since "*more than 100 multinational companies have acquired multiple laboratories abroad and are increasingly tapping into these laboratories for new sources of technologies*".

Weston *et al* (1999) provided the example of M&A in the global chemical industry. They highlighted the motive of gaining access to key scientists in the acquired firm, who in turn were used for development of particular R&D programs, and pointed to the creation of broader technology platforms at the higher strategic level. However, surveys of acquisition motives have rarely touched on the acquired firm's R&D activities as a strategic motive. Sometimes, access to R&D activities was only a motive subordinate to a strategic desire for cost reductions through economies of scale (Hughes *et al*, 1980) or through avoidance of duplicate efforts. Cooke (1986) spoke for the full, or more efficient, utilisation of intangible resources, such as specialists or high-tech equipment. This discussion is often associated with the synergy approach, where combinations of, for example, technical expertise embedded in one firm and manufacturing knowledge in the other create added value (Capron & Mitchell, 1998). In addition, Hagedoorn & Duysters (2002) found that a strategic and organizational fit between companies improved technological performance in general.

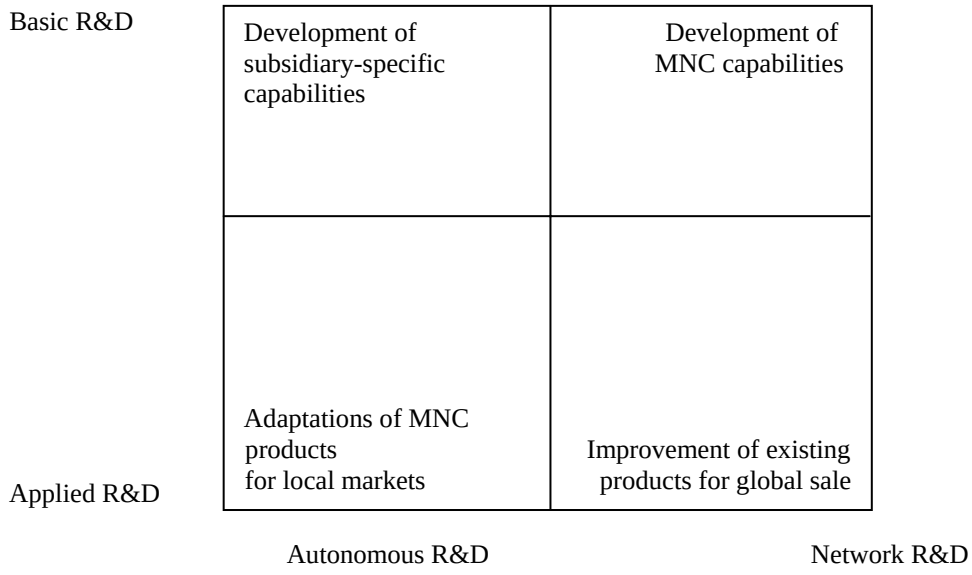
Other contributions more directly connect acquisition motives and the R&D activities of the acquired firm. Dettmer (1963) focused on this perspective by addressing access to better and complementary unexploited technology in the acquired firm as an acquisition motive. Later, Chen & Su (1997, p. 73) highlighted the motive of "*seeking of technological advantages or knowledge capital of a takeover target"*, making it top priority on their motive list. More recently, Bower (2001) stated that access to the acquired firm's R&D activities was one of five acquisition motives emphasized. Acquisitions were, in this context, a substitute for in-house R&D activities, and helped the acquiring firm to quickly build up positions in highly competitive and dynamic markets. Finally, Chakrabarti, et al, (1994) provided a closer look at the technological perspective of acquisition by identifying one cluster of "technological acquirers" that strategically sought new technology and know-how. This aim was achieved through close cooperation between the two R&D departments subsequent to the acquisition, which resulted in the redeploying of R&D resources into more productive uses. Using this line of argumentation, one can assert that a knowledge-seeking acquisition is positively related to integration strategies, based on the interdependencies between the acquired firm, its headquarters, and other subsidiaries.

