Transnational learning structures in multinational firms: Organizational context and national embeddedness

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Abstract

The role of national institutional context is often overlooked in analyses of learning behaviour in multinational organizations. Drawing on arguments from institutional theory and learning theory we consider the organizational contingencies, and the institutional context in which these are embedded, in explaining the use of structures to support learning across national borders. It is hypothesized that country of origin effects on subsidiary learning structures are mediated by two organizational contingencies, namely transnational human resource management governance structures and subsidiary global research and development expertise. To test this, structural equation modelling is used on a dataset of 292 foreign (including Japanese, US, French, German, Nordic) and home-owned subsidiaries operating in the UK. The results confirmed the hypothesized institutional effects. The evidence suggests that understanding the interaction between

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institutional and firm-level context is important in providing a fuller explanation of the types of learning structures subsidiaries are likely to engage with.

Keywords
human resource management, institutional theory, international management, knowledge diffusion, learning, multinationals

Introduction

Multinationals are conceived of as complex organizational networks where knowledge of strategic value is geographically dispersed (Bartlett & Ghoshal, 1989; Gupta & Govindarajan, 2000; Kogut & Zander, 1993). A multinational's ability to tap into these knowledge resources with speed and utilize them on a global scale for local responsiveness, global integration and global learning is seen as a key source of competitive advantage (Bartlett & Ghoshal, 1989). Learning structures that support social interaction across national borders raise important questions regarding learning in multinational contexts. The learning literature emphasizes the criticality of social interaction to organizational learning derived from the sensemaking process (Nonaka & Takeuchi, 1995; Teece, 2001). International management writers focus on the role of social interaction in the globalization process arising from the identification, sharing or creation of knowledge that contributes to global learning or global integration (Bartlett & Ghoshal, 1989; Taylor, 2006). One area overlooked is the role of institutional context in shaping learning behaviour in multinationals. The national business systems (NBS) and more specialized national innovation systems (NIS) literatures demonstrate how institutional structures shape learning in firms at home which can resonate when multinationals move operations abroad (Almond & Ferner, 2006; Doremus et al., 1999; Ferner & Varul, 2000; Lam, 2003; Patel & Pavitt, 1991, 1997; Pavitt, 1999). The influence of context, specifically organizational contingencies and the institutional environment in which these are embedded, on learning structures spanning national boundaries is the focus of this article.

This article contributes to the learning literature by considering the relevance of institutional embeddeness in the use of structures to support learning. The article also contributes to institutional arguments by applying insights from the learning literature to expand explanations of how institutional forces interact with learning processes. Few studies have developed these arguments by bringing together the learning and institutional literatures (Lundvall, 1999). There are also empirical gaps. Many of the NIS researchers have used patents or research and development (R&D) investment figures as proxies of subsidiary learning behaviour. This has been beneficial in exploring trends in subsidiary behaviour across MNC country of origin or country of operation, but less fruitful in explicating organizational-level influences or subsidiary structures involved in the learning process. Also, patents can conflate an outcome with a process, and as only some types of knowledge are patentable it is a limited proxy for learning. On the other hand, the case study tradition among the European NBS researchers (e.g. Almond & Ferner, 2006; Kristensen & Zeitlin, 2005) has provided depth in our understanding of organizational structures and processes, but generalization has proved difficult. Survey evidence from European MNCs is particularly lacking.

We define transnational social learning structures (TSLS) as a set of cross-national intra-organizational structures based on social interaction that support learning associated with the development and diffusion of global policies, organizational competencies and culture, and best practice and know-how. We argue that a subsidiary's use of transnational learning structures is a product of the parent's country of origin and that this influence is exerted through distinct preferences for governing human resources internationally and organizing global R&D, which can be explained by reference to national institutional systems. To test this, a survey of organizational practices among French, German, Nordic, UK and other European subsidiaries compared with Japanese and US firms operating in the UK is analysed.

Organizational learning and transnational social learning structures

Organizational learning is a dynamic process whereby individual knowledge moves through different levels, from individual to group and organizational, and back again (Huber, 1991). Social interaction is an important element of organizational learning in that it supports the transfer and integration of knowledge through discussion and dialogue among individuals (Brown & Duguid, 1991) and groups (Hult & Ferrell, 1997; Kang et al., 2007). Through social learning structures knowledge can be moved from the individual to collective and captured within the organizations' processes, competencies or culture making it accessible to organizational members for utilization in different settings (Huber, 1991). In the multinational setting, evidence shows that transnational social learning structures such as transnational project teams (Zárraga & Bonache, 2003), international assignments (Wong, 2005), committee or governance groups (Asakawa & Lehrer, 2003) and personal networks (Au & Fakuda, 2002) are an important means through which knowledge can be captured, made sense of and diffused.

Social interaction facilitates the diffusion of explicit knowledge (Zander & Kogut, 1995), but also the creation and diffusion of tacit knowledge (Nonaka, 1994; Nonaka & Takeuchi, 1995). In MNCs, the geographical dispersion of actors in the learning process means the business and social norms and assumptions in which the learning takes place are heterogeneous. Failure to address this can interfere with successful organizational learning (Wong, 2005). Social interaction through transnational learning structures can overcome some of the barriers to learning that can arise because of the opportunity it affords for information interpretation (Ernst & Kim, 2002; Nonaka & Takeuchi, 1995).

Transnational social learning structures (TSLS) and the nature of knowledge

The way in which TSLS uncover and share knowledge can be linked to the fourfold classification of tacit knowledge developed by Collins (1993) and extended by Blackler (1995). In this classification 'embodied knowledge' is reflected in the skills of an individual, developed through action, for example, project work. Zuboff (1988) argues that such knowledge is dependent on physical cues, is context specific and requires

face-to-face dialogue. 'Embrained knowledge' is reflected in the cognitive abilities of an individual. One way of tapping into such individual knowledge is through social interaction among knowledge holders. In this way tacit knowledge can be shared to create new knowledge (Senge, 1990). In contrast tacit 'embedded knowledge' can exist at the organizational level reflected in routinized organizational processes such as how employee performance is managed. Through this routinization the past lessons learnt are made accessible to organizational members (Levitt & March, 1988). However, in international organizations the interpretation and application of this knowledge can vary, despite the desire for global standardization (Teece, 2001). Project groups and committee structures that function through face-to-face communication provide an opportunity for different national interpretations to be revealed and considered within the context of globalization priorities (Tregaskis et al., 2005). 'Encultured knowledge' is similarly tacit organizational-level knowledge, but reflected in the assumptions, beliefs and norms underpinning practice. In the multinational context the potential for variation in encultured knowledge across different national settings is high. Socialization is an important mechanism for surfacing norms and assumptions to facilitate shared understandings (Senge, 1990), while dialogue enhances the effectiveness of problem solving by revealing divergent assumptions held by organizational members (Brown & Duguid, 1991).

However, Blackler (1995) argues that knowledge cannot be easily segmented into discrete packages as the classification above suggests. Instead, knowledge is multifaceted and there are important relationships between the different types of knowledge. Social interaction becomes the focus for the process of knowing (Blackler, 1995; Nonaka, 1994). Thus, within any one form of transnational social interaction multiple types of tacit knowledge are likely to be relevant.

