Organizational Learning in Multinationals: R&D Networks of Japanese and US MNEs in the UK*

Alice Lam

BRESE, School of Business and Management, Brunel University

ABSTRACT  The institutional approach treats organizational forms and behaviour as contingent upon institutions that are durable and socially embedded and so several authors have argued that the nature and modes of operation of multinational enterprises (MNEs) vary according to their national origins. This paper examines the ways in which national patterns of organization and innovation affect Japanese and US MNEs’ global R&D networks and transnational learning, based on case studies of their R&D laboratories in the UK. In particular, it focuses on how these MNEs tap into foreign academic knowledge base and scientific labour through collaborative links with higher education institutions.

Relative to many Japanese MNEs, US firms have developed a greater organizational capacity for coordinating globally dispersed learning and embedding themselves in local innovation networks because the liberal institutional environment within which US MNEs have developed enables them to extend their organizational and human resource systems across institutional and geographical boundaries. By contrast, Japanese MNEs appear to be more limited in their transnational learning because of the much more tightly integrated organizational and business system within which they are embedded. The paper also illustrates how the contrasting logics of the US ‘professional community’ and the Japanese ‘organizational community’ model of learning are manifested in MNEs.

INTRODUCTION

The management of innovation within multinational enterprises (MNEs) has changed considerably over the past decade. One notable trend has been the extension of R&D activities and competence portfolios on a global scale (Gerybadze and Reger, 1999; Pearce, 1999) to augment the knowledge base of the firm (Florida,
1997; Howells, 1990; Kuemmerle, 1997, 1999a, 1999b). In the science-based high-technology industries especially, a growing element of firms’ strategies involves collaboration with world class academic institutions and research centres, and recruitment of the best scientific personnel on a global scale (Kaounides, 1999; Lam, 2001). However, relatively little attention has been given to how firms develop collaborative relationships with universities and research centres, and their strategies for tapping into local scientific labour markets. Accordingly, this paper examines the organizational and human resource strategies adopted by US and Japanese MNEs in managing their global R&D networks and transnational learning activities in the pharmaceutical and ICT sectors. It builds on the institutional perspective that stresses the strong influence of home-based institutions on the structure and behaviour of multinationals (Doremus et al., 1998; Morgan, 2001; Pauly and Reich, 1997; Whitley, 1999, 2001). The empirical evidence is based on four in-depth case studies carried out in the R&D laboratories of US and Japanese MNEs in the UK. The main aim of the study is to understand the ways in which national institutions shape the nature and boundary of firms’ transnational social space for learning, and their ability to tap globally dispersed knowledge networks.

GLOBALIZATION OF R&D: FROM TECHNOLOGY TRANSFER TO ORGANIZATIONAL LEARNING

Firms in most of the industrialized countries have increased the proportion of their R&D investments abroad since the mid-1980s (Patel, 1995; Roberts, 2001). US firms were pioneer investors in R&D facilities abroad but Japanese firms only established their foreign R&D sites much later and their foreign subsidiaries have a lower level of R&D intensity compared with US firms (Cantwell, 1995; Doremus et al., 1998). As a result of their intensive investment activity since the mid-1980s, Japanese pharmaceutical and electronics firms in the mid-1990s operated 32 per cent more R&D sites abroad than US firms and more than twice as many sites as European firms, according to Kuemmerle’s survey (1999a).

The global dispersion of R&D has been driven by firms’ needs to acquire new knowledge and capabilities, and to gain access to unique human resources (Cantwell, 1995; Dunning and Wymbs, 1999; Florida, 1997; Howells, 1990; Kuemmerle, 1997, 1999a, 1999b). Since the mid-1980s, the overseas R&D units of many MNEs no longer confine themselves to transfer parent company technology to host countries, but are developing major innovations for the global market by leveraging the unique knowledge resources of some host country environments. Gerybadze and Reger (1999) argue that the proliferation of national innovation systems and knowledge centres at various locations throughout the world has strengthened the incentives for multinationals to go for global knowledge sourcing. When deciding to establish or expand R&D abroad, firms are
increasingly motivated by the wish to gain access to sophisticated resources that cannot be found anywhere else.

These changes are clearly demonstrated in Pearce and Papanasatassiou’s (1999) survey of the evolution of overseas R&D labs in the UK. The authors distinguish three different roles of laboratories: support, locally integrated and internationally interdependent categories. The study shows that the internationally interdependent type, whose main aim is to generate new scientific knowledge that can underpin the technological distinctiveness of the MNE, has emerged as the most prevalent type of laboratory in MNEs’ units in the UK. They suggest that supply side factors, namely the technological capability and research infrastructure of the UK, and the availability of local scientific personnel, are most important in affecting the strategic positioning of these labs.

A key element in the global learning strategies of MNEs has been the growth of transnational collaborative relationships with academic institutions. This trend is particularly prominent in the science-based industries where the traditional barriers between scientific and technological disciplines are breaking down, and there is an increased interchange between basic and applied research. Forging close links with academic institutions helps to speed up innovation and also broaden the boundary of knowledge exploration. Large MNEs seek to establish strong links with local higher education institutions also to gain early access to the best students and academic researchers. In the dynamic technological fields, competitive advantage increasingly depends on tacit competence and unique configurations of knowledge resources. Recruitment of scientific personnel is one of the main ways for MNEs to tap effectively into new clusters of knowledge located abroad.

The US and UK have been popular locations for MNEs seeking to establish links with higher education institutions because of the high quality academic knowledge base, the openness of their academic institutions, and the presence of a large pool of well-trained scientific personnel. For Japanese companies without a strong overseas R&D presence, collaboration with academic institutions in the US or Europe represents an attractive avenue for gaining access to leading scientific expertise. MNEs internationalize their university collaborations in general; but Japanese firms appear to have internationalized their university collaborations to a larger extent (Granstrand, 1999).

R&D NETWORKS AND TRANSNATIONAL ORGANIZATIONAL LEARNING: THE ‘SOCIAL EMBEDDEDNESS’ OF MULTINATIONALS

As firms seek to use knowledge and innovation generated on a global scale, the development of international R&D organization becomes a central issue. Zanfei (2000) describes the new organizational mode of transnational innovation as ‘a double network’ comprising the internal and external networks. The internal net-
works refer to the organizational mechanisms for the coordination and integration of distributed R&D units, while external networks are constituted by relations with actors outside to the firm. A number of authors argue that a subsidiary’s ability to gain access to local knowledge sources is dependent upon its embeddedness in the host country context and the social relations of technological innovation (Blanc and Sierra, 1999; Frost, 2001; Zanfei, 2000). What makes MNEs unique as knowledge creating organizations is their ability to create ‘transnational social spaces’ for learning. This is achieved by linking their internal networks with their external and locally embedded knowledge networks spanning diverse organizational and institutional contexts.

The ways in which multinationals develop ‘transnational learning spaces’ and their ability to tap into local knowledge sources, however, differ between firms of different national origins, as suggested by the institutional approach to organizations (Doremus et al., 1998; Morgan, 2001; Pauly and Reich, 1997; Whitley, 1999, 2001). In a similar vein, the national innovation system literature (Hollingsworth, 2000; Lundvall, 1992; Nelson, 1993) emphasizes the impact of distinctive national institutions on firms’ innovation patterns and technological trajectories. Several authors also note the strong influence of national innovation systems on the technological and innovation activities of MNEs (Pavitt and Patel, 1999; Patel and Vega, 1999).