Characteristics of R&D Activities

Ranft (1997) argued that R&D activities were often the driver in a firm's innovative processes. A major challenge for acquiring firms has, therefore, been to tap into and explore the acquired firm's R&D resources and capabilities. Håkanson & Nobel (1993) suggested that the acquired unit's R&D activities be expanded by assigning it a group-wide responsibility within specific areas. Decentralised and loosely coupled networking organisations (Hill *et al,* 2000), theoretically describable as a 'heterarchy' (Hedlund, 1986), a 'transnational organisation' (Bartlett & Ghoshal, 1989), or a 'differentiated network' (Nohria & Ghoshal, 1997), have typically used this strategy. In decentralised MNCs, subsidiaries have acted very independently by being responsible for capability development within specified areas. In the end, these are assessed by other MNC units as highly important (White & Poynter, 1984; Birkinshaw & Hood, 1998; Holm & Pedersen, 2000; Frost et al, 2002).

Subsidiaries have played a wide range of roles within MNC's (Schmid, 2000). This paper focuses on the role of the acquired firm's R&D unit and therefore emphasizes a unit acting as a centre of gravity that significantly contributes to the entire MNC capability development (Chiesa, 1995; Brockhoff, 1998). In terms of R&D activities, the subsidiary can play different roles that more or less qualify for specific mandates and positions. The R&D unit may, on the one hand, concentrate on pure capability creation processes that do not specifically relate to a certain product. On the other hand, the unit may centre on more product-oriented activities, in which the R&D unit only pays attentions to pure modifications of the headquarters products to fulfil local market demands. Secondly, the R&D unit can be very autonomous in its behaviour when R&D activities take place independent of other R&D activities in the MNC. In contrast, the R&D unit might be fully integrated with other R&D units of the MNC, so that R&D activities come about interdependently with other corporate units. Figure 1 illustrates these two spectres by including the four archetypical roles of a subsidiary's R&D unit in an MNC.

Figure 1. Roles of an R&D unit in an MNC subsidiary



The purpose of following a combination of an *applied* and *autonomous* R&D strategy is to customise MNC developed products to meet local customers' specific demands. To fulfil this role, the R&D unit modifies headquarters' or other sub-units' products without depending on additional resources from other MNC units. Consequently, the final product is often not usable (or saleable) in other MNC units or in their related markets. In the combination of *network* and *applied* R&D activities, the subsidiary R&D unit is responsible for modifying existing products in cooperation with headquarters or other sub-units, so the final product design meets global demands. Development of subsidiary-specific capabilities, as in the situation of an *autonomous* and *basic* R&D strategy, requires concentrated R&D activity without control or influence from other R&D units in the MNC. The outcome of such a strategy is the creation of unique and disparate capabilities, which will be considerably different from the resources and capabilities located in other MNC units. A negative effect here is the substantial degree of tacitness and inimitability in the underlying knowledge of the developed capabilities. Consequently, the capabilities will probably not be utilised in other parts of the MNC. The mixture of *network* and *basic* R&D is, therefore, preferable for building MNC relevant capabilities, because the R&D unit embraces the advantage of being inspired by other R&D units in its creation and development of capabilities. In this

combination, the developed capabilities will still be unique, while at the same time, they will fulfil the requirements of other MNC units.

Literature addressing capability-creating R&D activities in MNC subsidiaries often classifies basic R&D activities at the top of the hierarchy of different subsidiary R&D roles. The "corporate technology unit", where subsidiary-generated new technology, which is of a long-term or exploratory nature for either headquarters (Ronstad, 1978) or in general (Taggart, 1998), has been an example of a top-hierarchical position. However, Medcoff (1997) and Nobel & Birkinshaw (1998) found that basic R&D was not necessarily usable for other corporate units in the short term or even in the medium run. According to these researchers, the purpose of basic R&D is to discover new platforms of knowledge, which is not specifically associated with particular products. Zander (1999) considered basic R&D to be an exploration strategy focusing on new insights and fields of expertises by developing certain items of knowledge not producible elsewhere in the corporation or, at times, elsewhere in the industry. The end goal of the subsidiary's R&D unit was, therefore, to develop knowledge considerably different from existing MNC knowledge. Gerybadze & Reger (1999) pointed to a trend of more foreign R&D sites being assigned the role of creator of basic technologies. Conversely, surveys by Papanastassiou and Pearce (1999), and Pearce (1999) revealed that basic R&D activities in subsidiaries were of only minor importance. Further, Florida (1997) demonstrated that applied R&D had a much higher importance when it encompassed the aim of creating commercial concepts.

The other aspect investigated in previous research is the division between autonomous and network R&D strategies. Persaud et al (2002, p. 61) defined autonomy as: *"the degree to which a subsidiary R&D lab has control over the strategic decisions affecting its direction and operations"*. The authors further claimed that autonomy positively effected innovation, by leading to greater freedom in developing unique relationships with both internal and external partners, although the risk of opportunistic behaviour - the subsidiary R&D unit following its own research goals rather than the goals defined by headquarters - was present. Furthermore, the writers further statistical support for autonomy being dividable into two areas: the freedom to choose with whom one establishes relationships, and the freedom to select which areas the R&D unit was to do research. Reflecting the scope between autonomy

and network, Brockhoff (1998) described three standards of R&D roles: the 'hub', the 'competence centre' and the 'network model'. In a hub, decision-making was centralised and headquarters co-ordinated all other R&D laboratories. In the competence centre, R&D activities were experimental, isolated and specialised. Finally, the network model was characterised by high intra-organisational integration and intensive subsidiary involvement in the formulation and implementation of strategies. Likewise, Birkinshaw (2002) divided R&D roles into the 'integrated network', where R&D centres were tightly, and the 'loosely-coupled network', in which laboratories were given autonomy positions and specific roles to fulfil. Birkinshaw (2002) recommended the integrated network solution when the underlying R&D knowledge was not easily observed and the loosely-coupled network when assets were characterized by a low degree of mobility (the extent to which the knowledge base could be separated from its physical setting). In general, Chiesa & Manzini (1996) advised that headquarters govern R&D units if the network model is implemented. As suggested by Birkinshaw and Hood (2001), this would allow headquarters to distribute resources by delegating mandates and supporting initial "genius" knowledge creation while, at the same time, enabling the blocking of unprofitable research programmes.

The surveys investigating the success rate of network-based R&D activities have not provided a clear picture. Brockhoff & Schmaul (1996) and Ensign *et al* (2000) spoke of positive success rates, whereas Taggart (1997), and Taggart & Hood (1999) took the opposite position. Several MNCs have used the network-oriented structure, making R&D units dispersed in different countries responsible for certain product or technology areas. For example, Chiesa (2000) described how Nissan, the Japanese car manufacturer, developed a minivan as an outcome of cooperation between headquarters and different US-located R&D centres in California, Michigan and Tennessee. Downey (2003) provided the example of Nokia having 18,000 engineers scattered across 69 sites worldwide. Furthermore, he described the development of the 777 aircraft in which Boeing operated with 238 cross-functional teams, including customers, operators and line mechanics in collaborative design networks. Birkinshaw's (2002) case study of Ericsson's Radio System business reflected on this complexity by portraying how the firm developed its third generation mobile telephony by involving 10,000 engineers located in at least 20 different R&D sites around the world. Finally, Gassmann & Zedtwitz (1999) demonstrated how the Schindler Group, at present a

worldwide leader in escalators and elevators, built up its R&D capacity through acquisitions, where acquired firms took specific positions in a highly integrated organisation. Today, the company employs around 500 engineers working in several R&D centres around the world. Through both intraorganisational cooperation, and close collaboration with local science centres and universities, they have developed the complex technology behind the elevator keypads that operate the car based on the number, location and destination of waiting passengers together with aerodynamic influences. The network system makes sure that the development of such unique components is usable worldwide.

The question then becomes which strategy the acquiring firm should emphasize when integrating the acquired firm if: (1) it is a capability-based acquisition, and (2) the purpose is to create synergy subsequent to the acquisition. Haspeslagh & Jemison (1991) highlighted the risk of simply absorbing the acquired firm, emphasizing value destruction caused by key employees leaving the firm. Conversely, preserving the acquired firm by leaving it in an entirely autonomous position will not lead to synergy in the long run. Haspeslagh & Jemison (1991) proposed to start the integration process with a preservation strategy, and build a symbiotic approach over time. This becomes a kind of networking organisation where the acquired firm keep elements of autonomy while it is simultaneously absorbed. Gassmann & Zedtwitz (1999) also recommended that the acquired firm reserve some degree of autonomy, but the unit must be forced into a corporate network at the same time, creating the opportunity to improve MNC knowledge. Håkanson & Nobel (2001) advised strong integration, since the acquired firm typically favoured transfers of developed technology to the parent organization - apparently since transfers of tacit and complex knowledge has been interpreted as easier within hierarchies (Kogut & Zander, 1995; Almeida et al, 2002).

The discussion leaves two dilemmas. One is the choice between autonomous and network-oriented R&D, while the other is the availability of the two alternatives: basic or applied R&D. The challenge is to find the right balance when walking the tightrope between the different strategies. A recommendable strategy is to bring in elements from all four extremities, but still emphasising the network and basic R&D. Using this model, the capability-based acquired firm keeps its superiority in terms of a specific knowledge or technology, but at the same time this capability will be of use elsewhere in the corporation.

The model advocates a more cohesive approach to decentralisation and networking, a proposal that corresponds to a recent finding of Gerybadze & Reger (1999) concerning MNC organisational structures. Based on this discussion, I hypothesize:

> **Hypothesis:** An acquired capability-based R&D unit focuses its activities on basic and network-oriented R&D.

Methods and Measurements

Data for this study was collected through a questionnaire survey undertaken in the spring of 2000. The questionnaire was sent to those Danish industrial firms that acquired a foreign firm in the period from 1994 to 1998, during which 151 Danish MNCs acquired 469 firms abroad. Three mailings by post and a follow-up phone call to non-responding firms resulted in 54 returned questionnaires bringing about a response rate of 35.76 percent. A bias control of the responding acquiring firms compared to non-responding firms, including figures on numbers of acquisitions made in the survey period, investments countries, the year of establishment, numbers of employees at the end of 1993 and the end of 1998, and corporate turnover in 1993 and 1998, showed no bias of significance when comparing mean values using a one-tailed t-test. The questionnaire primarily contained questions concerning factual figures, such as the percentage of R&D cost compared to turnover, and questions to be answered on a 1 to 7 point Likert scale.

This section presents the descriptive data and statistical analysis based on a t-test. The purpose of using the t-test was to distinguish the group behaviour of capability-based acquiring firms from an opposing group of acquiring firms that solely follow growth and market-related strategies. The partitioning of observations was based on a non-hierarchical clustering method resting on a random selection of five variables' seed points covering different aspects of the acquired firm's capabilities. The purpose of the cluster analysis was to group objects based on the characteristics they possessed, including high internal homogeneity on the one hand and high external heterogeneity on the other. Different clustering tests were run for selecting the procedure leading to the highest degree of external heterogeneity. The clustering of firms was based on recommendations from Hair *et al* (1998) and Der and Everitt (2002).

