



The effects of global knowledge reservoirs on the productivity of multinational enterprises: The role of international depth and breadth

Mario I. Kafourous*, Peter J. Buckley, Jeremy Clegg

Leeds University Business School, Maurice Keyworth Building, University of Leeds, Leeds LS2 9JT, UK

ARTICLE INFO

Article history:

Received 25 January 2010

Received in revised form 31 January 2012

Accepted 16 February 2012

Available online 18 March 2012

Keywords:

Appropriability

Spillovers

Depth and breadth

Productivity performance

ABSTRACT

This study rests upon the premise that differences in the productivity performance of multinational enterprises (MNEs) stem from variations in their ability to access and combine globally distributed knowledge reservoirs within one organization. Its contribution lies in demonstrating that this important source of variation is determined by (a) the idiosyncratic manner in which the MNE's network of subsidiaries is structured, (b) the international breadth and depth of this network and (c) its location choices in the global landscape. We find that when multinationals spread their operations across many geographical markets, they benefit from knowledge externalities more than when they concentrate their activities in few countries. We further show that the ability to exploit spatially distant knowledge depends not only on idiosyncrasies specific to the MNE, but also on exogenous forces associated with international variations in appropriability regimes and industry-specific technological opportunities. As our study considers how the subsidiaries of the MNE *collectively* influence the productivity of the entire group, it captures complementarities and synergies within the group, and deepens understanding of how MNE-specific and location bound factors jointly shape performance outcomes.

© 2012 Elsevier B.V. All rights reserved.

1. Introduction

A prevalent theoretical avenue for explaining interfirm variations in productivity rests upon the effects of external knowledge (Argyres and Silverman, 2004; McGahan and Silverman, 2006; Miller et al., 2007). Notwithstanding the valuable contributions of prior studies, understanding of the forces shaping the ability of multinational enterprises (MNEs) to exploit spatially distant knowledge from various nations remains incomplete. This significantly limits theory development about the role of knowledge externalities in the global economy. Our study addresses this lack of understanding. It centres on the premise that the R&D conducted by other organizations around the world leads to the creation of *global knowledge reservoirs* (i.e. globally dispersed pools of ideas and specialist knowledge regarding scientific advances and technological developments). Building on this concept, it analyzes the factors influencing the generation and diffusion of knowledge, the ability of MNEs to access knowledge and, thus, the effects of global knowledge reservoirs on the productivity performance of MNEs.

The current study extends prior research in three important ways. It is theoretically accepted that each subsidiary is embedded in an interactive and integrated network of subsidiaries (Cantwell

and Piscitello, 2000). Studies that approach the MNE as a global whole offer valuable insights into how firms invest abroad (Ito and Wakasugi, 2007; Belderbos and Zou, 2009), create patents (Penner-Hahn and Shaver, 2005; Singh, 2008) and transfer knowledge across units (Fisch, 2003; Kurokawa et al., 2007). However, these contributions overlook the impact on performance arising from the knowledge reservoirs resident in the entirety of the host countries in which the MNE operates. As a result, scholarly understanding of the role of such resources is developing through the accumulation of anecdotes rather than through systematic empirical research (Frost, 2001).

We address this weakness by examining whether, and under what conditions, the network of MNE subsidiaries enables the entire group as a whole to become more productive through combining globally dispersed knowledge within one organization. Our analysis relies on a novel mapping approach that matches the location choices of MNEs to the knowledge reservoirs residing in those locations. Rather than focusing on knowledge flows within just one or two nations (Almeida and Kogut, 1999; Iwasa and Odagiri, 2004), we model productivity as a function of the knowledge originating from 18 countries and 28 industries. Since this approach captures not only the firm's entire network but also most of the world's research efforts, it offers a more complete account of the synergistic function of the MNE and deepens our understanding of how its global operations interact with country-specific resources to determine performance outcomes.

* Corresponding author. Tel.: +44 0113 3434 588; fax: +44 0133 3434754.
E-mail address: mk@lubs.leeds.ac.uk (M.I. Kafourous).

Our second contribution lies in demonstrating that variations in MNEs' ability to benefit from global knowledge reservoirs can be explained by the structure of their portfolios of subsidiaries. To capture the fact that, while some multinational groups spread their operations across a large number of foreign nations (Quintas et al., 2008; Lahiri, 2010), others concentrate their efforts in a few countries and are more deeply embedded there (Allen and Pantzalis, 1996; Tang and Tikoo, 1999), we develop the constructs of *international depth* (the extent of business operations and investment in host countries) and *international breadth* (the number of countries in which the MNE operates). Building on these multidimensional constructs, we propose and test a set of hypotheses explaining how differences in depth and breadth impact the ability of MNEs to exploit knowledge reservoirs. Since our analysis identifies the factors determining the success of international knowledge sourcing, it has important implications for firm strategy.

Third, despite the importance of the supply side of technological change, little research has examined the role of exogenous factors in explaining international variations in knowledge externalities. We complement studies that focus on firms' own attributes by showing that the benefits of external knowledge are contingent upon (1) the set of technological opportunities in a given industry, and (2) international variations in intellectual property rights (IPR) protection. By combining MNE-, industry- and location-specific factors, our integrated framework enables us to demonstrate how the generation, evolution and diffusion of knowledge may vary across industries and countries; the relative power of these factors in explaining performance asymmetries; how such forces *jointly* shape productivity outcomes.

