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# New forms of organisation and R&D internationalisation among the world's 100 largest food and beverages multinationals

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ABSTRACT

This paper explores the strategic internationalisation of Research and Development (R&D) activities of the world's 100 largest food and beverages (F&B) multinationals (MNEs) in 1996 and 2000 with a sample of nearly 8000 affiliates for each period. We develop a global innovation strategy (GIS) structure where we analyse the R&D internationalisation process of F&B MNEs. We argue that in a fully developed GIS model the sourcing of creative inputs does not come exclusively from a 'central' R&D laboratory, but other overseas R&D laboratories or technological affiliates can also undertake genuine knowledge creation activity from capitalising on the scientific heterogeneity fostered in individual host countries as well as distinctive demand conditions. Our results indicate the increasing importance of overseas technological affiliates in the application of a GIS in the leading F&B MNEs, which determine the degree of their technological internationalisation. Two variants of technological affiliates reflect two broad knowledge-related activities, i.e. adaptation and genuine forms of knowledge creation.



## 1. Introduction

Innovation and technology are of particular importance to the development agenda of countries (UNCTAD, 2005) and a relevant contributing factor, perhaps the most important, to the creation of competitive advantage for firms (Porter, 1998). Learning processes provide the foundations for establishing technological competencies or organisational capabilities that contribute to the firm's competitive advantage (Cantwell and Kosmopoulou, 2001; Cohen and Levinthal, 1989; Kuemmerle, 1997, 1999; Pearce, 1999). Research and Development (R&D) is thus a major determinant of good performance in global corporate competition for Multinational Enterprises (hereafter, MNEs) (Franko, 1989).

Given these developments, the internationalisation of R&D has attracted the interest of both academics and practitioners, as such strategies enable the firm to tap into knowledge externalities in world centres for scientific and technological excellence, and facilitate agreements with institutions which are at the forefront of research.

However, there are still few empirical analyses on MNEs' new transversal structures. While general aspects of the internationalisation of R&D have now been thoroughly explored, our knowledge of these relatively recent R&D superstructures is still insufficient. There is a need to complement the traditional analyses based on patent data or foreign R&D expenditures with studies of these new forms of R&D organisation in MNEs, in order to understand better the internationalisation of these companies' innovative activities.

This paper analyses the global organisation of R&D in the leading firms of the food and beverages (F&B) industry, and the motives that lead to these firms concentrating their most relevant innovative resources in new centres, often located abroad. In doing so we analyse a sample of around 8000 affiliates of the world's 100 largest food and beverage multinationals (hereafter, F&B MNEs). We approach the internationalisation process using a typology developed and elaborated in earlier studies (Pearce, 1999; Pearce and Papanastassiou, 1999) and investigate the role of the R&D-oriented subsidiaries of MNEs according to the internal resources of the company and the mandate of the subsidiary.

We thus develop a global innovation strategy (GIS) model where we identify the evolution of technological strategies and the

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critical role of overseas R&D laboratories or technological affiliates in MNEs, which in turn we apply to F&B MNEs. Therefore, our study contributes to the aim of shedding more light on innovation in the so-called low-tech industries, as proposed by recent analyses (von Tunzelmann and Acha, 2005). Second, the majority of previous studies of these forms of global R&D organisation are case studies of small groups of companies. These analyses, in our view, should be complemented with statistical analyses of large samples of similar companies. Third, although the food and beverages (F&B) sector is classified as a low R&D intensity sector (UNCTAD, 2005), F&B MNEs internationalise their R&D activities, according to patent analyses, more than MNEs in most other sectors (Alfranca et al., 2005; Cantwell and Hodson, 1991). Furthermore, F&B MNEs can be considered as precursor to other MNEs because they are, on average, older and more internationally experienced and more internationalised (Stopford and Dunning, 1983). Their analysis, therefore, could help towards a better understanding of the rationale for the new patterns of R&D internationalisation in other MNEs within a GIS model.

The rest of the paper is organised as follows. The next section provides the theoretical foundations and the literature review; Section 3 presents the data and sample description; while Section 4 discusses our empirical methodology and variables. The empirical results and their interpretation are discussed in Section 5. Finally, Section 6 concludes the paper by offering future research questions.

## 2. Theoretical background and literature review

One of the key changes during the refocusing of the competitive organisation of the MNE over perhaps the last 40 years has been the decentralization of innovation and R&D. In the years immediately after the second world war, as modelled by Vernon (1966) in the original product cycle model, United States MNEs (in particular) created sources of competitive advantage in their home country and used processes of technology transfer to apply these advantages as the basis of internationalisation. Gradually an ever-expanding literature on innovation and R&D has drawn attention to the dispersal of technology creation and application units throughout these firms' global networks. We have characterized these internationalised processes and facilities as reflecting *interdependent individualism* (Papanastassiou and Pearce, 1998). Thus the reason for establishing particular laboratories or innovation-oriented subsidiaries in certain locations is to draw on specific creative/technological capacity there. By internalizing these attributes, laboratories/subsidiaries individualize their contribution to group-level competitiveness. But for this indeed to work for the group these units also need to function *interdependently* with other similar units of the parent company (with similarly individualized capacity and agendas) elsewhere. To achieve this mixture of localized learning as part of *group* knowledge generation the types of technology affiliates (TAs) analysed later in this paper have emerged. These can take coordinating and organisational roles in group evolution which are informed by, and operative in, regional contexts as part of even wider overall group perspectives.

Based on earlier empirical research (Papanastassiou and Pearce, 1999; Pearce and Papanastassiou, 1999) we have drawn out the aims and structure of a GIS, which seeks to depict how contemporary MNEs might now use dispersed laboratories and subsidiaries to pursue a competitive regeneration (Pearce and Papanastassiou, 2006; Papanastassiou and Pearce, 2008). Essentially we see the emergence of the GIS (and other views of decentralized innovation in MNEs, (e.g. Bartlett and Ghoshal, 1989, 1990)), as reflective of MNEs' response to heterogeneity in the global economy. This includes *technological* heterogeneity, in terms of very different learning potentials from countries' national systems of innovation (NSI), and *market* heterogeneity, in terms of different taste patterns in national markets. It also reflects the modern MNE as a heterarchy (Hedlund, 1986, 1993; Birkinshaw, 1994) where laboratories and subsidiaries are encouraged to individualize (from local characteristics) their contribution to the group.

These perspectives can be schematically formalized in terms of the GIS of MNEs fulfilling three key aims: firstly, to detect and internalize new creative potentials from diverse sources of science and technology; secondly, to derive from these the broad parameters of a new product concept (NPC); thirdly, to complete the competitive development of the NPC in different forms that correspond to markets with different tastes and at different levels of development. Though the GIS ultimately targets the introduction of NPCs into a range of market places it is also implicit in this approach to innovation that processes will be designed for each region in a way that takes account of input availabilities as suggested in the first key aim of a GIS. In this manner product innovation represents the ultimate link between the firm and the market place.[3]

From an implementation perspective, this GIS is being overseen and coordinated by a central R&D laboratory and operationalised through three types of decentralized and networked laboratories. The first of these lab types is the internationally interdependent laboratory (IIL), which carries out basic/precompetitive research by tapping into and internalizing distinctive strands of its host-location scientific agendas and technological capabilities. Assembling a network of IILs, each accessing a different local scientific potential, i.e. responding to technological heterogeneity, provides an MNE with a range of complementary sources of new knowledge. By encouraging knowledge exchanges between IILs, and by itself seeking to understand and assimilate research output from throughout the network, the central lab aims ultimately to assemble the technological basis of a strong NPC. The preceding point leads us to the coordinating role of a 'parent' laboratory in a GIS, and indeed of the status of a home-country parent headquarters (HQ) in an MNE which is now placing significant emphasis on the decentralization of much of its creative and innovative strategic activity.

Once the bases of the NPC are in place, the second type of decentralized laboratory, the locally integrated laboratory (LIL), comes into play. Working with a product mandate (PM) subsidiary the LIL operationalises the new technology in collaboration with other local creative functions, especially marketing and engineering. Thus a network of LILs allows the MNE to develop a range of differentiated variants of the new good so as to meet the specific needs of particular market spaces (i.e. respond to market heterogeneity). An LIL is a central element in the PM's creativity, and essentially mediates new science emerging from applied research to the other functions (i.e. those with which it works in a closely integrated fashion) involved in the innovation process. In a fully developed GIS an MNE will authorize a separate PM/LIL nexus in each of several regional markets to generate a distinctive variant of the NPC that responds to all the idiosyncratic tastes and needs of its regional customer base and optimizes the production technology in its use of the input environment (availability and price of factors) of the host country. A subsidiary operating in this manner can be designated as having a *regional* product mandate (RPM) (Papanastassiou and Pearce, 2008).

Though the work done by IILs and LILs, as mediated and motivated by the central lab, completes the innovation process per se, a third type of decentralized lab remains to play a further role in MNE group competitiveness. Thus, once the new product is successfully

[3] Harabi (1995) argues that once process innovations are marketed they could be considered as product innovations.