This paper elucidates basic characteristics of the capability-based acquisition building on the resource-based view framework of Wernerfelt (1984) and Barney (1991). The five variables selected for clustering are: (1) the importance for the acquiring firm of gaining access to the acquired firm's capabilities; (2) the importance for the acquiring firm of gaining access to the acquired firm's relations to local science centres; (3) the inimitability of the acquired resources; (4) the non-tradability of the acquired resources; and (5) the uniqueness of the acquired resources. The interrelatedness between the five factors was satisfactory with a Crombach Alpha Coefficient of 0.78.

Using a non-hierarchical clustering procedure assigned the clusters in regard to a specified number. In this case, the number was two. In this survey, the cluster seeds were randomly selected. Using this technique, one cluster of 22 capability-based acquired firms and another cluster of 32 market-based acquired firms emerged. The differences in means are presented in Table 1.

Table 1. Mean differences: Five clustering variables using a non-hierarchical random selection clustering method

Variable	Mean capabilities-based cluster	Mean marked-based cluster	F – Statistics
Access to capabilities	5.79	3.66	26,70***
Access to scientific centres	3.59	1.76	17.29***
Degree of inimitability	4.06	2.33	30.91***
Degree of non-tradability	4.50	2.53	29.63***
Degree of uniqueness	5.41	2.14	71.52***

n = 53
Based on 1-7 Likert scale questions
†p <.10; *p <.05; **p < .01; ***p < .001.

Five questions covered the aspect of network versus autonomous-based R&D with regard to R&D activities. The respondents were asked to assess the degree of integration measured on a 1 to 7 point Likert scale where 1=autonomous and 7=integrated. Furthermore, respondents were questioned on the degree to which the acquired firm could make its own strategic decisions concerning R&D. Third, respondents were asked about the degree of cooperation

between the acquired firm's R&D unit and other R&D units in the MNC. Finally, respondents were asked whether R&D-related knowledge transfers to and from other MNC units had taken place.

To test the concept of basic versus applied R&D, respondents were asked to mark the importance of four different R&D activities using a 100% scale, where the percentage selected should demonstrate the relative weight. The four strategies were: (1) development of technological capabilities, (2) development of new product or processes, approaching basic R&D, and (3) development of existing products or processes, and (4) adaptation of MNC products to the local market demands, approaching applied R&D.

Results

The acquiring Danish firms were typically medium-sized with less than 1000 employees, although a few firms were very large and internationalised, leading to a mean of 4877 total employees and a mean distribution of 1182 and 3695 employees in Denmark and abroad respectively. The typical Danish firm acquired less than one firm per year in the period, but again, some firms acquired more frequently. One firm acquired 74 foreign firms in 18 different countries. The acquired firms were often small, with a mean of 488 employees and turnover averaging US$ 30 million at the time of takeover. The acquisitions normally took place in the nearby markets of Sweden, Germany, the Netherlands and the UK. Furthermore, the US was a popular investment country. R&D costs in proportion to turnover, and the number of R&D employees in proportion to the total number of employees in the acquired firm were also tested. The figures, as presented in Table 2, cover the period at the time of takeover (the acquired firms in the sample was acquired between 1994-1998) and 1999. The R&D activity level in proportion to turnover and employees was in the range of 4 to 5% in both periods. A t-test did not show any significant changes in the resources used between the two time periods.

Table 2. Acquired firm R&D figures

R&D Factor	Time of takeover		1999	
	Mean	Variance	Mean	Variance
R&D in proportion to turnover	3.98 %	26.97 %	5.02 %	35.98 %
R&D employees in proportion to total employees	4.40 %	34.98 %	4.74 %	30.91 %

N = 43

The high variances indicate a great disparity within the cohort of acquired firms showing a wide span going from no activity at all to an R&D cost at 30% of turnover. Likewise 16% of the firms specified that between 10% and 25% of employees were working in the R&D unit. The great variation is related to disparity within the group of participating firms and acquired units in terms of such as aspects as type of industry, target size, and firm age.