Drawing on this earlier work, this paper argues that the transnational learning activities of MNEs continue to bear the strong imprint of ‘home country effects’. This does not imply the replication of home-based organizational forms and learning patterns in the global arena, but refers to the ways in which home-based institutions shape the nature and boundary of firms’ ‘transnational learning spaces’, and their ability to tap into local innovation networks. In particular, I suggest that US MNEs will be able to develop a greater organizational capacity, compared with their Japanese counterparts, for coordinating globally dispersed learning and embedding themselves in the local innovation networks. This is because the liberal market institutional environment within which US firms are embedded allows them considerable flexibility to extend their organizational and human resource systems across institutional and geographical boundaries. By contrast, Japanese MNEs are likely to be more limited in their transnational learning because of the much more tightly integrated organizational and business system within which they are embedded. More specifically, the home-based institutions shape MNEs’ transnational learning spaces in three main ways: (a) modes of international R&D organization; (b) transnational collaboration with academic institutions; and (c) human resource strategies and links with local labour markets.

**Modes of International R&D Organization**

Multinationals adopt a variety of global R&D structures and management styles in coordinating globally dispersed R&D units. A key managerial problem is the
balance between autonomy and control of overseas R&D units and the use of different types of coordinating mechanisms for effective knowledge transfer. Gassman and von Zedwitz (1999) identify five ideal forms of structural and behavioural orientation in international R&D organization (see Table I). The authors argue that there is an evolution towards integrated R&D networks. This is seen as the most advanced form of R&D organization whereby the central R&D department evolves into a competency centre among interdependent R&D units that are closely connected by flexible and diverse coordination mechanisms. The role of the central R&D unit shifts from a control centre to a group with rights and duties equal to those of the dispersed units. Overseas R&D units assume a strategic role affecting the entire company. They enjoy a high degree of autonomy and perform distinctive roles in knowledge creation through their extensive external networks.

The extent to which different types of MNEs are able to adopt the integrated R&D network model, however, will tend to vary. Existing empirical evidence suggests that Japanese firms have not developed this mode of R&D organization as much as leading US and European MNEs (Gassman and von Zedwitz, 1999; Gerybadze and Reger, 1999). They appear to experience a strong isomorphic pull towards the ‘ethnocentric’, ‘hub’, model of international R&D organization (Gronning, 2001; Sakakibara and Westney, 1992). This is characterized by the dominance of the main laboratory at home in all research and advanced development activities, tight control over decentralized activities by means of long-term R&D programmes as well as through resource and personnel allocation.

The different modes of international R&D organization reflect the dominant system of managerial coordination adopted by firms, which, in turn are rooted in differing national approaches to technological innovation and their internationalization strategies. Japanese multinationals in general tend to be tightly integrated and seek to maintain a high level of internal organizational proximity and coher-

---

**Table I. Five typical forms of international R&D organization**

<table>
<thead>
<tr>
<th>Type of R&amp;D organization</th>
<th>Organizational structure</th>
<th>Behavioural orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnocentric centralized R&amp;D</td>
<td>Centralized R&amp;D</td>
<td>National inward orientation</td>
</tr>
<tr>
<td>Geocentric centralized R&amp;D</td>
<td>Centralized R&amp;D</td>
<td>International co-operation</td>
</tr>
<tr>
<td>Polycentric decentralized R&amp;D</td>
<td>Highly dispersed R&amp;D, weak centre</td>
<td>Competition among independent R&amp;D units</td>
</tr>
<tr>
<td>R&amp;D hub model</td>
<td>Dispersed R&amp;D, strong centre</td>
<td>Supportive role of foreign R&amp;D units</td>
</tr>
<tr>
<td>Integrated R&amp;D network</td>
<td>Highly dispersed R&amp;D, several competence centres</td>
<td>Synergetic integration of international R&amp;D units</td>
</tr>
</tbody>
</table>

ence (Campbell and Burton, 1994; Westney, 1999). They develop their internationalization strategies by building on and extending their existing technological expertise to overseas markets. This is achieved by maintaining a close integration between the technological competencies based at home and those transferred to overseas subsidiaries. Therefore, their R&D activities have remained highly centralized in the home laboratories and the level of R&D intensity of their foreign subsidiaries is low compared with that of the US or European multinationals (Belderdos, 2001; Meyer-Krahmer and Reger, 1999). The Japanese approach to product innovation is characterized by a tight integration between R&D and manufacturing operations, and frequent rotation of people across functional boundaries. This particular feature of the Japanese innovation system further inhibits the de-centralization of R&D activities to foreign subsidiaries.

The dominance of the home country R&D organization is also a result of the country’s long years’ of experience as a ‘technology follower’ (Sakakibara and Westney, 1992; Westney, 1993, 1994). Japanese firms have spent several decades developing organizations and knowledge transfer systems to acquire foreign technology. The patterns of R&D organization have been designed to acquire and adapt external technology for product development back at home. This ‘inward’ learning pattern has led Japanese firms to treat overseas R&D units primarily as ‘technology listening posts’ or highly specialized units within the corporation. The implication of this tight home-centred structure is that Japanese overseas R&D facilities may be limited in the scope of their innovation activities and their ability to integrate themselves within local innovation networks. Blanc and Sierra (1999) argue that there is a trade off between internal organizational proximity and the ability of the firm to develop diverse relations of proximity to actors external to the firm. One would expect Japanese firms, then, to experience a higher degree of organizational tension in managing their overseas R&D units (Asakawa, 2001), especially in basic research where organizational autonomy is most needed to foster innovation.

US MNEs, by contrast, are less likely to be inhibited by their dominant system of management coordination and home-based innovation system from moving towards the integrated R&D network structure. US MNEs in general are more decentralized and their subsidiaries are loosely coordinated via financial performance measures. This allows the subsidiaries a greater degree of autonomy in managerial decision making and local adaptation. One would also expect US firms to have a stronger inclination than Japanese firms to develop globally distributed R&D networks because of the national innovation system’s focus on achieving scientific breakthroughs and radical innovation (Doremus et al., 1998; Hollingsworth, 2000). This kind of innovation system requires firms to develop highly flexible and permeable organizational structures to acquire knowledge from a wide variety of external sources (Hage and Hollingsworth, 2000; Whitley, 2000).
Transnational Collaboration with Academic Institutions

In the United States, universities have historically played a prominent role in the national innovation system (Mowery and Rosenberg, 1993). This builds on their important role in performing a large proportion of publicly-funded basic research and a long history of close collaboration between university researchers and industrial scientists and engineers. Policy developments over the past two decades have strengthened the incentives for academics to engage in industrially relevant research (Hane, 1999; Spencer, 2001). Another important factor contributing to the innovative role of the US university system is the tight coupling of research and graduate education. This has important effects on students as professional researchers and also as sources of technology transfer (Feller, 1999, p. 83). US firms recruit a large number of PhD scientists into their laboratories which cements the links between the two sectors and facilitates reciprocal knowledge flow (Westney, 1993). As a result, US firms have been able to draw upon a strong academic science base at home to support their radical and entrepreneurial innovation strategies. One can argue that US firms do not have to look abroad for basic research and academic links. However, like firms from elsewhere, they are subject to intense competitive pressures to broaden the scope of innovative search in order to sustain and strengthen their existing innovation strategies. In the 1990s, many leading US MNEs sought to create a global scientific space through their global R&D networks and academic links. The key objectives appeared to be the broadening of the firm’s external knowledge networks and the search for unique capabilities and human resources.

Japanese firms’ motives for developing overseas academic links are very different. They appear to use globalization as a strategy to compensate for the weaknesses of home-based institutions and to ‘disrupt’ their existing patterns of learning. Nakayama and Low (1997, p. 249) argue that the growing internationalization of R&D and investment in overseas universities are evidence of Japanese industry’s lack of confidence in the research function of Japanese universities. The academic science base in Japan is relatively weak in a number of fields and the role of universities in the national research system has been less significant. The post-war economic policy of Japan has placed a heavy emphasis on firms creating their own technical capability to ‘catch up’ with the West in selected areas (Baba et al., 1995; Kodama and Branscomb, 1999). Public funding in basic research is relatively low compared with other advanced economies, and the university sector has been deprived of increases in public funding for the past two decades (Clark, 1995; Nakayama and Low, 1997). The role of universities in Japan has been primarily as knowledge ‘disseminators’ providing a steady stream of graduates for industry, rather than knowledge ‘generators’ (Methé, 1995; Oka, 1993). Formal linkages between university and industry in R&D collaboration have also been severely handicapped by the historic institutional separation between the two

© Blackwell Publishing Ltd 2003
sectors (Hane, 1999) and the lack of institutional arrangements and incentives for Japanese universities to perform commercially relevant research, at least until recently. Thus, Japanese firms have not developed strong links with universities at home and have limited experience in conducting basic research. Their innovation strategies have tended to focus on applied R&D projects to promote a cluster of continuous and incremental product innovation.

However, since the mid-1980s Japanese firms have become more concerned with the need for developing more creative research organizations with greater capabilities in basic research and radical innovation. Instead of looking towards their home-based institutions, they go abroad to search for productive university ties and set up basic research facilities. Japanese firms expect their overseas facilities to play a dual role. The first is to enable them to learn the organizational routines of basic research; and the second, to help them to acquire basic research findings and academic knowledge in certain specialized areas not available at home (Methé, 1995; Turner et al., 1997). Thus, one would expect Japanese MNEs’ relationships with overseas academic institutions to be more focused and specific, evolving around the advancement of new technologies as opposed to the broad objectives of knowledge networking.

Human Resource Strategies and Links with Local Labour Markets

When learning is central to the missions of overseas R&D units, firms’ strategies for developing a global human resource system and gaining access to local scientific personnel becomes crucial. MNEs will vary in the extent to which they are able to develop effective human resource strategies for tapping into local labour markets and scientific communities. This tends to be heavily influenced by their home-based labour market institutions and employment systems.

US firms have traditionally relied on an external learning strategy that takes advantage of the country’s mobile and open professional labour markets. The open recruitment of scientists and engineers has enabled US firms to pursue a radical innovation strategy through continuous renewal of their knowledge base and creation of new technological possibilities. Moreover, the strong links between industry and universities facilitate human resource mobility between the two sectors. This allows firms to gain access to a large supply of professional researchers who are conducting advanced research at universities. The professional-oriented career structures and open employment systems facilitate the development of a decentralized global R&D structure and allow overseas units a greater degree of autonomy in local recruitment. US MNEs may, then, enjoy a comparative institutional advantage when they seek to extend their learning and human resource systems across geographical boundaries. The institutional structures and human resource practices within firms support the formation of global professional networks.
Japanese firms, by contrast, have historically built their innovative capabilities on a well-established firm-based internal labour market with a strong emphasis on internal knowledge transfer. The high degree of internal job rotation and career mobility is accompanied by a relative absence of horizontal labour mobility in the large firm sector. The insular nature of the human resource system in R&D is further reinforced by the institutional separation between industry and academia, and the reluctance of Japanese firms to recruit university-trained PhDs into their organizations (Nakayama and Low, 1997; Westney, 1993). When Japanese firms set up R&D units in the UK and USA, they are likely to come under pressure to alter their human resource systems to accommodate the demands of a more open, external-oriented learning pattern. This may conflict with their home-based labour market institutions and employment systems. One would expect Japanese firms to experience greater tensions in adapting their human resource practices to facilitate the development of globally dispersed knowledge networks.

RESEARCH METHODS AND THE INTERVIEW SAMPLE

The study is based on four case studies of two US MNEs: one in the ICT sector (US-ICT) and the other in the pharmaceutical sector (US-Pharma); and two Japanese MNEs from the same two sectors (J-ICT and J-Pharma). They are all large multinational firms operating in the science-based industries. The two ICT firms are comparable in terms of their size, scale of R&D investment and the duration of their R&D operations in the UK. US-ICT’s Bristol Laboratory was established in 1985 and, J-ICT’s Cambridge Laboratory in 1989. The two companies in the pharmaceutical sector, however, cannot be claimed to be directly comparable because of the substantial differences in their size and R&D investment (see below). Moreover, US-Pharma’s R&D site in the UK was established in 1955; whereas J-Pharma’s London Laboratory was initiated in 1990. The ‘bias’ of our sample is inevitable because of the contrasting national patterns of sectoral development in pharmaceuticals between the two countries.

The case studies focus on the MNEs’ R&D laboratories in the UK. All four units studied are research labs with the objectives of exploring new technologies or researching new scientific fields. The two US laboratories are part of the globally distributed R&D centres; whereas the Japanese ones are campus-based laboratories, reflecting the distinctive pattern of Japanese overseas R&D investments. Data were collected by semi-structured interviews with senior managerial and technical staff in R&D, human resource and academic liaison groups as well as those directly engaged in collaboration with the universities. The semi-open questionnaires covered four main areas: organization of R&D and innovation, globalization and knowledge sourcing, human resource strategies and recruitment, and academic collaboration. A small number of interviews were also conducted with © Blackwell Publishing Ltd 2003
the key academics in the partner universities to gain a balanced understanding of the collaborative relationships.

In the case of the Japanese firms, interviews were also carried out with senior management at the headquarters in Japan. This was necessary for collecting essential company information not readily available in the UK. The contacts with the headquarters were also important for gaining access to the laboratories in the UK. The Japanese interview sample is much smaller owing to the difficulties in gaining access to key staff in Japan and the small scale of the local laboratories. Access to J-Pharma in Japan was relatively restricted and only four interviews were carried out. However, this was compensated by the fact that the two interviewees at the headquarters in Japan had previously worked in the overseas laboratories in the USA and UK, and were able to provide rich information on the role of these laboratories.

All the interviews were conducted on an individual basis, except for those in Japan where the staff preferred group interviews. The interviews in Japan were conducted in Japanese and, in the UK, in English. The interviews with the two US MNEs were conducted between 1999 and 2000; and the Japanese MNEs, during 2001. The interview sample is shown in Table II. All the interviews were recorded and transcribed. These data were supplemented by company documents, press releases and other relevant published materials.

US MNEs’ R&D LABORATORIES IN THE UK

The two US MNEs examined here have sought to build an integrated form of network R&D organization on a global basis since the early 1990s. An important policy focus of the R&D organizational restructuring in recent years has been to enhance global coordination and integration of the geographically distributed research laboratories into the global knowledge networks. Both laboratories in the UK enjoy a clearly defined and controlled autonomy within the MNE groups in terms of their R&D and business strategies, and relationships with local education and research systems. Both companies manifest a strategic aim to build a systematic and all encompassing approach to the way they interact with local universities. Gaining access to and recruitment of scientific personnel appears to be a key strategic objective of their university links. Moreover, the companies also increasingly seek to enlarge their space for the search of scientific expertise by tapping into the wider European labour markets. This is particularly notable in the case of US-Pharma.

US-ICT: The Bristol Corporate Laboratory

*Global R&D networks and knowledge sourcing.* US-ICT is a company dedicated to the design, manufacture and provision of services and systems for measurement, com-
putation, imaging and communications. In 2000, it had 88,500 employees and over 540 sales and support offices and distributors worldwide in more than 120 countries. Since 1998, US-ICT has undergone radical transformation, attempting to reinvent itself from a hardware manufacturer to an enterprise service producer and systems integrator. The research and development conducted by US-ICT is distributed between the corporate laboratories and R&D groups at the divisional level. Its central research organization is globally distributed, employing 800 employees at laboratories in six sites around the world. Its headquarters are in California, USA and Bristol, UK. The Bristol site employs approximately 240 people and is the second largest research site.

An important consequence of the recent restructuring has been an increase in the global coordination of the corporate laboratories, now having become a single

© Blackwell Publishing Ltd 2003

Table II. The interview sample

<table>
<thead>
<tr>
<th>Company</th>
<th>Position/background of staff interviewed</th>
<th>No. of interviews in companies</th>
<th>No. of interviews with local academic collaborators</th>
</tr>
</thead>
<tbody>
<tr>
<td>US-ICT</td>
<td>Managing Director of R&amp;D Lab; Human Resource Manager; External Collaboration and Academic Liaison Manager; Departmental Managers (4 areas); R&amp;D Divisional Manager; Senior engineers (engaged in collaborative projects with partner universities)</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>US-Pharma</td>
<td>Vice President of Laboratory; Human Resource Director; Learning and Development Manager; Director of Discovery Biology; Recruitment and Academic Liaison Manager (2 areas); Head of External Technology Acquisition; Licensing and Collaborations Manager; Director of Project Management; project leaders and other scientific staff engaged in collaborative projects</td>
<td>16</td>
<td>3</td>
</tr>
<tr>
<td>J-ICT</td>
<td>Headquarters: General Managers, R&amp;D Group (2); General Manager of Global R&amp;D; Managers, Human Resources and Recruitment (3); Cambridge Laboratory: Manager (Japanese)</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>J-Pharma</td>
<td>Headquarters: Director of Planning and Coordination in Clinical Research; Director (formerly coordinator and researcher in UK Lab); R&amp;D Planning (formerly laboratory manager in US Lab); London Laboratory: Research Director (Japanese); researcher (Japanese)</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>
distributed centre. Thus there is only one central laboratory with sites in California and Bristol. The strategic importance of Bristol Laboratories has increased as a result of the restructuring. The research activities of the corporate laboratories are organized into specific programmes that can be located anywhere in the world. Projects are conducted on a global basis, involving expertise and resources located in the geographically dispersed R&D units. Coordination is achieved via global project teams and the promotion of systematic human resource strategies.

Another significant shift in US-ICT’s R&D strategy has been the closer alignment of the research programmes with business activities. This has resulted in a change in the focus of the research towards application-oriented and short-term objectives. To counter-balance this, US-ICT is seeking to maintain its basic research capability by widening its technological base through external collaboration and networking. This has also been prompted by the need to speed up the learning process and to create new competencies in an environment where the rate of change is dramatic. Another issue facing the company has been the growing intensity of competition for scientific personnel. There is a growing concern that the best researchers might be increasingly reluctant to pursue careers in large industrial corporations. The company’s recent move to focus more on commercially driven applied research might have exacerbated the problem. Thus, the critical issues facing the company’s corporate laboratories are twofold: (a) the need to sustain the vitality and originality of the fundamental core of scientific knowledge available to the group; and (b) to ensure that they have a stable supply of core R&D staff.

Building strategic partnerships with universities. A key aspect of the company’s policy response has been to develop closer institutional links with major research universities in order to gain early access to the best scientific expertise. Since the mid-1990s, there has been a conscious policy effort to develop more systematic and stronger links with universities. A new position responsible for external academic links was created in 1995 at Bristol. The mandate of this new role is the development of a ‘Strategic University Relations Programme’ on a global scale together with their US counterparts. The mission of this programme has been to concentrate resources on a small number of key institutions from which the company is most likely to resource its human and intellectual capital. The term ‘strategic partnership’ is used to denote the intention to forge long-term and trusting relationships with key institutions. These are sustained by a range of linking mechanisms including an industrial input to curriculum development, student placements, exchange of staff and collaboration in research.

The intention behind all these measures, according to the academic relations manager, is to have ‘early access to the most talented people’ and ‘trusted access to the best ideas’. By becoming a trusted partner in the academic community, US-ICT would be in a better position to catch the best students early but also have
opportunities to influence the education and training of future researchers. Activities such as giving seminars at universities and supervising student projects are often used to cement relationships with particular institutions. Student placement is an especially important linking mechanism and recruitment channel. US-ICT favours recruiting students who have spent a period of internship with them. The purpose of this is that students will have gained the business understanding and organizational knowledge, and hence become more qualified and suitable than those with a pure specialist academic training.

The competition for scientific expertise and the need to gain access to wider knowledge networks are key factors driving US-ICT to establish strategic partnerships with universities. The company recognizes that ‘there is no better way to access knowledge than through people’. US-ICT is developing these links on a global scale, but the main focus is on the UK and US institutions.

Linking global and local innovation networks: a strategic partnership with the University of Bristol. Although US-ICT’s university links are coordinated on a global scale, the regional factor plays an important role. The close relationship between Bristol Laboratories and the University of Bristol illustrates this. The company has historically developed various links with the university and has recently identified it as one of its global strategic partners. The relationship has intensified in recent years, and become more focused on the Computer Science Department and more recently, also the Mathematics Department. The links with the Computer Science Department have developed around two types of activities: (a) the funding of specific research projects; and (b) personnel-based exchanges including student placements, exchange of staff and participation of the company’s staff in curriculum development and project supervision. These links are guided by a broad policy framework agreed between the university and the company. It includes a mission statement defining a long-term initiative to facilitate the exchange of knowledge through the exchange and sharing of people. The company is currently funding two research projects, both of which are basic in nature. The research objectives are very broadly defined, leaving the academics with a great deal of discretion in defining their own agenda. It appears that the main objective is to use the research projects as vehicles for gaining access to the expertise and knowledge networks of an eminent professor in computer science, rather than the generation of specific technology or intellectual properties. Another important dimension of the partnership is the intensification of personnel exchanges. The recruitment of students is seen as a very important part of the partnership:

Transfer through people is the most effective way of working in partnership over a long period of time with a key university, and as a result their students come to work with us. These mechanisms are very effective. (Managing Director, US-ICT Lab Bristol)
The recruitment side is very important. They [US-ICT] want to be able to get access to students and to try and target and persuade the best ones, the ones that fit their profile. They want those as early as possible because the experience is they can often be put to use almost immediately. And even if they couldn’t, it would be worth investing in further development of them until they can. So that’s what a lot of it’s about. (Head of Computer Science Department)

Another focal point of interaction is the Basic Research Institute in Mathematical Science (BRIMS). This is an intermediate research organization located at the interface between the company and the university. It seeks to create a permeable boundary between the institutions to facilitate the interchange of people and flow of knowledge. BRIMS was set up in 1994 as part of the company’s ‘Basic Research Initiative’ to widen its research base. It is dedicated to pure basic research without any immediate obligation to transfer technology. It has developed close relationships with the Department of Mathematics at Bristol University. The relationships are maintained primarily through joint appointments of key research staff and various informal exchange activities. The research staff are funded by the company but formally employed by the university. They represent ‘joint human capital’ shared between the company and the university. For the company, BRIMS helps to enhance its visibility and reputation in the academic world and acts as a vehicle for attracting top researchers. The Director of BRIMS described the organization as a ‘recruitment porthole’ for the company. BRIMS has also created a new research group in a local university which is potentially important to the company. The relationship between US-ICT and Bristol University represents a model of industry–university partnership structured around the interchange of people and reciprocal flow of knowledge. The company places a great deal of emphasis on building long-term relationships with its academic partners. The recruitment of students and gaining access to top academic researchers appear to be the priority goals. Forging strong institutional links with key universities amounts to the formation of an ‘extended human resource system’ for the company. It ensures that the company has a stable supply of core R&D personnel and enables the company to broaden the scope of human resources and knowledge networks into the wider academic community. By embedding itself in the local higher education and research system, US-ICT seeks to integrate the local knowledge resources with its global R&D networks.

US-Pharma: Central Research in UK

Global R&D networks and knowledge sourcing. US-Pharma is a global pharmaceutical company which has been experiencing rapid growth and expansion in recent years. The company boasts the industry’s largest pharmaceutical R&D organization: its
Global Research and Development division, with approximately 12,000 employees, six discovery sites and an expected 2001 investment in total R&D of about $5 billion. The company has formed alliances with more than 250 partners in academia and industry that strengthen its position in science and biotechnology.

The case study presented here is based on interviews carried out at US-Pharma’s Central Research in the UK. It is the largest research facility outside the United States with over 1500 employees at the site. It is also the company’s European Headquarters for the discovery and development of new drugs.

Central research at US-Pharma is organized on a global basis, with a central research committee overseeing the whole portfolio, covering the different sites worldwide. Project-based management has become a key managerial tool for the coordination of global R&D. Research teams and project managers located at the different sites increasingly work in coordination with each other. To facilitate global coordination, the company has developed a Common Planning and Scheduling System (COMPASS) which is universally adopted by the company’s research labs worldwide. The intention is to have a set of common definitions and codes to enable the company to ‘roll up’ all the projects into its portfolio view. Intra-company knowledge transfer across globally dispersed laboratories is a complex process. COMPASS is an attempt to establish a common codification system and database to facilitate this.

US-Pharma has increasingly recognized the need for external collaboration, and has significantly increased its external technology investments over the past five years. While external collaborative projects at US-Pharma are coordinated on a global basis, most of the company’s academic links in the UK have developed on a personalized basis through the contacts of individual scientists. There is a strong emphasis on encouraging a bottom-up approach and ‘getting the science right’. Although the External Technology Acquisition Unit acts as a focal point of the collaboration, its role is primarily a commercial and contractual one. The scientific aspects of academic collaboration are driven by the individual scientists and project groups. About 30 per cent of the company’s external collaboration budget is spent on academic institutions. The bulk of the linkage activities takes the form of a ‘quasi-subsidy’ whereby the company does not demand a precise contribution or service.

This includes the following categories: (a) ‘goodwill grants’, that is, money that is given to universities to fund a course or student project; (b) CASE studentships that are part funded by the company and part by government. The main aim is to use these as mechanisms for building relationships with individual academics or departments, although there were examples where student projects had led to important findings that were valuable for the company. Higher on the collaborative scale are (c) projects that have a ‘semi-commercial’ component whereby the company’s requests are clearly defined, even though the expected return is usually quite flexibly defined. Post-doctoral collaborations belong to this category in which ‘the
science’ is an important consideration. It is seen as the most important form of collaboration and ‘good value for money’. A large proportion of the money for academic collaboration goes to this form of scheme, and the company currently funds about 30 post-docs. It also funds (d) larger scale projects, referred to as ‘strategic collaboration’, but this seems to be rather rare. The main one that has been identified is the collaboration with the Biosciences Department at the University of Dundee which involves a consortium of five pharmaceutical companies and the Medical Research Council. The amount invested is substantial and the company describes this as one of their most prominent academic collaborations. The collaboration enables the company to gain quick and cost-effective access to an extremely complex area in which it had little experience. It facilitates rapid development of new expertise and provides networks of academic contacts to support in-house innovation. The company also recognizes that recruitment of students is another important beneficial aspect of the collaboration.

Employee resourcing: building strategic partnerships with universities and increased ‘Europeanization’. In the face of growing competition for qualified scientific personnel, US-Pharma has sought to develop a more focused and targeted approach to the ways it relates to higher education institutions. The Director of Human Resources in Central Discovery described recruitment as a very ‘tough’ area. Forging closer academic links has become so important that the company has recently created ‘strategic recruitment specialists’ in chemistry and biology, staffed by scientists with PhD qualifications, to liaise and develop strategic relationships with their ‘preferred institutions’. As part of its employee resourcing strategies, US-Pharma provides teaching funds for a number of UK universities to develop courses in key areas of skills shortages. However, more significant efforts to boost skills supply take place at the industry level, with US-Pharma engaged in initiatives through working groups within the Association of British Pharmaceutical Industry (ABPI) to attract graduates to Combinatorial Chemistry. The company is also involved in similar initiatives in Bioinformatics and is a leading member of the UK Life Sciences Committee Working Party on postgraduate and post-doctoral training.

Another significant development in the company’s recruitment strategy is the trend towards ‘Europeanization’. This was initially driven by shortages of people, but the company has increasingly recognized the qualitative benefits of casting its recruitment net wider. At the PhD level, it is notable that the company’s European strategy has been prompted mainly by the need to compete for the best scientific talent, especially in biology and biotechnology. There is a growing awareness of the importance of tapping into the European science base in order to gain early access to ‘new and ‘emergent’ ideas. This is essentially about a wider search for the ‘potential of innovation’. It is part and parcel of the company’s global competition and innovation strategies.
JAPANESE MNEs’ R&D LABORATORIES IN UK UNIVERSITIES

The two cases examined here are both university-based laboratories, and can be considered as typical of Japanese firms’ approach to tapping into foreign academic knowledge base. They were established about ten years ago and the companies have made a substantial investment in them. They represent the European nodes in the companies’ triplolar global research network. The global R&D organization of the two companies, in contrast to the two US cases, approximates the ‘hub model’ rather than an ‘integrated network’. The central research laboratories at home maintain tight control over the research programmes in the overseas units through allocation of resources and close monitoring. Both laboratories are managed by Japanese research scientists dispatched from the central laboratories at home. The pharmaceutical company’s initial attempt to appoint a foreign research director and grant its London laboratory autonomy had proved to be ‘unsuccessful’ from the viewpoint of the parent company. This subsequently led the company to take strong measures to re-integrate the overseas unit within its domestic research facilities. Moreover, in both cases, the relationships with the universities revolve around the advancement of specific technologies core to the companies’ product development strategies.

J-ICT: The Cambridge Laboratory

Global R&D networks and knowledge sourcing. J-ICT is one of the world’s leading global electronics and ICT companies, with 1069 subsidiaries, including 335 overseas corporations. It has seven corporate research laboratories in Japan, employing a total of 2700 research staff, the Central Research Laboratory being the largest of these, employing 930 research staff. J-ICT’s overseas R&D began with the establishment of two R&D centres in the USA and two university-based laboratories in Europe in 1989. Prior to this, J-ICT had begun its R&D globalization programmes at home. In 1984, the company introduced a visiting researchers programme to internationalize its R&D workforce. Between 1985 and 2000, it hosted a total of over 200 researchers from abroad. This programme is seen as an important vehicle for ‘internal R&D globalization’ at J-ICT.

J-ICT’s triplolar research networks include four research and design centres in the USA and five sites in Europe. The scale of these laboratories is relatively small. The facilities in the USA employed a total of 60 people and, in Europe, around 30. In the USA, J-ICT focuses mainly on medium term applied research in the semi-conductor area; whereas in the UK, a key objective has been to strengthen fundamental research. The relationship with Cambridge University, on which this case study is based, appears to be the most important and visible one. The European sites are coordinated by a parent organization, the Corporate Technology Group, based in the UK. The management team of the Group is solely Japan-
ese, comprising a general manager and four local laboratory managers, all of whom are Japanese expatriates.

The Cambridge Laboratory: an ‘embedded laboratory’ for collaborative research and knowledge transfer. The J-ICT Cambridge Laboratory (JCL) was established in 1989 in close collaboration with the Microelectronics Research Centre (MRC) of Cambridge University. It aims to create new concepts of advanced electronic/opto-electronic devices. J-ICT made an initial donation towards the building of the laboratory and its subsequent extension, and rents laboratory space in the MRC. It also pays an annual collaboration grant decided in a written agreement drawn up with the university on a five year basis. Subjects of research are agreed with the university; J-ICT owns all of the intellectual property rights generated from collaborative research with the university receiving royalties on all commercial benefits from patents and research exploitation.

JCL is relatively small, employing seven permanent research staff, two fixed term contract staff and an administrator. It collaborates with 24 researchers from the university, led by the Director of the MRC. The total team of about 30 is considered a good size for fundamental research. J-ICT refers to the Cambridge Laboratory as an ‘embedded’ laboratory. This involves the research group of JCL being physically located within the same building as MRC, the frequent sharing of research staff and information, and intimate co-operation in research. J-ICT considers the main advantage of an embedded laboratory to be the ability to share and influence the purpose and targets of research identified within MRC. Indeed, one of the main roles of JCL is to integrate the fundamental research conducted at the university with the strategic objectives of the company. As highlighted by the laboratory manager of JCL, the collaboration is not simply a case of ‘asking university people, please do this sort of research and we want to receive some results’. Rather, as researchers from JCL and MRC work together, it is possible to direct research towards the same goal, though this is not always effortless.

JCL is funded by the Central Research Laboratory in Japan. The subject areas and future direction of JCL are regularly discussed at an annual advisory committee meeting at Cambridge, involving people from J-ICT and the collaborating academics. The laboratory manager of JCL is a Japanese researcher from the Central R&D who acts as the key liaison person between J-ICT and JCL. He visits Japan at least twice a year to report on progress and decide the future objectives of JCL. J-ICT also makes intensive use of progress reviews and frequent written reports for monitoring the progress and research direction of JCL.

There are currently three collaborative projects, one of which has reached a stage whereby it is currently in development in collaboration with the Central Research Laboratory in Japan. This is one of the most publicized projects heralded as a breakthrough in semiconductor memory technology. The project started ten years ago at the initiation of JCL, with research on single electron devices...
lasting for seven years representing a cumulative learning period necessary to gain the expertise that formed the foundation of this invention. JCL regards its role in interfacing ‘the scientific’ with the ‘development’ world being critical for the innovation. The laboratory manager interviewed stressed the importance of having Japanese staff based in JCL to fulfil this important knowledge transfer function.

*The role of the Cambridge Laboratory in J-ICT’s global knowledge networks.* JCL plays a dual role in J-ICT’s global knowledge networks. The first is the making of scientific breakthroughs through collaboration with MRC, and the second, managing the transition from scientific to development work, in conjunction with the Central Research Laboratory in Japan. It appears that JCL is fulfilling the role of an ‘innovator’ as well as a ‘contributor’ simultaneously. The organizational learning capability of JCL is augmented by its ability to leverage the scientific expertise within MRC. The collaboration with MRC enables the company to collaborate with some of the most highly qualified researchers in the UK, and gain access to a vital source of human resources. JCL itself employs only seven permanent researchers but is able to collaborate with 20+ research staff of MRC. JCL also funds two research fellows and ten studentships. These students work on projects jointly devised and supervised by the academics and JCL. This further strengthens the links with the university and helps to promote knowledge exchange. The collaboration with MRC has also helped to boost the scientific reputation of J-ICT and widened its academic network through joint publications and conferences. It provides a platform for the company to take part in wider European collaborative projects. At the time of the interview, JCL had successfully completed an EU funded collaborative project on single electron devices.

The evidence thus far suggests that the JCL–MRC collaboration has been a success, both in terms of tangible outputs and its apparent strategic importance for J-ICT. Both the J-ICT management and researchers at Cambridge described the partnership as ‘stable and successful’. A number of factors might have contributed to this. Firstly, JCL has been able to embed itself within the university both physically and socially. It has established strong personal and social networks within the university and engaged in reciprocal knowledge sharing. A senior Cambridge researcher interviewed emphasized the importance of the ‘two way process’ and how JCL ‘brings in a lot of extra scientific expertise and knowledge to the university group’. Secondly, J-ICT has made large investments in its domestic R&D and established a strong scientific culture at its central laboratory at home. This facilitates scientific communication with the overseas researchers and the appropriation of scientific breakthroughs. Finally, the tight personnel linkages have also contributed to the integration of research at JCL with product innovation at home.

It is, however, worthy of note that JCL is relatively small. Its collaborative objectives and research focus have remained highly specific, and tightly connected with
the product innovation strategy at home. This indicates that the innovative capabilities may be limited or circumscribed, in that if it were more extensive it would be able to conduct a more varied spectrum of research and broaden its scope of knowledge search. It could be argued that JCL remains primarily a ‘strategic listening post’ rather than being developed into a distributed centre of excellence with its own distinctive capabilities and autonomy. The JCL-MRC collaboration is itself just one node within J-ICT’s global knowledge networks. J-ICT also participates in several other university collaborations within Europe, Japan and the USA. At the time of the study, these have not yet been fully integrated at the global level, with the Central Laboratory in Japan acting as the coordinating centre.

J-Pharma: The London Laboratory

Global R&D networks. J-Pharma is the fourth largest pharmaceutical company in Japan and was the tenth fastest growing company worldwide in 1999. Nevertheless, its annual turnover and R&D investment are quite small compared with the global giants. US-Pharma, for example, with a turnover of £8.8 billion was able to invest £1.7 billion in R&D in 1999 compared with J-Pharma’s R&D investment of £265 million. Originally founded in 1936, J-Pharma’s overseas operations were initiated in 1979 with the setting up of East Asia Regional Services in Singapore and J-Pharma USA was established in 1981. In 1982, J-Pharma’s basic research facilities became operational with the construction of Tsukuba Research Laboratory. It functions as the nucleus of drug development activities and employs around 400 research staff. Overseas R&D facilities were commenced through the establishment of J-Pharma Research Institute in Boston in 1989, and the initiation of J-Pharma’s London Research Laboratories in 1990. These together form the company’s tripolar research network, with the Tsukuba Laboratory acting as the focal link.

The London Research Laboratory: an experiment in dual-channel organizational learning. J-Pharma’s initial investment of £12 million to build and equip the London Research Laboratory (JLL henceforth) at University College London (UCL) was heralded as ‘the largest and the longest-term funding arrangement that any company has ever made with a university in the UK’ by the Committee of Vice Chancellors and Principals (FT, 1990). An eminent American cellular neurobiologist was appointed research director in 1992. Several academics at UCL were closely involved in the setting up of the laboratory and sat on its Advisory Board. JLL had a multinational research staff of 40, including some scientists seconded from the main research laboratories in Tsukuba, Japan. JLL’s initial focus was basic research in cell and molecular biology, aiming to discover novel ways of treating certain disorders of the central nervous system. For the first five years, JLL developed close links with the academics through consultancy, student projects and
other informal exchange activities. There was a strong expectation on the part of the academic community for JLL to be integrated into the university and engaged in reciprocal scientific exchanges.

The establishment of JLL represented an experiment in, what Methe and Penner-Hahn (1999) describe as, ‘dual-channel’ organizational learning in that J-Pharma perceived its weakness to lie in pharmaceutical discovery research, especially in biotechnology. Therefore, it was not only engaged in ‘single-loop’ learning in acquiring the scientific expertise in molecular biology. It also was engaged in ‘double-loop’ learning in attempting to acquire the organizational routines necessary for independent basic research. Thus, concern was placed both on the transfer of knowledge and also at gaining an understanding of the research process conducted at JLL. However, in 1997 there was a dramatic change in the research orientation of JLL. Its research focus was shifted from basic research to applied (drug discovery) research, and the American research director was replaced by a Japanese, an experienced drug development researcher from Tsukuba Laboratory. The shift in research focus and tightening of organizational control have had significant effects on JLL’s links with the university and its capacity for learning.

The shift from basic to applied research: a failure in organizational learning? JLL was initially conceived to focus on basic, curiosity driven research that may provide new drug candidates which would then be developed at the Tsukuba research laboratories in Japan. Initially the lab was given sufficient independence to carry out this mandate. However, after a few years without producing what was felt to be significant drug candidates it was reintegrated within the research activities of the Tsukuba laboratory. JLL currently collaborates on projects with the Tsukuba laboratory, whereby project team members concurrently conduct research on the same project. Tight control is maintained through project management and intensive two-way communication between the two labs via the internet and visits of researchers. The role of JLL appears to have shifted from being that of an ‘innovator’ in the global R&D network to a ‘contributor’ within the product development system at home.

The reason given for this dramatic change of research orientation and management, according to the interviews with J-Pharma, was that following three or four years of investment, no new drug candidates had been discovered. It was stated in the interviews that the president of J-Pharma became impatient for some return on the investment made. However, this expectation and the subsequent change of direction seem remarkable given the fact that J-Pharma’s president had stated that the aim of JLL ‘is to produce good medicines for the central nervous system. It will take at least five to six years – and in many cases more than 10 years – to reach that stage’ (FT, 1990). It can be argued that the change in research orientation partly reflects the ‘failure’ of J-Pharma to gain an understanding of the
research process conducted at JLL and hence to evaluate its research progress appropriately. The tangible output of drug candidates used to evaluate the achievements of JLL may not be a sufficient measure of the success of the collaboration. The academic at UCL responsible for the initial set up of JLL repeatedly pointed out in the interview that ‘there were some very serious misunderstandings’ about the nature of doing basic research and the role expected of JLL:

... the real problem was this misunderstanding about direction from the beginning. Their claim was they had always had the same thing in mind, they wanted to see drugs on line in three to five years and that was not on the table in the early years.

The dramatic shift in the research direction of JLL also reflects the wider change in the strategic focus of the company. After the mid-1990s, J-Pharma concentrated its resources on a number of strategic therapeutic areas, with the research in neurology conducted at JLL being the most important one. Tsukuba Laboratory has taken the lead in the development of new drugs in this field. Indeed, the change of research director at JLL, from an American academic scientist to a Japanese researcher with drug development experience, can be considered as an attempt to harness and exploit the research conducted at JLL. A related factor arose from the need to achieve tighter organizational control. It was considered by head office that the foreign research director sought too much independence and could not be held accountable for the direction of research. Following the appointment of a Japanese research director, JLL became more integrated within J-Pharma. The Japanese director considered his task to be to ‘integrate and bridge’ basic and applied research, and to ‘educate’ the local researchers on drug development.

The dramatic change in research direction resulted in very high staff turnover, with half of the research staff leaving, and the subsequent alienation of numerous academics and cessation of substantial links with UCL. There is now little formal collaboration between JLL and the university. Informal contacts and personnel exchanges also appear to be minimal. One of the key academics initially active in the links claimed that JLL is now ‘a non-entity to the university’. He described the change in research direction as ‘an enormous disappointment’, and reckoned that ‘none of the really good basic research at the university will ever find its way through the doors of J-Pharma’. This is because the community of academic scientists on campus no longer felt that they were connected. This raises questions about its long-term ability to build academic links and tap into the wider knowledge networks. J-Pharma itself has also expressed doubts about the value on return for the investment in JLL and its long-term viability.

The collaboration between J-Pharma and UCL has not been considered a success by both parties concerned. J-Pharma has not been able to sustain its initial
effort in dual channel organizational learning, and has failed to establish close ties with the local academic community. The company was unable initially to coordinate the research conducted at JLL owing to its independence, and hence took strong measures to integrate JLL within its domestic research facilities. This alienated the local researchers and academics and weakened JLL’s ability to tap into the local knowledge networks. The experience of JLL demonstrates the tension of adaptation and integration of this dispersed centre of learning within J-Pharma’s global knowledge network. The apparent lack of success of JLL also reflects a deeper problem in organizational learning facing the company. Although J-Pharma is one of the most research intensive Japanese pharmaceutical companies, its R&D investment remains very small. The company’s traditional weakness in basic research and its strong reliance on a cohesive product development system means that it might not have developed the necessary organizational routines to recognize the value and harness the outputs of basic research conducted abroad. The ‘misunderstandings’ between the company and the university highlighted in the case study are symptomatic of the communication distance between them. Evidence elsewhere suggests that the organizational learning difficulties experienced by J-Pharma is a common problem for firms in the Japanese pharmaceutical industry (Chikudate, 1999; Roehl et al., 1995).

A COMPARATIVE ANALYSIS OF THE CASES

The case studies reveal some fundamental differences between the US and Japanese MNEs in the ways they manage their global R&D networks and seek to tap geographically dispersed scientific knowledge and expertise. To start with, the mode of coordination and integration of overseas R&D units differs significantly between firms from the two countries. The US MNEs have sought to develop globally integrated networks of R&D coordinated by project management. The local R&D facilities were granted a considerable degree of autonomy to generate links with the local academic institutions and research communities, while both the Japanese MNEs were characterized by a more centralized R&D structure in which intensive use was made of communication and Japanese nationals to integrate the overseas facilities into the product development systems at home. Their international R&D organization displays the characteristic features of a ‘hub model’ in which the central R&D at home maintains strong technological leadership and exerts tight control over the decentralized R&D units overseas.

Empirical evidence based on other studies also supports these observations. For example, the study by Gassman and von Zedwitz (1999), based upon a sample of 33 technology-based MNEs, shows that most of the Japanese companies adopted the ‘hub model’, and the majority of the cases characterized by an integrated R&D network were either of American or European origins. Chiesa (1999) describes the management control style in Japanese global R&D as ‘participative centralization’
where the managers and key technical people are Japanese and technology planning remains with the central labs. This is in stark contrast with the ‘coordinated autonomy’ management style which appear to be more commonly found among the US and European firms.

The case studies also show a significant contrast between the US and Japanese firms in their patterns of interaction with local universities. In the case of the US MNEs, it appears that the main motives behind the establishment of overseas basic research and academic links are founded on the desire to tap globally dispersed scientific labour pools and to augment the basic research capability that previously existed within corporate R&D. Both the companies studied have sought to extend their knowledge networks to academic institutions in a fluid and expanded way through research collaboration, personnel exchanges, participation in education and training programmes and recruitment of students. Indeed, the sourcing of scientific human capital and recruitment of students are the primary objectives in their development of ‘strategic partnerships’ with universities.

In contrast, the Japanese MNEs have not developed this type of broad-based university relationships and human resource strategies. The Japanese R&D facilities established at the universities are relatively small and engaged in rather focused research activities. They are established primarily for the acquisition of specialized expertise, and also helping the Japanese firms to develop new organizational routines in basic research. This is especially important for J-Pharma. This reflects a distinctive mode of R&D globalization among Japanese firms generally whereby overseas academic collaboration is used to compensate for the weakness of basic research at home. Both the facilities are located on-campus and they enable the Japanese firms to gain access to local academic expertise through research collaboration. However, the recruitment of local scientific personnel does not appear to be a key motive behind the collaboration.

Using Santoro and Charkrabati’s typology (2001) of industry–university relationships, one could argue that the US MNEs are acting more as ‘collegial players’ in that they seek to establish long-term ‘strategic partnerships’ with key academic institutions forging multi-dimensional and trusting relationships through personnel exchanges and recruitment. This has enabled them to build strong social networks and personnel linkages with the local academic community, enhancing their ability to tap into the local knowledge sources. Conversely, the Japanese MNEs appear to act more as ‘aggressive’ or ‘targeted players’ in that they seek more tangible research outcomes and are more restricted in their attempts to access local knowledge networks.

Another striking contrast between the MNEs from the two countries concerns the role of human resource strategy in global coordination and local knowledge sourcing. The US firms have placed a strong emphasis on developing a global human resource system and international project teams to coordinate the decentralized R&D networks. There are exchanges of scientific staff among the differ-
ent R&D units and recruitment is also carried out on a global basis. Another important aim of their human resource strategy is to support integration within the local external networks through recruitment and personnel exchanges with their academic partners. It could be argued that the US MNEs have sought to develop a human resource system at the global level, and also to extend this to the local academic institutions in order to create a global scientific network for knowledge sourcing.