2. Theoretical foundation

2.1. Global knowledge reservoirs

Our analysis rests upon the premise that technical knowledge, both internal and external to the organization, drives productivity performance through influencing the technologies, processes and general understanding within the firm (Argyres, 1996; Bell and Albu, 1999; Argyres and Silverman, 2004; Cassiman and Veugelers, 2006; Lahiri, 2010). In-house R&D generates an organizational pool of knowledge that increases productivity performance through pointing to new technological avenues and solutions, as well as leading to new products and services, more efficient processes, and lower organizational and production costs (Zahra et al., 2000; Kafourous, 2005; McGahan and Silverman, 2006). Nonetheless, as intellectual property laws do not work as well in practice as they do in theory, firms cannot always prevent other organizations from building on their work (Teece, 1986).

As a result, firms can often access and exploit external knowledge by browsing patents, reverse engineering competing products, hiring scientists from their rivals, collaborating with other firms, and by buying inputs at a price that is lower than their true user value (Griliches, 1992; Cheng and Nault, 2007).¹ Consequently, the knowledge that firms develop by conducting R&D contributes not only to their own performance, but also to society's generic reservoir of knowledge. This reservoir, in turn, may

reinvigorate existing knowledge, serve as the seed for future technologies, and improve the productivity of other companies too (Scherer, 1982; Miller et al., 2007; Singh, 2008). Hence, performance is a function of a firm's own (internal) knowledge stock and of the reservoir of external knowledge accessible to the firm, with the two being interrelated (Coe and Helpman, 1995).

Rather than focusing on the role of spillovers – the leakage of knowledge and technologies across firms – within one economy, our analysis involves a whole array of MNEs, industries and countries. Instead of attributing differences in productivity to the knowledge of one nation, we link productivity outcomes to globally dispersed reservoirs of knowledge that firms in foreign countries develop. These country-specific reservoirs comprise smaller industry-specific pools of knowledge that evolve over time depending on each country's industrial structure, and on the amount and type of R&D undertaken in each industry. Hence, they inevitably differ in terms of characteristics, size and growth rates. Bringing together knowledge from different locations is valuable in enriching a firm's own knowledge base, reducing variable costs and enhancing its productivity (Bernstein and Mohnen, 1998; Bayoumi et al., 1999; Buckley and Carter, 2004; Cantwell and Mudambi, 2005; Quintas et al., 2008). Conversely, if firms tap a limited range of similar knowledge pools, uninspiring products are likely to be developed (Santos et al., 2004).

Although it is often assumed that knowledge travels with ease from one location to another, this is not always the case (Jaffe et al., 1993; Branstetter, 2001). Knowledge passes only imperfectly through national borders as it is often embodied in local engineers, scientists and settings (Almeida and Kogut, 1999). Empirical evidence supports this argument, indicating that knowledge diffusion and the production of ideas is geographically localized and spatially bounded (Almeida and Kogut, 1999; Keller, 2002). Furthermore, although international trade may facilitate knowledge diffusion (Grossman and Helpman, 1991; MacGarvie, 2006; Salomon and Jin, 2008), tangible products and assets cannot embody tacit knowledge. For these reasons, we subscribe to the view that globally dispersed knowledge reservoirs – or at least a large part of them – are tied to the nation in which they have been created (i.e. they are locationally fixed).

2.2. Geographically distributed networks of subsidiaries

Although the geographical constraints on knowledge diffusion limit the ability of organizations to access knowledge reservoirs that reside outside their home country, a global network of subsidiaries is a strategic mechanism that assists MNEs in achieving proximal access to knowledge reservoirs and, thus, in overcoming these constraints. Since MNEs operate in different locations around the world, they are better able to deploy investments to access knowledge reservoirs and, thereby, to increase their productivity. While the empirical evidence regarding this proposition remains limited, it is supported by international business theory (Birkinshaw and Hood, 1998; Cantwell and Piscitello, 2000). Although each subsidiary is part of a network of similar subsidiaries, it operates within its own unique environment, and this may improve not only its individual function but also the function of the entire group (Birkinshaw and Hood, 1998). By considering how the overseas units of the MNE collectively influence performance, our analysis places emphasis on the more dynamic and synergistic functions of the multinational.

The units of MNEs in disparate host countries can improve the process of knowledge identification and accumulation (Kogut and Zander, 1993; Feinberg and Gupta, 2004). These units facilitate continuous learning (Kotabe et al., 2007), and assist MNEs in developing new competencies (Zahra et al., 2000) and in achieving resource positions that their rivals cannot easily imitate (Dierickx

¹ Following Marshall (1920) who identified the benefits of "industrial districts" as labour market pooling, access to specialist suppliers and interfirm spillovers of technology and knowledge, one can theoretically distinguish between 'rent' and 'true' spillovers (Griliches, 1992). Rent spillovers occur when the new products that a firm develops are used as inputs by other firms. By contrast, 'true' spillovers are unpriced and occur when a research team acquires ideas from the results of another firm (Griliches, 1992). This study does not deal with the distinction between rent and true spillovers, nor is this distinction necessary for our analysis. We use the term 'knowledge spillovers' to refer to the general productivity-enhancing effects.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات