1. Introduction

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Like much of the literature on strategic management today, we begin and end this introductory discussion by reference to resources. The resource-based view of the firm, whether applied in its original form (see e.g. Barney, 1991; Conner, 1991; Peteraf, 1993), or as a more general concept, postulates that differences in performance between firms are due to their different resource endowments. Thus the answer to the question of what makes one firm outcompete another is said to lie in the possession of resources that are value creating, rare and difficult to imitate. Of these, rarity seems to have the most explanatory power, if only because in addition to being the dismal science, economics is the science of scarcity, and the economic idea of value is inexorably linked to scarcity. Of course, to an extent rarity is a function of the time and effort someone is willing to put into imitation, but this seems a secondary condition, since by definition, things that are genuinely rare are not likely to be imitated very easily.

Firms thus compete based on their ability to own and access rare resources, which in itself is not new. Firms have always had an incentive to integrate vertically, whether in the case of backward integration into resources, or forward integration into marketing and distribution outlets. Transaction cost analysis and the theory of internalization have been used to explain why, under conditions of uncertainty, the transaction costs over the market can become prohibitive, and firms would prefer co-ordination within the hierarchy to secure critical resources (Buckley and Casson, 1976; Hennart, 1986). Similarly, firms have a standing incentive to engage in horizontal integration (via mergers and acquisitions), as this can yield market power, market share and innovative resources.

What is new, however, is both the geographical scope as well as the manner in which valuable resources can be acquired and accessed. A multinational like Unilever is present in nearly all markets in the world today, and in order to accommodate this extraordinary geographical reach, substantial changes have occurred in the internal organization of the firm. In order to achieve a bi-directional flow of information within the firm, multinationals have become less hierarchical, resulting in the advent of new conceptual forms, such as Hedlund's (1986) Heterarchy and Bartlett and Ghoshal's (1989)

Transnational. In addition to the changing configuration of internal activities, the boundaries of the multinational firm have become more porous, incorporating many forms of co-operative relationships, such as joint ventures and strategic alliances, with the two often distinguished by the presence and lack of an equity investment share. Additionally, the influence of the activities of national regulators, NGOs and other non-market actors on the firm has increased significantly along with global reach (Lundan, 2001).

The adoption of the terminology of networks is one way for scholars to try to come to terms with the complexity that presents itself in the operations of multinational firms today. At their most general, such networks are akin to the network models of linear programming, where series of nodes are connected by different carrying capacities, and the question is what is the optimal way to push resources through the network. In such a configuration some nodes are better connected than others, and if the nodes represent subsidiaries or business divisions of the firm, these are of greater strategic significance within the network. On the other hand, if there are parts of the network that are not connected, there are said to be structural holes in the lattice.

Increasingly, what is travelling through the network in addition to intermediate goods and finished products is knowledge. The kind of knowledge that is likely to be both valuable and rare is tacit knowledge, i.e. knowledge and experience embodied in people and the connections between people (see e.g. Cantwell, 1991; Spender, 1996). Since it is tied to skilled employees, a great deal of valuable knowledge tends to be location specific. The challenge for the multinational then becomes to absorb this locally generated knowledge held by the subsidiary, and to leverage it with the financial and other resources available within the firm.

By extending the analysis from within the firm to encompass a number of different actors outside the firm, the network structure gives a form to the complex reality of the firm. In addition to being useful in describing the structural features of modern multinationals, networks also represent a way to approach the means of control and co-ordination that lie somewhere between the arm's length transactions of the market, and the administrative fiat within the firm (see e.g. Powell, 1990; Thorelli, 1986). Since many of the nodes comprising a network lie outside the boundary of the firm, some form of mutual accommodation has to form the basis for managing these relationships. What is remarkable about modern multinationals is thus not only their global reach, but the extent to which on one hand they are focused on the exploitation of their ownership-specific assets abroad, and on the other hand are actively pursuing ways in which they can build on the stock of knowledge-based resources within the firm (Lundan and Hagedoorn, 2001).

From a structural perspective, the multinational has to find a way to co-ordinate its disparate parts in a way that allows it to disseminate the knowledge and capabilities of the firm in order to pursue market opportunities, and at the same time, the structure has to support the objective of allowing the firm to reach and 'tap into' various location-specific resources abroad. Consequently, the question posed in the literature is how do the network connections of a firm enable it to transfer knowledge from other entities in the network, as well as within the firm? Furthermore, how can the local connections of the subsidiaries be harnessed in order to generate new knowledge and innovation?

The trade and investment liberalization undertaken in the past decades has acted as a catalyst in the shaping of numerous local concentrations of knowledge-based activity that are potentially attractive to multinationals. Such locally attractive hotspots include most famously Silicon Valley, known for its concentration of high technology firms, and the positive externalities that firms present in the area enjoy. But examples also include regional economies, like Emilia-Romagna in Italy or Baden-Württemberg in Germany, where public policy as well as industrial evolution have played a role in creating an economic district that is attractive to local and multinational firms alike (Cooke and Morgan, 1998). Examples also include various governmental programmes and research consortia aimed at improving the technological competitiveness of firms in a particular area, such as ESPRIT in the European Union. The internationalization of corporate R&D (see Niosi, 1999) is both a response to the need to source knowledge-based assets abroad, as well as a contributing factor to the dispersion of the sources of competitive advantage (Dunning and Lundan, 1998).

The contributions in this volume explore the connection between network structures and the transfer of knowledge in a range of multinational activities. The collection begins with a review of the two theoretical concepts central to our discussion, namely networks and knowledge. In the first contribution, Lecocq and Yami adopt a sociological perspective and argue that changing from a value chain to a value network analysis involves more than just semantics, since it allows the authors to highlight the need to incorporate the various interdependencies between a firm and its environment into the strategic analysis model. Important in this process is the identification of all the market and non-market actors that have the potential to increase or decrease the value of the resources held by the firm. With the relationships mapped, the second significant step in the process is the attribution of strategic importance to these actors. They advocate a form of analysis that tries to challenge the assumptions inherent in the traditional model of strategic analysis that talks about 'partners' and 'competitors', since they believe that if 'partners' and 'competitors' are the entities the world is divided into, the kinds of interactions that are envisaged between them are already contained in the definitions.

The second theoretical contribution in this volume is by Bo Bernhard Nielsen, who reviews and synthesizes the research agenda in the emerging field of strategic knowledge management. Through a careful reading of the existing literature, he not only provides us with an account of how the essential problem regarding the transfer of non-codified knowledge has been dealt with in the strategic literature, but is also able to point to a specific direction in the conceptualization of knowledge within the context of management. This direction is towards a recognition of both complementary, or knowledge transferring, alliances as well as synergistic, or knowledge creating, relationships in the multinational network.

The final contribution in the theoretical section of this volume is made by Schmid, Schurig and Kutschker. They present a detailed review of the four most popular models of the multinational firm, namely Hedlund's (1986) Heterarchy, Bartlett and Ghoshal's (1989) Transnational, Doz and Prahalad's (1991) Diversified Multinational Corporation (DMNC) and White and Poynter's (1990) Horizontal Organization, and the assumptions contained in these models concerning the kinds of flows that are expected to take place within the multinational network. Subsequent to the analysis of the extant literature, the authors then provide evidence of the empirical importance of these kinds of flows by reference to a cross-national sample of European subsidiaries originating in the Centres of Excellence project (Holm and Pedersen, 2000). They find that the network embeddedness of subsidiaries is dependent on a number of factors, so that a subsidiary can receive large flows, and yet the consequences of possible disconnection from the network might not be very severe for the parent. They also find that the direction of flows is still dominantly from other corporate units to the subsidiaries, and only a fraction of subsidiaries initiate substantial flows.

The second part of this volume contains nine (mostly) empirical studies that fall under three different headings. The first set of four contributions deal with the management issues related to subsidiary headquarters relationships. They explore the various roles different subsidiaries assume within the multinational network, the ways in which multinationals try to control their subsidiaries, and the consequences of the diversity of subsidiary roles on the ability of the multinational to appropriate knowledge flows from its subsidiaries. The following two chapters deal specifically with the extent to which subsidiaries of multinational firms are able to collaborate with other firms, research institutions and within private and public research consortia in order to enhance their innovation capabilities. Finally, the remaining three chapters discuss case-based evidence regarding the pattern of internationalization of firms, and how such patterns can reflect different ways of tapping into and building on the resources located outside the firm.

The first contribution to discuss the issue of headquarters subsidiary relations is the chapter by Pearce and Tavares, which describes the results of a survey of multinational affiliates in the UK. They investigate the extent to which these subsidiaries might be moving from a local market orientation towards assuming a product mandate, in other words, towards using local technology and creative inputs to develop new products. The authors predict that the proportion of product mandate subsidiaries is on the rise, decreasing the threat of exit by 'footloose' subsidiaries and the adverse consequences for the local economy, but presenting the multinational parent with the challenge of co-ordination and control.

The following contribution by Foss and Pedersen takes an even closer look at learning within subsidiaries in an effort to identify the different sources of the knowledge that is generated at the subsidiary level. Specifically, these sources include internal R&D within the subsidiary, knowledge within other MNC units, knowledge within the MNC network (including suppliers) and knowledge related to the local (host) economy cluster. Also drawing on data from the Centres of Excellence project (Holm and Pedersen, 2000), they find that different sources of subsidiary knowledge necessitate different organizational mechanisms to facilitate knowledge transfer. Thus, for example, the degree of autonomy of the subsidiary was found to be important in the transfer of local cluster-based knowledge.