The human resource strategy of the Japanese MNEs, by contrast, focuses predominantly on internal integration and knowledge transfer between the R&D centre at home and the overseas units. The key actors are the Japanese expatriate managers and researchers whose main role is to monitor local progress and appropriate knowledge acquired from the local units. The human resource systems of the Japanese firms remain ethnocentric with limited extension of the home-based internal labour market to the global arena. The price they pay for this strong internal focus is that they lose an important aspect of knowledge sourcing through linkages with local labour markets and personnel exchanges.

The implication of the above differences is that the US MNEs have been able to embed themselves to a greater extent within the local innovation networks. The Japanese MNEs, however, appear to be more limited in the scope of their knowledge sourcing and the ability to tap into the wider knowledge networks. The main results of the case studies are summarized in Table III.

The differences between the US and Japanese MNEs observed in the study reflect the contrasting logics of the ‘professional community’ and the ‘organizational community’ models of learning and innovation playing out in the global arena (Lam, 2000, 2002). In the case of the US firms, the professional model allows firms a much greater flexibility to extend their human resources and learning systems across institutional and geographical boundaries. Moreover, US firms have

<table>
<thead>
<tr>
<th>US MNEs</th>
<th>Japanese MNEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home-based model of learning and innovation</td>
<td>Professional community model</td>
</tr>
<tr>
<td>International R&amp;D organization</td>
<td>Integrated R&amp;D networks</td>
</tr>
<tr>
<td>Nature of relationships with local universities</td>
<td>Collegial players</td>
</tr>
<tr>
<td>Human resource strategy</td>
<td>Recruitment of local scientific personnel important</td>
</tr>
<tr>
<td>Degree of embeddedness in local innovation systems</td>
<td>High</td>
</tr>
</tbody>
</table>
historically established strong institutional links with academia leading to a greater degree of human resource mobility between the two sectors, and the formation of research networks within a global scientific space (Mahroum, 2000). In contrast, the Japanese organizational community model, characterized by a strong firm-based human resource system and internal organizational proximity, appears to have inhibited the ability of firms to create a transnational learning space through extended professional networks.

It could be argued that US firms in general enjoy a ‘comparative institutional advantage’ in developing transnational learning spaces to broaden the scope of their knowledge exploration. This advantage is reinforced when they locate their R&D units in an environment where labour market institutions and systems of higher education are congruent with those at home. Both the US and UK employment systems are organized around liberal market institutions conducive to horizontal labour mobility and external learning. The two countries also share a similar background of having a strong higher education sector and research base. This institutional proximity appears to have facilitated the transfer of home-based learning and human resource practices, and led to a higher degree of local embeddedness of the US firms. The Japanese firms, on the other hand, appear to be more limited in the scope of their transnational learning because of the constraints imposed by their home-based institutions. The divergence between the UK institutions and the Japanese MNEs’ domestic ones may also have created a bigger barrier to learning. While the nature and boundary of firms’ ‘transnational learning spaces’ are heavily influenced by their home-based institutions, the dynamics of the interaction between home-based and local institutions are also relevant.

Another factor to be taken into account is the relative strength of different sectors in national innovation systems and how this affects firms’ globalization strategies and learning patterns. This is especially significant in the case of Japan where there are substantial differences between the ICT and pharmaceutical industries in terms of their domestic R&D capabilities and global competitiveness (Kitschelt, 1991; Odagiri and Goto, 1996). The Japanese ICT and electronics industry has been able to maintain a large domestic R&D capability and sustain their global competitiveness over the past three decades. They developed their overseas capabilities only reluctantly in recent years. Indeed, their overseas basic research laboratories were established primarily to act as strategic listening posts.

Conversely, the Japanese pharmaceutical industry is younger, firms are much smaller in size and have less well-developed domestic R&D capacity. Until recently, Japanese pharmaceutical companies did not receive the level of government backing enjoyed by the ICT sector. There had been a significant historical underinvestment in R&D in the pharmaceutical sector. Since a firm’s absorptive capacity is a function of its level of prior related knowledge and those with greater
capacity in internal R&D are also able to contribute more to a collaboration as well as learn more extensively from it (Cohen and Levinthal, 1990; Powell et al., 1996), it could be argued that J-ICT’s relative domestic strength in R&D has enabled it to have the absorptive capacity to appropriate the scientific discoveries made in their overseas units, and also to engage in more effective learning. By contrast, J-Pharma may not possess the necessary ‘absorptive capacity’ to benefit from the knowledge gained from their overseas research facilities without significant augmentation of domestic research capabilities. Such sector differences appear to be less evident in the case of the US firms.

CONCLUSIONS

This study examines the ways in which US and Japanese MNEs develop their transnational social spaces for learning through their global R&D networks and links with foreign academic institutions. The evidence presented in the paper generally supports the ‘social embeddedness thesis’ of the institutional perspective, namely, home-based institutions provide the basis for the development of MNEs’ transnational social spaces, and thus their strategic behaviour and organizational forms will continue to diverge.

Three further points are worthy of attention. The first is that the concept of ‘transnational social space’ needs to be broadened to incorporate the external, local networks of firms. Morgan’s (2001) and Whitley’s (1999, 2001) analysis of the ‘transnational social space’ of MNEs focuses narrowly on the internal governance structures and the application of firms’ existing competencies. It neglects the external dimension of firms’ transnational social space and puts too little emphasis on the dynamics of organizational learning within MNEs. My analysis suggests that external networks and the local embeddedness of the subsidiary R&D units are critical to organizational learning and innovation within MNEs. The innovative behaviour of MNEs cannot be fully understood without taking into account how national institutions shape their transnational learning spaces encompassing the internal as well as external networks.

The second point concerns the notion of ‘social embeddedness’, and the need to take into consideration the role of host country institutions as part of the social context within which the learning activities of MNEs are embedded. The conventional institutional approach has tended to predict the strategic behaviour and structure of MNEs on the basis of their national origins alone. This study suggests that the dynamics of interaction between home-based institutions and the local context may also be relevant. A growing body of work attests that learning is essentially a social and interactive process rooted in spatial and relational proximity (Gertler et al., 2000; Lundvall, 1992; Porter, 1998; Saxenian, 1994). MNEs are attracted to places rich in knowledge sources and technological capabilities in order to exploit the innovative richness arising from the social dynamics of local learning (Gertler,
Institutional proximity between the home and host country environment may lead to a greater ease in local learning and knowledge transfer. A revised ‘social embeddedness’ thesis should be flexible enough to accommodate a role for the local, host country context in providing a more adequate explanatory framework for understanding organizational learning and innovation within MNEs.

A final point to note is that the emphasis on national institutional logic underlying the innovative behaviour of MNEs does not imply national uniformity and the absence of sectoral variation. Countries with different institutional arrangements develop and reproduce varied systems of economic organization with different social and innovative capabilities in particular industries and sectors. Globalization of innovation may indeed reinforce, and not dismantle nationally distinctive patterns of innovation (Cantwell, 1995). The study presented in this paper has illustrated the social dynamics underpinning this process. Future research should examine in greater detail whether the differences in the global R&D organization and learning activities of MNEs support their differing innovation trajectories.

NOTES

*The research on which this paper is based is part of a multi-country study funded by the European Commission, DGXII, TSER Programme SOE1-CT97-1054. The author would like to thank the editors of this special issue and the two anonymous referees for their valuable comments on an earlier draft. The research assistance of Andy Nicolaides is gratefully acknowledged.

REFERENCES


© Blackwell Publishing Ltd 2003


© Blackwell Publishing Ltd 2003


© Blackwell Publishing Ltd 2003