Transnational social learning structures (TSLS) and globalization

In multinationals a prime reason for interest in organizational learning is the contribution to globalization, that is, global integration, local sensitivity and global learning. Here we consider the form that transnational learning structures take and their effect on globalization priorities. For example, the expatriate assignment in multinationals is seen as an important means of identifying new knowledge and transferring tacit knowledge (Bonache & Brewster, 2001; Cerdin, 2003). Parent country expatriates play a significant role as the 'parent company's organizational translators' whereby they interpret and disseminate parent knowledge to overseas' operations (Cerdin, 2003; Wong, 2005). Expatriates integrate the parent and overseas operations through the sharing of common management frameworks relating to how employees are, for example, developed or performance is managed (Sparrow et al., 2004).

Project group structures are recognized as a means of bringing employees together to interpret information, share ideas and generate new knowledge (Lei et al., 1999). In multinationals, international project groups and governance structures (e.g. international committees) are significant in using members' knowledge about the national or business context and subject specific expertise to aid knowledge diffusion and innovation (Snow et al., 1996), the capture and sharing of best practice (Tregaskis et al., 2005), and development or implementation of global policies (Almond & Ferner, 2006). There has been

a considerable amount of work looking at cross-functional groups as an important learning mechanism for bringing together knowledge from diverse environments (Nonaka, 1994; Nonaka & Takeuchi, 1995). Global learning project structures, similarly, provide an important social context for making sense of diverse knowledge bases.

Informal networks also have an important role in knowledge transfer in multinationals, helping to support not only the identification of expertise within a distributed network, but also political issues associated with subsidiaries giving up knowledge or accepting new knowledge (Tregaskis et al., 2005). Expatriates, for example, through their training and assignments develop a wide array of relationships with actors internal and external to the organization (e.g. customers, suppliers). Through these social networks the expatriate is able to access and transfer knowledge that might otherwise be missed by the organization or be time consuming to identify (Au & Fakuda, 2002). The expatriate builds up the connections for accessing the embedded and encultured knowledge specific to these groups (Nohria & Ghoshal, 1997: 158). Such networks also build social capital among network members. Burt (1992: 62) explains one function of social capital in terms of 'an army of people processing information who can call your attention to key bits'. Informal social networks are a valuable learning resource that can mitigate the risks and costs associated with information scanning and accessing community based knowledge. Expatriates are not the only group of employees to develop social networks. In MNCs training opportunities for managers are concerned with facilitating internal professional networks as much as developing managerial competencies (Taylor, 2006). In functional areas such as manufacturing, or R&D, job rotation or staff exchanges are used to transfer embedded knowledge about manufacturing processes or technology applications (Ernst & Kim, 2002). A by-product of these formal structures is often the establishment of informal personal relationships that can be drawn upon for problem-solving (Tregaskis, 2003).

In sum, we have argued that TSLS are important to organizational learning because they use social interaction as a means of identifying, interpreting and diffusing knowledge across national contexts. The learning structures of particular relevance in the context of the MNC are international: project groups, committees, assignments and informal networks. These structures contribute to global learning outcomes in relation to, for example, the development and diffusion of global policies, global organizational competencies, a shared global culture, the capture and sharing of global best practice, or the collaborative generation of new know-how. The extent to which subsidiary members have the opportunity to engage in these national boundary-spanning activities provides insights into the potential contribution of local subsidiaries to global learning.

Transnational social learning structures (TSLS) and context

Whilst it has been argued that learning is strategically important, the ways in which this is realized and the structures adopted by firms are bound up with a range of contextual factors. We argue that three contextual issues particularly salient to the use of TSLS are: a) a subsidiary's perceived global R&D expertise; b) the multinational's transnational human resource management (HRM) governance structures; c) the country of origin of the subsidiary's parent. We argue that the effects of country of origin on use of TSLS are mediated by HRM governance structures and the subsidiary's reported global R&D competence.

Global R&D expertise

Centralizing knowledge for global competition without compromising the ability to capture or leverage local knowledge is the challenge that has seen many multinationals move toward strategically differentiated roles for subsidiaries (Birkinshaw & Morrison, 1995). R&D knowledge in particular is seen as a strategic resource and therefore there is a strong desire by the parent to control and utilize this for global purposes. One way of achieving this is through the establishment of transnational structures for identifying and diffusing R&D expertise generated outside the home country. At the same time the empirical evidence suggests subsidiaries can have a strategic role to play in both the creation and diffusion of strategically important knowledge. For example, studies on MNC centres of excellence by Frost et al. (2002) and Holm and Pedersen (2000) identified subsidiaries that undertook a role that they defined in terms of organizational units with capabilities recognized as valuable by the MNC and which were intentionally exploited and/or shared with other parts of the company. In instances where a local site has a recognized strategic capability it is not only in the interests of the parent to control this, but also in the interest of the subsidiary to ensure other parts of the business become dependent on their knowledge. This they can achieve through engaging in cross-national forums that promote adoption of new processes or products, train other parts of the business in the applications of these, and access customer information to ensure products and processes meet demand (Frost et al., 2002). Transnational structures that enable a subsidiary's employees to interact with other parts of the business can be critical to its resource accumulation or its ability to retain or gain a global mandate and a more central role in the MNC network. TSLS are particularly appropriate in international R&D contexts where the transfer or adoption of knowledge must also be managed politically (Mudambi & Navarra, 2004). Equally, the R&D environment relies on local tacit knowledge that will need to be interpreted and integrated for application on a global scale (Lam, 2003). Socially based interaction structures are particularly pertinent here as they can prove much more powerful than relying on information management systems and standard operating procedures alone (Teece, 2001). Thus, it is argued that where subsidiaries are a site of global R&D expertise, the use of learning structures is driven both by the parent's desire to control a global resource and by the subsidiary's interest in retaining its position as a site of global expertise. We would therefore anticipate that where a subsidiary has global R&D expertise it will be more likely to engage with TSLS. We therefore propose:

> *Hypothesis 1*: The extent to which a subsidiary is a site of global R&D expertise will impact positively on the use of TSLS by the subsidiary.

Transnational HRM governance

Transnational HRM structures are an important mechanism for integrating knowledge relating to how employees are organized, managed and developed across national borders (Beechler et al., 1999). Recent work has explored the impact of variation in HRM structures on global integration and the extent to which HRM knowledge is developed collaboratively, standardized or localized (Taylor, 2006; Wächter et al., 2006). One structure in

particular has gained pace in the area of knowledge diffusion and integration, namely HRM network structures (Sparrow et al., 2004; Taylor, 2006; Tregaskis et al., 2005). Because networks create social structures with a relational context, through for example task forces or committees and personnel exchanges, they can facilitate learning (Nahapiet & Ghoshal, 1998). Taylor (2006) suggests the HRM function has an important role to play through the design of HRM systems and policies supporting the creation and sharing of knowledge across national borders. Network structures are important in the coordination and control of resources in MNCs to enhance the pace of learning (Inkpen & Tsang, 2005). Snell et al. (1998) found that where the HRM function in the multinational saw itself as a transnational HRM team and undertook development to function as a transnational team it was in a better position to then support transnational R&D and marketing functions. It could therefore be argued that where transnational HRM governance structures in the form of international HRM networks are adopted they provide an HRM architecture that supports international learning across subsidiaries: We hypothesize:

Hypothesis 2: The use of formal international HRM networks will impact positively on the use of TSLS by subsidiaries.