One aim was to test whether the acquired capability-based R&D unit conducted basic or applied R&D. Table 3 provides an overview of the distribution in percentages in terms of four R&D roles. The development of technological capabilities covered the pure basic R&D, whereas the development of new products and processes included the same aspect in a modified form. Development of existing corporate products and processes, and pure adaptations of corporate products to fulfil local demands, belonged to the applied R&D activities. The figures in Table 3 show the percentage of the total activity. For example, development of technological capabilities counts for 10.91% of the total R&D activity among the capability-based acquired firms.

The hypothesis, suggesting that the capability-based group would exhibit a higher degree of basic R&D, was only partly supported. Such activity covered 52% of the total activity in the capability-based group compared to 35% in the market-based group. The degree of basic technology research was almost equal when comparing the two groups. One reason could be that basic R&D processes taking place in firms are often only modified version of ‘true’ basic research in which the relationship to the end product is kept. Instead, if firms need particular

elements of 'basic knowledge' they typically tap into the research located in local science centres - such as universities (Gulati *et al*, 2000; Rynes *et al*, 2001). Consequently, in this sample, responsibility within basic R&D related to direct product or process developments to a much higher degree, since such activities were significantly higher in the capability-based group. Both groups of acquiring firms highly prioritised the development of products in terms of new developments and further development of existing corporate products. The most important role of the market-based R&D units was to customise corporate products in order to meet local market demands, in contrast to the capability-based group in which applied R&D activities were only of minor importance. However, in the latter group, pure applied R&D was still more important than the basic R&D.

Table 3. T-test: Differences in means concerning the role of the acquired R&D unit

R&D factor	Mean Capability-based group	Mean Market-based group	T-values
Development of new technological capabilities	10.91% (10.43)	10.83% (13.62)	0.02
Development of new products/processes	40.91% (18.36)	23.75% (21.76)	2.44*
Development of existing corporate products/processes	28.77% (17.91)	22.50% (18.79)	0.96
Adaptation of corporate products to local demands	19.41% (12.89)	42.92% (39.97)	1,98*

N = For the competence-based group and the outcome-based group respectively: 22,12
Based on a t-test assuming equal variances. The figures in the category of adaptation of corporate products are based on a t-test assuming unequal variances
Standard deviation values are set in parentheses
†p <.10; *p<.05; **p < .01; ***p < .001.

The other main factor investigated was the degree of integration. The result of the t-test, as presented in Table 4, showed a significant difference between the two groups of acquiring firms, though in absolute figures both clusters emphasised the network model. The firms in the capability-based group seemingly preferred an integrated status while still retaining some autonomy. The tendency in the market-based group was similar, but more firms favoured the pure archetypal solution, as shown through the higher variance.

Table 4.T-test for differences in R&D activity mean values

Nature of R&D activity	Mean Capability-based group	Mean Market-based group	T-values
Degree of integration	4.89 (1.64)	4.22 (3.24)	1.45†
R&D unit co-operation	5.45 (2.79)	3.62 (4.85)	3.61***
R&D-related knowledge transfers from the acquired firm to other corporate units	4.90 (2.09)	2.90 (3.19)	4.45***
R&D-related knowledge transfers from headquarters to the acquired firm	5.00 (3.17)	4.86 (3.63)	0.27
Acquired firm responsible for own R&D activities	3.76 (2.32)	3.19 (1.96)	1.37†

N = For the competence-based group and the market-based group respectively: (27,18); (31,21); (31,21); (30,21) and (30,21), all based on t-test assuming equal variances
Variance values are set in parentheses
First question: 1 = autonomy position, 7 = integrated position
Remaining questions: 1= to a low degree, 7= to a high degree
†p <.10; *p<.05; **p < .01; ***p < .001.