Following this focus on the role of the subsidiary, the chapter by Andersson, Björkman and Furu looks at the role of the MNC headquarters and the effectiveness of various means of subsidiary control. Working with a sample of Swedish subsidiaries, they find that the only co-ordination mechanism that had a significant impact on the transfer of competence to the MNC was the presence of a parent representative on the subsidiary board and the amount of direct attention given to the subsidiary. Contrary to expectation, they did not find support for a relationship between competence transfer and subsidiaries with a product mandate role (in a full structural model).

Last of the group of four, the contribution by Simões, Biscaya and Nevado looks at the role of the subsidiary within the multinational network by paying particular attention to the issue of autonomy. They define autonomy as consisting of subsidiary competence, corporate embeddedness and local embeddedness, and envisage the subsidiary as two-faced, with one side turned towards the parent firm, and the other turned towards the local economy. Based on survey evidence from Portuguese subsidiaries, they find that managerial rotation should be low for the local learning processes and subsequent embeddedness to develop. They also found that the manufacture of unique products tended to increase the subsidiary's autonomy, as did the development of local marketing competencies.

The related chapter by Giarratana and Torrisi moves away from the issues of managing the multinational towards looking specifically at competence accumulation through collaboration in high technology. Their evidence relates to a sample of the 15 largest electronics firms in Europe and covers both EU-sponsored and private collaborations. They find that EU-sponsored agreements, whether in the core or non-core sectors of the firms, do not have a significant effect on the technological performance of the firms, as measured by patents. Rather, they may serve as a forum where firms can influence the future direction of technical standards, for example. By contrast, private research collaborations were found to have a strong positive effect on patenting, particularly in non-core sectors, and particularly with US and Japanese partners.

The contribution of Miotti and Sachwald analyses the extent of co-operation in research and development based on a sample of manufacturing subsidiaries in France, some of them indigenous French firms, and others the affiliates of other European, US and Japanese firms. They conclude that for the French firms, international R&D partnerships are more efficient than French partners at increasing the firms' innovative capabilities. Furthermore, firms that co-operate with American partners tend to do so in relatively high technology sectors, while also co-operating with EU and Japanese firms.

The chapter by Welch, Benito, Silseth and Karlsen is the first of the final group of papers that deal with the pattern of internationalization, and in the case of the first two contributions, with somewhat unorthodox forms of international expansion. The authors performed a detailed case study of a medium-sized Norwegian firm in its efforts to penetrate the Russian market. They found that connections made in Russia through purchasing some years earlier were instrumental at a later stage in providing the firm with the connections and credibility that was required for market access in Russia. Thus the knowledge accumulated through inward links was able to be used by the firm at a later stage to assist in outward expansion.

In a similar vein, in the following chapter Mathews discusses the cases of several South East Asian firms that have taken extremely quick steps to internationalize without any apparent ownership-specific advantages. He argues that these firms have succeeded due to their ability to connect to various competitive resources around the world both by acquisition as well as by association. The accelerated internationalization of the newcomers and latecomers is made possible by organizational innovations that capitalize on their network of prior connections, and by strategies that allow the newcomers to complement what was already on the market by utilizing their international connections. In short, such firms are from the very beginning outward oriented, linked and integrated.

Finally the contribution by Tsang describes not the pattern of internationalization, but the pattern of supplier relationships within the European personal computer industry. She uses pooled case studies to argue that the degree to which European, American and Asian firms have specialized in different parts of the value chain has its basis in the central cultural concepts of their country of origin. The cultural influence of the home country is not seen merely as a backdrop to the activities of the firm, but instead she demonstrates how a particular way of thinking translates into advantages at different stages of component production. The resulting structure of the firm, with its characteristic network of connections with suppliers, is shown to be driven in part by economics, and in part by culture as mediated through economics.

In the chapter by Mathews there is a reference to the 'new zoology of the international economy', alluding to the fact that multinationals come in many sorts and sizes, some heavy and slow to move, and others light and quick on their feet. I am given to using another animal metaphor in connection with our argument concerning network structures and the transfer of knowledge within the firm, which is the contrast between the killer whale and the heron. The killer whale has learned how to beach itself in order to stalk a group of seals, and teaches this skill to its offspring in a process that can take years. In the world of birds, the heron has learned how to use pieces of bread (thrown by people to feed ducks) as bait, when it stands in shallow water and waits for the fish to come close enough to be grabbed. But unlike the killer whale, the heron has the ability to learn, but not the ability to teach, and subsequent generations of herons are left to discover the tricks of bait fishing on their own.

The contributions in this volume explore the various kinds of learning that take place in multinational subsidiaries, as well as the conditions under which the locally generated knowledge can be transferred within the firm. Multinationals that learn, but are unable to disseminate the knowledge within the firm, benefit locally, but such benefits cannot be leveraged within the firm. Multinationals that are able to teach, as well as learn, can combine the unique location-bound resources found in local clusters with the global resources of the firm to generate valuable and rare capabilities.

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