A second organizing mechanism is the presence of a formal global policy on organizational learning. Global HRM policies can be used to co-ordinate scarce or valuable labour resources on an international level, for example, expatriate policy or succession planning for high potential employees. Global policy might have a role to play in coordinating learning structures that encourage knowledge diffusion or the collaborative development of knowledge across international borders. There is evidence that subsidiaries develop knowledge as a competitive resource, which can have negative consequences for its transfer and the development of global competitive competencies (Mudambi & Navarra, 2004). Global policy on organizational learning might be used by multinationals to attempt to circumvent such opportunistic behaviour and control knowledge as a strategic resource. Thus, global HRM policies signal the activities the parent sees as legitimate within subsidiaries (Tregaskis, 2003). We might expect that if an MNC adopts a global policy on organizational learning this will support the use of transnational learning structures at subsidiary level.

Hypothesis 3: The use of a global policy on organizational learning will impact positively on the use of TSLS by the subsidiary.

Mediated effects of country of origin

Here we argue that the use of TSLS is shaped by the national origin of the MNC, mediated by the location of global R&D expertise and transnational HRM governance. The national business systems (NBS) and the national innovation systems (NIS) literatures provide insights into how national institutional forces shape labour market skill systems and technological specialization in the home country with consequences for how operations overseas are managed and the role of international learning in the MNC. The evidence suggests first, some particularly strong contrasts between US firms on the one hand and European

and Japanese firms on the other. Second, in some areas of practice German firms might be distinct from other European firms. These contrasts form the foci here.

Doremus et al. (1999), anticipating the 'varieties of capitalism' literature (Hall & Soskice, 2001) detailed how the home country shaped MNC approaches to innovation, encouraging national technological specialization, which we argue has important consequences for international learning. The approach to innovation in Japan and Germany contrasts starkly with the US, UK and a number of other European countries in that there is a focus on medium technology, incremental innovation through internal resources, inward looking labour markets and, in the case of Japanese companies, an emphasis on buying technology from overseas (Methé, 1995). US and UK firms are typified more by a focus on radical innovation and external labour use to support the influx of new ideas. This is consistent with distinctions between liberal market economy (LME) (e.g. US and UK) and co-ordinated market economy (CME) (e.g. Germany, Japan) (Hall & Soskice, 2001). German firms, in particular, have been identified for their adoption of high-skilled niche product strategies that are highly dependent on home labour market skills and knowledge. One consequence of this has been limited internationalization concentrated in certain sectors, for example, engineering or chemicals (Streeck, 1992). Late and limited globalization might also impact on the extent and nature of international organizing structures in German MNCs. Case study evidence on German MNCs indicates that personal or network controls, which are more likely to support TSLS, are much less in evidence (Tregaskis et al., 2005). More generally, there is evidence that MNCs tend to invest less in R&D abroad, retaining strong control and significant investment at home (Doremus et al., 1999). Resistance to R&D globalization has been linked to the tacit and interdisciplinary nature of knowledge underpinning R&D innovation, making it highly dependent on person-to-person interaction (Patel & Pavitt, 1997). Therefore, R&D globalization would place greater demand on MNCs to adopt organizational structures that supported transnational learning.

Lam (2003) found country of origin effects on different models of R&D globalization. She explained these differences in terms of variation in internal and external labour market utilization by Japanese and US firms, which also impacted on MNCs ability to co-ordinate dispersed knowledge and exploit local innovation networks. Japanese companies were more likely to adopt a 'hub' model where R&D is dispersed geographically, but overseas operations support the adoption of centralized technologies. Expatriates play an important role in diffusing parent knowledge or acquiring local process innovation. There is a strong emphasis on firm-specific internal labour markets with high job rotation within the firm. The separation between academia and industry within the Japanese approach reinforces this inward looking learning process. There is a marked absence of the horizontal movement of personnel across the geographically dispersed units of the MNC; career structures do not support such transfer, nor does the international business structure demand it. Lam describes these as elements of an 'organizational community model' of learning and innovation where organizational systems are internally focused and collaboration with local innovation systems is limited. In contrast, US MNCs tend to adopt globally integrated R&D networks whereby R&D is decentralized through centres of excellence located in a number of host countries with the remit to develop capability in certain areas and diffuse these across regional or global communities. The collaboration between industry and academia, a strong institution in the US, is encouraged in

overseas operations and provides a route through which local subsidiaries can embed with local innovation systems. Mobile and open professional labour markets provide a pool of expertise that the MNC can tap into. In this way the international labour market of the MNC becomes an important strategic knowledge resource. Human resource systems that support the horizontal transfer of personnel across the MNC, collaborative transnational work through international project teams and co-ordination of knowledge through international project structures are more common. These are characteristics of what Lam refers to as a 'professional community model' of learning and innovation where collaboration extends across national and organizational boundaries.

There is a strong body of work examining human resource control structures adopted by US MNCs (Almond & Ferner, 2006; Gooderham et al., 2006). This work argues that US MNCs are distinctive in the desire to control subsidiary activity, which they achieve through centralization, policy formalization and social controls (Harzing, 1999). This is often in contrast to both Japanese and European approaches where policy tends not to be so formalized or centralized (Ferner et al., 2004). Almond and Ferner (2006) explain the desire for control in US MNCs in terms of two specific features of the American business system: dominance effects (Smith & Meiksins, 1995), whereby the dominant position of the American economy globally reinforces the transfer of organizing structures from the home country to overseas subsidiaries; and the development of 'technology' to effectively manage subsidiaries through centralization. This technology combines structures that reinforce centralization with mechanisms for diffusing knowledge in a negotiated way, that is, mechanisms that allow social dialogue so that the subsidiary has a voice to varying degrees in the knowledge that is shared or created. We might then expect US MNCs to use organizational policies as a key HRM governance structure exerting central control over subsidiary learning behaviour together with HRM network structures that are part of the technology of control. This would in turn lead to a much greater use of TSLS.

The hypotheses: Mediated country of origin effects

The evidence suggests country of origin differences in firm-level learning behaviour. The presence of global R&D expertise in subsidiaries encourages international learning structures as a means of capturing the global benefits of subsidiary R&D activity. The extent to which global R&D expertise is decentralized to subsidiaries is limited by whether the MNC is home- or overseas-owned and by the country of origin of the overseas firm: UK (home)-owned MNCs might be more likely to give their UK operations global R&D responsibilities to retain control in the home country, compared with overseas-owned subsidiaries operating in the UK; US firms might be more likely to give their overseas firm global R&D responsibilities compared with German or Japanese firms because of their divergent approach to R&D globalization. The country of origin affects would therefore impact on the use of TSLS as follows:

Hypothesis 4a: Global R&D expertise in the subsidiary is more likely to mediate country of origin effects on the use of TSLS for home-owned (UK) MNCs than overseas-owned MNCs.