The extent of knowledge transfers between the acquired R&D unit and other MNC units further indicated a higher level of integration. The low variance in the capability-based group confirmed that the acquired firms, in general, transferred knowledge to other corporate units, while the market-based group only saw intensive knowledge transfers taking place occasionally. The high degree of knowledge transfers that took place in the capability-based group was associated with the high degree of underlying cooperation between the R&D units, as expressed by the high correlation coefficient between the two factors (0.63; $p<0.0001$). Regarding R&D collaboration, the difference between the two groups was again significant at a 99.9% level. The figures clearly showed that the ownership of resources on which other units depend creates an incentive for knowledge transfers. Furthermore, the R&D units in both groups of acquired firms were dependent on knowledge from headquarters, but probably for different reasons. In the case of the capability-based acquired firms, the continued exploration of capabilities was essential, whereas in the market-based cases the upgrading of resources turning them into capabilities was more important. In general, headquarters' R&D units took an active part in the R&D processes of the acquired firm. Finally, the acquired

firm's mandate to make its own strategic decision concerning R&D was tested. Here, a higher level of autonomy was present in the capability-based group, in contrast to the aforementioned higher level of integration. However, possession of capabilities, upon which other units depend, typically paves the way for a subsidiary to win responsibility within the corporation – expressing the dilemma between integration and autonomy (Taggart, 1998).

Regarding, the schism between network and autonomous-based R&D, the acquired R&D unit was supposed to be highly integrated while still leaving some scope of autonomous activities. Whether this was evident is hard to say. The t-test revealed a higher degree of integration and cooperation with other MNC units, but simultaneously indicated a higher degree of strategic responsibility and less dependency on headquarters. As in the case of basic versus applied R&D, the figures showed a tendency, but not unambiguous proof. A likely interpretation is that the intention of integrating the acquired firm turned out to be too difficult in practice. Organisational and national cultures, and the historically different trajectories of the two firms are likely to ruin the integration process (Shrivastava, 1986; Brockhoff, 1998). However, the desire to avoid destroying value through failure to properly preserve capabilities could be an alternative explanation (Haspeslagh & Jemison, 1991). Furthermore, the R&D capabilities of the acquired firm will typically be embedded in persons and organisational systems, leading to high transfer and integration costs. These complications might cause a situation where integration costs exceed value creation. Even though the acquiring firms have high expectations for a subsequent integration of R&D capabilities, the cost of doing so might have blocked the process.

Conclusions

This paper reflects on the relationship between the MNC's strategic initial awareness of possibilities for capability-creation processes in the new subsidiary, and the nature of R&D activities in that particular subsidiary. The role of the acquired firm's R&D unit reflects a strategic choice between independency and interdependency on the one hand, and basic versus applied R&D on the other hand. The question raised here is what impact the acquisition motive of gaining access to capabilities has on the R&D activities in the acquired firm subsequent to the takeover. The strategic motivation can be interpreted as a search for both

capabilities and synergistic effects. The purpose, therefore, is to tap into another independent firm's capabilities and make them usable for the different units of the acquiring MNC. However, the full utilisation of the acquired capabilities is only possible through the use of explorative and resource-combining strategies. The acquired R&D units must be given the needed mandates and resources to further develop new and unique capabilities. A focus on basic oriented research, with applicability in mind, is necessary. To make capabilities relevant, the network R&D strategy should be emphasized, although elements of autonomy should be encompassed, leaving room for uniqueness. This combination of R&D strategies is an emerging perspective and is in contrast to the traditional centralised MNC.

A t-test analysis showed a possible relationship between the capability-seeking acquisition motive and a subsequent explorative integration strategy However, emphasis was put on product development rather than knowledge and technologies, which probably was an outcome of the inimitability and non-marketability characteristics of acquired resources. Basic-oriented capability developing processes were of low importance in this connection, and the MNC often accessed some alternative sources. To conclude, the capability-seeking acquiring MNC preferred a modified integration of the target firm's R&D unit, which was in line with the well-known symbiotic integration strategy as proposed by Haspeslagh & Jemison (1991). This secured a preservation of the autonomous and basic-oriented R&D activities of the acquired firm and, at the same time, enforced the same activities in a corporate research network.

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