Hypothesis 4b: Global R&D expertise in the subsidiary is more likely to mediate country of origin effects on the use of TSLS for US firms compared to other overseas-owned firms.

In terms of transnational HRM governance structures the evidence suggests that US firms might be more likely to adopt these than either Japanese or European firms (Ferner & Almond, 2006; Lam, 2003). The institutions in the US home country arguably foster professionally oriented models of learning and innovation in MNCs. These are characterized by the greater use of transnational co-ordination structures to manage learning globally, for example, through the diffusion of human resource systems that encourages horizontal international transfers, career structures, project working and professional networks. Thus, transnational governance structures, in the form of a formal international HRM network or HRM policy on global learning, could be anticipated as a key explanation of US distinctiveness. Also, transnational governance structures might be more dominant in US firms while their adoption in Japanese and European firms is variable. Specifically, the traditions associated with the transfer of personnel and structure of international operations in German (Tregaskis et al., 2005) and Japanese companies (Delios & Björkman, 2000) suggest that the subsequent use of international networks, compared with US firms, is likely to be significantly lower. However, transnational HRM policy is a governance structure more closely associated with US firms than either European companies (including German firms), or Japanese firms. Thus, in this instance we would not expect German firms to be atypical to other European firms. Thus we hypothesize:

Hypothesis 5: Transnational HRM governance via international HRM networks will be a significant positive mediator of country of origin effects on use of TSLS for US firms compared to Japanese or German firms.

Hypothesis 6: Corporate HRM governance via a global organizational learning policy will be a significant positive mediator of country of origin effects on TSLS for US firms compared to European and Japanese firms.

The relationships hypothesized are shown in Figure 1.

Data and method

Data

The survey data are the result of a multi-stage project involving the construction of a sampling frame of home- and foreign-owned multinationals operating in the UK, a pilot and screening stage and a face-to-face CAPI (Computer Assisted Personal Interview) administered questionnaire. The gaps and biases in off-the-shelf databases (see Collinson & Rugman, 2005; McDonnell et al., 2007) that up until now have been used to examine employment issues in multinationals operating in the UK (Edwards et al., 2007) led the research team to invest significant resources in constructing a robust listing of the target MNC population. The size thresholds set for foreign-owned subsidiaries were: employment of at least 500 employees worldwide and at least 100 in the UK. For home-owned firms the size threshold was at least 500 worldwide and at least 100 of these outside the UK.

The database listing drew primarily on AMADEUS and FAME and was updated and supplemented with other web and professional data sources (for full details see Edwards et al., 2007). A total of 3099 companies was identified as part of the potential sample frame. A

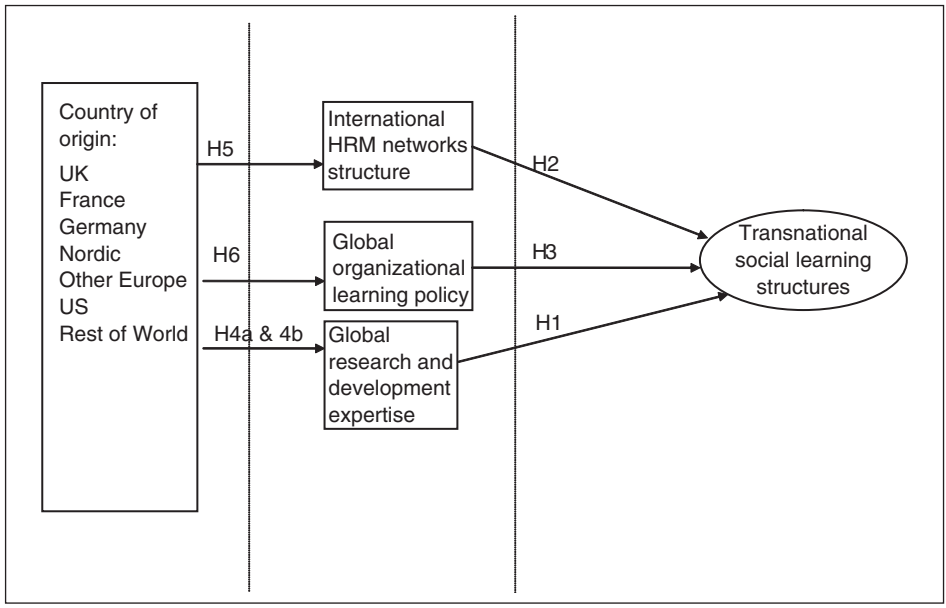

Figure 1 Hypothesized Model

telephone-administered questionnaire was employed to verify the database organizational details, pilot a number of key questions and ascertain interest in company participation in the main study. As a result, 951 companies were excluded as they fell below the size thresholds, were duplicate companies or no longer existed. Of those potentially eligible, 761 refused to participate and in 456 cases multiple call-backs to the company failed to result in communication with the respondent. A total of 931 (43% response rate) companies agreed to participate in the screener stage, of which 302 (33% response rate) agreed to take part in the main study. The survey data were collected from late 2005 to mid-2006. With listwise deletion, 292 cases were available for analysis (248 were foreign-owned and 44 home-owned).

Respondents were HRM specialists, in the best position to operate as organizational informants, and had been previously briefed regarding the type of information and expert knowledge required. Eighty-four percent of the respondents held senior HRM positions (e.g. director/management level) with the remainder being experienced HRM officers. Where respondents were unable to provide data on issues, for example, employment size, follow-ups were conducted. These steps were taken to minimize respondent bias (Katsikeas & Piercy, 1993; Zahra & Covin, 1993). In 23 out of the 44 UK firms there was no differentiation of UK operations from worldwide HQ for HR. Statistical analysis confirmed that the variable for home-owned (UK) firms did not confound HQ and subsidiary effects and provided support for the inclusion of a home-owned sample in this analysis.[1]

The questionnaire was developed drawing on measures used in previous survey work such as CLIRS (Marginson et al., 1995), and case study research the authors had been involved

with. A professional survey company GfK-NOP worked with the researchers to pilot and administer the questionnaires. Each survey interview lasted approximately 70 minutes.

Variables

Transnational social learning structures (TSLS) There is no recognized standard measure of TSLS. Thus the questions were developed from a combination of the literature and previous case study research examining international intra-organizational structures associated with learning across national borders (e.g. Lam, 2003; Tregaskis et al., 2005). The questions were also piloted with organizational respondents, refinements made and respondents reported the final set of questions as non-problematic transparent measures of the mechanisms utilized for international learning.

Construct validity of the scale The conceptual argument presented early in the article defined TSLS as a set of intra-organizational structures that support learning across national borders. Associated outcomes were identified in terms of: i) the development and diffusion of global polices; ii) global organizational competencies and culture; iii) and the development of global know-how or diffusion of global best-practice. Thus conceptually TSLS reflects structures with outcomes or potent learning structures. To identify learning structures respondents were asked to indicate whether they used any of the following four mechanisms specifically for international organizational learning purposes: expatriate assignments, international project groups or task forces, international formal committees and international informal networks. Responses were dummy coded 1 as yes and 0 as no. The distribution of responses found that 61 percent of firms used expatriates for organizational learning, 73 percent used international project groups/task forces, 53 percent used international formal committees and 84 percent used informal networks. Over 70 percent of the firms used more than one organizational learning mechanism, with the majority identifying task forces/project groups (36%) and informal networks (36%) as their single most important learning mechanism, followed by expatriates (21%) and then formal international committees (7%). These four items were used as primary indicators of TSLS (i.e. latent construct 1).

To gain insight into the learning brought about by these structures, respondents were asked to rate the importance of their most significant learning structure in achieving six outcomes, using a five-point scale where 1 represents not at all important and 5 very important. The responses for the most important learning mechanism in each organization give a measure of the salience of the six learning outcomes: 1) the development of global policy (mean 2.83, SD 1.30); 2) the adaptation of global policy (mean 2.97, SD 1.33); 3) the dissemination of best practice globally (mean 3.35, SD 1.41); 4) the generation of new knowledge or know-how globally (mean 3.14, SD 1.44); 5) the development of core global organizational competencies (mean 3.27, SD 1.47); 6) the development of a global organizational culture (mean 3.55, SD 1.41).

We have grouped these outcomes into three latent constructs:

- Latent construct 2 measured the impact of the social learning structures on global policy development and adaptation. α .90, mean 3.55, SD 1.34.

- Latent construct 3 measured the impact of the social learning structures on the diffusion of global best practice and development of global know-how. α. 90, mean 3.22, SD 1.35.
- Latent construct 4 measured the impact of the social learning structures on the development of global organizational competencies and culture. α .84, mean 2.91, SD 1.25.

The construct validity of this measure was tested using confirmatory factor analysis (Kline, 2006).[2] The results in Table 1 support this measure as a valid and reliable indicator of the TSLS concept.

Country of origin Firms were asked to indicate the country in which the 'ultimate controlling company' for the worldwide company was located. Interviewers prompted to ensure the 'operational headquarters' were identified. The subsidiaries were grouped on the basis of their country of origin into dummy variables representing Japanese (n = 21), US (n = 119), UK (n = 41), French (n = 23), German (n = 17), Nordic (n = 20), Rest of Europe (n = 32) and the Rest of the World (n = 19) firms. The reference category was Japan.

Global R&D expertise located in the subsidiary A perceptual measure was used whereby respondents were asked to indicate on a five-point scale (1 = strongly disagree to 5 = strongly agree) the extent to which they agreed that significant expertise in R&D within the worldwide company was generated by the subsidiary (mean 2.84, SD 1.30).

International HRM networks Respondents were asked whether HRM managers from different countries were brought together in a systematic way such as in task forces. Responses were coded as 1 indicating that HRM managers were brought together systematically on a regional or global basis (n = 182) and 0 indicating that they were not brought together (n = 110).

Global organizational learning policy To establish whether organizational learning was formalized, respondents were asked whether there was a formal policy on organizational learning within the worldwide company, with 1 indicating the presence of a policy (n = 103) and 0 indicating no policy (n = 189).

Control variables Four factors were controlled for. First, as firms might have greater capacity to engage in transnational learning owing to resources, the size of the subsidiary was controlled (Collins & Smith, 2006). The size was measured as the number of UK

Table 1 Goodness of fit statistics for the measure of transnational social learning structures

Model	χ^2	*d.f.*	*p*	*n*	*NNFI*	*CFI*
Four-factor model	36.57	32	>.05	294	.996	.997

Note: χ^2 = model chi-square, d.f. = degrees of freedom, NNFI = non-normed fit index, CFI = comparative fit index.

employees (log mean 2.88, SD 0.55, range 2–4.7). Second, because the demand for integration and sharing of learning might be greater among manufacturing operations, industrial sector was controlled through dummy variables for manufacturing (n = 148), services (n = 124) and other/non-production (n = 20). The reference category was services. Third, joint ventures and strategic alliances have the potential to aid organizational learning (Lei et al., 1997; Zhao et al., 2005). This was controlled through a dummy variable where 1 indicated the subsidiary engaged in joint ventures, strategic alliances or similar formal links with outside companies (n = 131), and 0 indicated no links (n = 161). Fourth, international co-ordination demands might impact on the co-ordination structures at the subsidiary level and on use of transnational learning structures, therefore warranting its inclusion as a control variable (Bartlett & Ghoshal, 1989). Respondents were asked to indicate which of the following levels or divisions of business organization existed in the worldwide company: 1) international product, service or brand based divisions; 2) regions (e.g. Europe or Asia-Pacific); 3) global business functions (e.g. manufacturing, R&D, sales). The scores on these questions were summed giving a measure of the degree of international organizing structures, whereby 0 indicated there was no international organizing structure (n = 16), 1 indicated one primary international organizing structure (n = 57), and 2 and 3 indicated two or three primary international organizing structures (n = 79 and n = 140).

Finally, the relationship between the two HRM governance mediators, namely HRM network structures and the adoption of a formal organizational learning policy was included in the structural model. Evidence suggests such HRM network structures are consistent with organizational efforts to formally access and manage distributed knowledge or generate social capital (Taylor, 2006; Tregaskis et al., 2005). They are often used to develop and implement HRM policies and initiatives across the MNC (Tregaskis et al., 2005). Thus, we might expect there to be an interaction between these two structures. This interaction was taken into account, but it has not been included as a formal hypothesis within the conceptual model owing to space constraints and its peripheral position to the argument.

Analysis

To test the hypotheses, covariance structure analysis was used with robust methods as the model included dichotomous variables (Muthén & Satorra, 1995). In recognition of the fact that the UK firms were represented by HQ HRM respondents, the analysis was also run excluding UK firms. The results showed the same relationships, which we would argue further support their inclusion. Therefore, this article reports the figures for the full dataset (i.e. both home- and foreign-owned firms). The analysis was conducted using EQS.

A model comparison test commonly adopted in causal analysis was used to examine the hypothesized mediated impact of country of origin on TSLS.[3]

Results

Table 2 presents the results of the model comparison test for the three structural models. In each case, the NFI, NNFI and CFI indicate good fit to the data. However, the highest values of the NFI, NNFI and CFI are for the full and indirect effects models, indicating better fit. No significant difference between the full model and the indirect model, plus

Table 2 Goodness of fit statistics for the structural model

Model	*Model* χ^2	*d.f.*	*p*	*Model* $\Delta\chi^2$	*p*	*AIC*	*CAIC*	*NNFI*	*CFI*
Base line model:									
Full model with direct country effects	265.48	191	<.001	---	---	-116.52	-1009.78	.96	.97
Indirect country effects model	279.97	199	<.001	14.49	>.05	-117.02	-1043.02	.96	.97
Direct effects only model	323.04	219	<.001	62.96	>.05	-114.96	-1139.17	.95	.96

Notes: χ^2 = model chi-square, $\Delta\chi^2$ = change in model chi-square, AIC = Akaike's information criterion, CAIC = Bozdogan's version of the AIC statistic, NNFI = non-normed fit index, CFI = comparative fit index.

equivalent values of the NFI, NNFI and CFI, indicate that the indirect effects model has equivalent fit to the full model. Lower AIC and CAIC statistics suggest the indirect model is a better fit to the data. With fewer paths, it is the more parsimonious solution. In sum, transnational HRM governance structures and subsidiary level global R&D expertise are important factors mediating the impact of the country of origin.

Figure 2 shows the significant paths for the indirect effects model; full results are listed in Table A1 in the Appendix. For purposes of clarity the paths for the control variables are not listed, although these were significant as predicted. TSLS are, as predicted, positively associated with the presence of international HRM networks (H2), the presence of a global organizational learning policy (H3), and perceived global R&D expertise within the subsidiary (H1). These results therefore support the hypothesized direct relationships between transnational HRM governance structures, perceived subsidiary level global R&D expertise and TSLS.

In terms of the hypothesized mediated effects of country of origin on TSLS we find full support. Table 3 shows the significant indirect effects of country of origin on TSLS. TSLS are greatest among the French, Nordic, Rest of Europe, UK and US firms and lower for German and Japanese firms and this effect is mediated by other variables. Figure 2 shows the mediated country of origin effects as follows. First, international HRM network structures mediate the impact of country of origin as predicted (H5). The results also show that the Rest of European firms, alongside French, Nordic and US, are more likely to have HRM network structures, which in turn positively impact on the use of TSLS, while German and Japanese firms are less likely to have HRM networks and in turn have lower socially based learning structures. Second, global organizational learning policy significantly mediates the effect of US country of origin (H6) as predicted, with this being a form of HRM corporate governance favoured by US firms over all other firms impacting positively on TSLS. Third, US subsidiaries are more likely to report global R&D expertise that is significantly associated with the greater use of TSLS (H4b), while this is not an important mediator for other overseas MNCs. The results testing H4a are unclear. Table 3 shows an overall indirect effect for UK firms on TSLS yet in Figure 2 the path coefficients (dotted lines) are not significant. This might

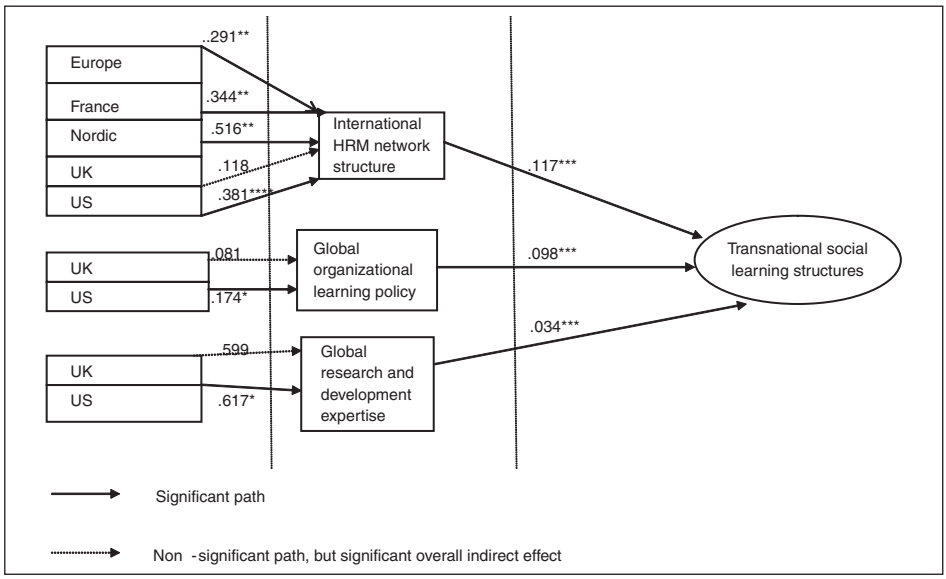

Figure 2.–Graphical representation of hypothesized relationships

Table 3 TSLS: Indirect effects for country for best fitting model

	Indirect effects
France	.068+
Germany	.045
Nordic	.071+
Rest of Europe	.051+
UK	.048*
US	.090***
Rest of World	.084++

Notes: Reference country is Japan. *** significant at p <.001 (1-tailed), ** significant at p <.05 (1-tailed), * significant at p < .01 (1-tailed)

+++ significant at p <.001 (2-tailed), ++ significant at p <.05 (2-tailed), + significant at p < .01 (2-tailed).

suggest that the indirect effect in Table 3 reflects a cumulative effect over the three mediators. In addition the path coefficient linking country of origin to global R&D expertise is greatest (.599). Thus, the direction of the relationship is as hypothesized and consistent with arguments that global R&D capability is largely home-based. This result is explored further in the discussion.

Table 4 shows the differential impact of country of origin on the use of each of the learning structures. Japanese, German and the Rest of Europe firms have the least, with the most extensive use being in US, French and Nordic companies. Therefore, there are

Table 4 Transnational social learning structures path coefficients, indirect effects of country for best fitting model

	Indirect effects
Expatriate assignment	
C-of-O: France	.067**
C-of-O: Germany	.046
C-of-O: Nordic	.071*
C-of-O: Europe	.051
C-of-O: UK	.046
C-of-O: US	.090***
C-of-O: Rest of World	.084*
International project groups or task forces	
C-of-O: France	.092*
C-of-O: Germany	.063
C-of-O: Nordic	.099*
C-of-O: Europe	.071
C-of-O: UK	.064
C-of-O: US	.125***
C-of-O: Rest of World	.116*
International formal committees	
C-of-O: France	.078*
C-of-O: Germany	.053
C-of-O: Nordic	.084*
C-of-O: Europe	.060
C-of-O: UK	.054
C-of-O: US	.105***
C-of-O: Rest of World	.098*
International informal networks	
C-of-O: France	.056*
C-of-O: Germany	.039
C-of-O: Nordic	.060*
C-of-O: Europe	.043
C-of-O: UK	.039
C-of-O: US	.076**
C-of-O: Rest of World	.071*

Notes: *** significant at p <.001 (2-tailed), ** significant at p <.05 (2-tailed), * significant at p < .01 (2-tailed).

country preferences in that these learning structures are more common in US, French and Nordic companies. Firms overall tend to favour international project groups and informal networks, over expatriates and formal committees. In Table 5 the effects of country of origin on each of the three factors measuring the impact of the learning structures are shown. Here we see that learning associated with the development and implementation of global policy (factor 2) is lowest in Japanese and Germany firms and greatest among US firms and to a lesser degree Nordic and French firms. This pattern of country of origin effects was also reflected in relation to measures of diffusion of best practice and development of know-how and the development of organizational

Table 5 Factors measuring the effects of TSLS: path coefficients, indirect effects of country for best fitting model

	International policy development	International policy adaptation	Factor 2
Factor 2: Global policy			
C-of-O: France	.275*	.297*	.278*
C-of-O: Germany	.190	.203	.190
C-of-O: Nordic	.298*	.319*	.298*
C-of-O: Europe	.213	.227	.212*
C-of-O: UK	.193	.206	.193*
C-of-O: US	.376***	.402***	.376***
C-of-O: Rest of World	.350**	.374**	.350**
Factor 3: Best practice diffusion and know-how development	Dissemination of best practice internationally	Creation of new knowledge or know-how	Factor 3
C-of-O: France	.338*	.335*	.338*
C-of-O: Germany	.231	.229	.231
C-of-O: Nordic	.363*	.360*	.340**
C-of-O: Europe	.259	.256	.258*
C-of-O: UK	.235	.233	.235*
C-of-O: US	.458***	.454***	.457**
C-of-O: Rest of World	.425**	.422**	.425**
Factor 4: Global competencies and culture	Development of core global organizational competencies	Development of global organizational culture	
C-of-O: France	.317*	.336*	.317*
C-of-O: Germany	.217	.230	.217
C-of-O: Nordic	.340*	.361*	.340**
C-of-O: Europe	.243	.257	.243*
C-of-O: UK	.220	.234	.221*
C-of-O: US	.429***	.455***	.429***
C-of-O: Rest of World	.399**	.423**	.399***

Notes: *** significant at p <.001 (2-tailed), ** significant at p <.05 (2-tailed), * significant at p < .01 (2-tailed).

competencies and organizational culture. Learning structures were more likely to have a perceived impact on the diffusion of best practice and to a lesser degree the development of know-how. The perceived impact on the development of a global culture was greater than the development of core global organizational competencies. Finally, perceived impact on policy was given the lowest rating and here the impact was greater for international policy adaptation than development. Therefore, the results indicate that while all three areas were perceived as significant impacts of TSLS, there was some variation in importance.

Discussion

The purpose of the article was to identify predictors of TSLS in MNC subsidiaries, in particular, firms' organizational contingencies and the institutional context in which these contingencies are embedded. The results supported the predicted mediated effect of country of origin on the use of TSLS. In addition country of origin effects among European firms were explored through the analysis, although not directly hypothesized. This exploration among European firms adds to the extremely limited survey data available for this group of MNCs.

The findings suggest that where MNC subsidiaries have TSLS, they are more likely to be engaged in knowledge exchange with other parts of the MNC. The learning structures were found to be significantly important in terms of diffusing best practice and developing know-how, and in the development of a global organizational culture and core competencies. They were used less however, for the development and adaptation of global policy. Thus the learning structures were associated with a perceived impact on international knowledge creation. The fact that formal structures are in place that allow subsidiary actors to participate in the social interaction that enables knowledge associated with global policy and know-how to be debated and discussed, is important in helping to facilitate the effective transfer and use of knowledge across national borders (Cerdin, 2003; Kostova, 1999; Sparrow et al., 2004). Another important function of TSLS is global integration, via policy adaptation, development of a global culture and dissemination of international best practice (Sparrow et al., 2004). All these activities reinforce global integration, but importantly by using social person-to-person based mechanisms it suggests more opportunity for negotiation and the multi-directional flow of knowledge than traditional integration tools that have included standardized technologies, operating procedures, management procedures and policies (Taylor, 2006).

The results supported the hypothesized relationship between a perceived global R&D role for the subsidiary and greater use of TSLS and a mediated country of origin effect: Japanese and German firms were low users of TSLS in comparison with others. This finding is consistent with the NIS argument that firms in these countries have similarities driven by sectoral dominance: specifically German firms dominate medium technology areas and incremental innovation where significant R&D capability is centralized in the home firm. This means their R&D activity is less likely to be globalized and intra-organizational co-ordination mechanisms are less likely to be adopted at the subsidiary level. These nations were also considered latecomers to globalization (Doremus et al., 1999; Streeck, 1992). Thus, their limited experience and time operating with global organizational structures might have impacted upon the extent and way in which cross-border learning structures have evolved. US firms by contrast demonstrate much greater use of TSLS compared with Japan. Also in line with the NIS argument the results suggest US firms are more likely to look to local labour markets for skill and knowledge resources, and particularly to host country environments that share similar supporting institutional arrangements (Guerreri & Tylecote, 1997) and technological specialization (Pearce & Papanasatassiou, 1999 on the UK as a source of scientific knowledge). However, mediated effects were not found for Nordic, French or Rest of European firms, but were found for home-owned UK firms. This supports Doremus et al.'s (1999) argument that despite

globalization there is still a tendency to retain critical R&D activity in the home country. As the host country in this study was the UK there is arguably less need for global R&D of European-owned firms to be located in another country within the same region. The situation might be different if we consider European-owned firms' R&D operations in a region outside of the EU. Thus, the evidence indicates that while the business capabilities of the subsidiary, in this case perceived global R&D capability, are significant in the use of TSLS, institutional effects are also an important explanatory factor. Ignoring interactions between the two, or failing to explore where institutional and firm-level capabilities interact, weakens our understanding of multi-level learning issues.

Finally, the results supported the hypothesized relationship between HRM governance structures and greater TSLS and a mediated country of origin effect. The use of network structures among the HRM community, whilst not widespread, has become increasingly significant in meeting globalization objectives (Sparrow et al., 2004). Integration through the promotion of common organizing frameworks, shared assumptions and values, and a management architecture for developing international social capital in multinationals is argued for (Taylor, 2006). Social capital provides organizations with a supportive environment conducive to learning through social exchange and relational networks (Nahapiet & Ghoshal, 1998). It might be that the transnational HRM structures evidenced here provide a supportive learning context because they enable international social capital, making it easier for organizations to establish TSLS. Equally, as Snell et al. (1998) argued, the ability of the global HRM function to organize itself along transnational lines leads to an organizational capability in transnational working that can be used to support other parts of the business. In addition, traditional approaches to integration through policy, in this case a global organizational learning policy, were also evident. This might be a reflection that organizational learning is identified as a global theme that can be used to manage and integrate activity. Sparrow et al. (2004: 110), for example, argue that in practice MNCs identify global themes that 'have ''relevance'' to managers across several countries – despite the fact that they have different values embedded in different national cultures and despite the reality that these global themes may end up being operationalized with some local adaptation'. One common global theme tends to be integration around core strategic competencies or capabilities that are linked to the business performance of the company. A global organizational learning policy might reflect efforts to integrate and coordinate resources to support learning as a core competence. Both these corporate HRM structures significantly mediated country of origin effects. As predicted, global organizational learning policy tended to be a governance structure favoured by US firms. Recent extensive case study research in 18 US companies operating in Germany, Ireland, Spain and the UK revealed considerable insights into the structures and processes adopted within these organizations (Almond & Ferner, 2006). The evidence here would provide further support to the case study finding that US MNCs tend to exert strong control over their overseas operations, owing to the heritage of the national business system that reinforced this mode of organization as optimal. In the area of organizational learning, policy and international HRM structures appear to be key planks of this control.

German MNCs again stood out as different from other European firms in their limited use of international HRM networks as a primary governance mode. German firms have

been late to globalize in general and when they do there is a tendency to do so in a Germanic way that places a continuing emphasis on organizational hierarchies or centralization of expertise as opposed to transnational HRM structures. Case evidence from Ferner and Varul (2000) found that the UK subsidiaries of German firms acted as 'vanguard' subsidiaries providing the parent with access to innovative practices in areas of international HRM as German companies attempted to internationalize. They found a number of mechanisms in place to diffuse knowledge about international human resource practice back to the headquarters. Therefore our finding appears contradictory. One explanation might be that the case evidence found that the mechanisms for diffusion centred on informal information flows or ad hoc visits by senior German managers to overseas operations, rather than via proactive and formal organizational learning structures. Another explanation might be that the German firms in the case research that were more likely to use transnational HRM governance structures were more likely to be large MNCs and those in highly internationally integrated operations such as pharmaceuticals. This highlights the close interaction between different organizational structures and the need to account for this when trying to explain the national embeddedness of organizational structures. Ferner and Varul stressed that any 'Anglo-Saxonization' evident in the practices or structures of German MNCs was in a German manner. The evidence here is supportive in the sense that German firms appear to be internationalizing in their own way. The lack of TSLS suggests that these are not a primary mode through which global learning occurs in German operations located in the UK.

More work is needed to establish whether the relationships examined here hold across different host country contexts. Case study work by Tempel et al. (2006) illustrated the importance of interdependencies between the subsidiary and local institutions, and parent and subsidiary in explaining the extent of compliance with parent mandates by US subsidiaries in Germany and Britain. Research by Gooderham et al. (2006) found that US MNCs were constrained in their ability to transfer calculative HRM practices to subsidiaries in Germany and Denmark/Norway when compared to the UK, Ireland and Australia. In the context of this article questions arise regarding which governance structures have a role to play in how transnational structures to support learning are created among employees operating in different host country environments.

The findings here also have methodological limitations arising from their reliance on a number of single item measures and single respondents. The use of single item indicators as proxies for social or organizational constructs is contentious. Validation work on some single item measures suggests, however, that where the abstract concept being measured is narrow or unambiguous to the respondent, or reflects a concrete abstract construct (i.e. where the theory suggests the construct comprises a single object and attribute) single item measures are as reliable as equivalent multi-item scales. Findings from work validating single item measures of job satisfaction (Wanous & Reichers, 1997), teaching quality (Ginns & Barrie, 2004) and attitudes towards advertising and brands (Bergkvist & Rossiter, 2007) point to the conditions under which their use might be legitimate. In this analysis we have limited the conceptual boundary of each of the single item measures. Statistical advances have also made it possible to take into account measurement weaknesses and their effects on the relationships modelled. Joreskog and Sorborn (1993) suggest that if using single

item predictors in structural equation modelling the reliability of these can be specified at different levels and their impact revealed. Following this guidance we found that the substantive results were not affected when we assumed low single item measure reliabilities.[4]

A single respondent as a key informant of organizational environments has been criticized on the basis that one individual lacks the full information required to provide reliable data or lack of consensus among informants means multiple views should be elicited (Bowman & Ambrosini, 1997). Others have shown that where organizational environments are small, or specialized functions are examined then the responsibility and knowledge of the role holder are essential criteria to maintaining data validity and reliability (Katsikeas & Piercy, 1993; Zahra & Covin, 1993). The problems associated with using multiple respondents also have to be considered in terms of effects on reduced response rates (Katsikeas & Piercy, 1993), and how to address and interpret low inter-rater reliability (Dholakia et al., 1993). In this study care was taken to minimize respondent bias by gathering information from the most senior HRM manager with responsibility for the HRM environment forming the focus of data collection.

Conclusion

In conclusion, the variation in the relative importance of the different mediators suggests that institutional forces remain a key factor in how multinationals organize their activities. However, the static nature of the research design here obviously limits an analysis of this dynamic. The NIS literature has emphasized the continuous feedback between firms and their institutional environments in shaping both the national innovation systems firms operate in and their response. This is something that warrants continuing focus. The work here might go towards contributing to these debates through its identification of key mediators of country of origin effects on learning structures across MNC intra-organizational borders. Our use of the survey method and our efforts to maintain representativeness and the reliability and validity of our data enable us to draw generalizable insights into our understanding of structures that support learning in a transnational context. The evidence suggests that, for firms operating in the UK, country of origin impacts on the mechanisms used to control and co-ordinate subsidiary behaviour; and as a consequence affects the extent to which social learning structures exist for the identification, interpretation and diffusion of internal organizational knowledge. Thus, how a firm manages the transnational learning architecture, in multinational environments, is not only a strategic function of its governance structure, but is shaped by the dominant organizing structures of the parent country.

Appendix Table A1 Path coefficients for indirect model

Path from	*Path to*	*Path coefficient*
HRM network structure	TSLS	.117***
Org. learning policy	TSLS	.098***
R&D expertise	TSLS	.034***
Size	TSLS	.017
International co-ordination structures	TSLS	.041**
Joint ventures/ alliances	TSLS	.067**
R&D expertise	Intra-organizational networks	.066**
Size	HRM network structure	.214****
France	HRM networks structure	.344**
Germany	HRM networks structure	.246
Nordic	HRM networks structure	.516****
Rest of Europe	HRM network structure	.291***
UK	HRM network structure	.118
US	HRM network structure	.381****
Rest of world	HRM network structure	.286*
International co-ordination structures	HRM network structure	.045
HRM network structure	Org. learning policy	.120*
France	Org. learning policy	.038
Germany	Org. learning policy	.225
Nordic	Org. learning policy	.064
Rest of Europe	Org. learning policy	.021
UK	Org. learning policy	.081
US	Org. learning policy	.174*
Rest of world	Org. learning policy	.171
International co-ordination structures	Org. learning policy	.059*
France	R&D expertise	.477
Germany	R&D expertise	.217
Nordic	R&D expertise	.283
Rest of Europe	R&D expertise	.399
UK	R&D expertise	.599
US	R&D expertise	.617*
Rest of world	R&D expertise	.780*
Manufacturing	R&D expertise	.622****
Other sector	R&D expertise	.469*

Notes: *** significant at p <.001 (1-tailed), ** significant at p <.05 (1-tailed), * significant at p < .01 (1-tailed)

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Notes

1 To examine if HQ status would confound the results a dummy variable was created where 1 indicated UK HQ managed separately from UK operations and 0 indicated no separation. Using the Lagrange multiplier test (Byrne, 2006) the results showed this dummy variable had no significant impact on any of the variables in the model.

2 To test the construct validity a reflective second-order confirmatory factor analysis was adopted (Kline, 2006) whereby the four learning structures (i.e. the indictors of latent variable 1) are specified as a factor. In addition, this factor reflects three latent outcomes (i.e. the indictors of latent variables 2, 3, and 4). The Satorra-Bentler rescaled χ^2 is non-significant indicating good fit with the data. The non-normed fit index (NNFI) and the comparative fit index (CFI) exceed .90 and .95, respectively, indicating good fit (Byrne, 2006). There were significant relationships between the second-order factor and reflective indicators in the predicted direction ($p < 0001$).

3 This allowed the indirect country effects model (Figure 1) to be compared to a) a full model where a direct effects country model was also specified, and b) a direct effects only model. If this latter model demonstrated best fit then we would conclude transnational HRM governance structures and global R&D expertise were not mediators.

4 Joreskog and Sorborn (1993) recommend setting a single item reliability to .85 and modelling error variance for a single item scale loading on a factor at (1-alpha)*variance of the item. We set the alpha of the three single item predictors to .5 and the results indicated that substantive results were not affected.

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