

Drivers for International Research and Innovation Activities in Developed and Emerging Countries

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Globalisation has been reshaping the business environment of firms. The corporate answer to increased openness of economies and international trade is the internationalisation of business processes. The international expansion of firm's processes and their businesses meets with both huge opportunities but also new threats. Foreign markets allow international firms to achieve scale advantages and to access international resources, including knowledge. As a consequence, firms can enlarge their market size and furthermore use internationally dispersed knowledge resources to enhance their competitiveness. For innovative firms the availability of new knowledge is essential to remain competitive. By using international knowledge pools companies can overcome the constraints of national available knowledge. However, firms might not take the risks of shifting business operations away from the centre if they would not be forced by their competitive environment and the need to enhance their innovativeness by absorbing new ideas and knowledge for innovative products and processes. Beside these pushing forces firms might possess capabilities and resources that enable firms to perform R&D and innovation activities abroad. This paper aims to spot the factors that lead firms to the decision to perform innovation and research activities abroad. Internationalising innovation will allow firms to enlarge their knowledge base by sourcing knowledge, technology and skills from other locations than their home market, potentially contributing to more ambitious and more efficient innovation efforts. Furthermore, approaching new markets often requires innovation designs that are adjusted to the specific environment in these markets. Developing or adopting such innovations at the location of potential customers may be more effective. Moreover, market success of new products not only depends on technological superiority or customer-tailored solutions, but also on price-efficiency. Globalisation has also fostered the emergence of new players in the world economy. Therefore international as well as national operating firms are not only confronted with

existing competitors from developed regions but also increasingly with enterprises from emerging economies especially in Asia. These firms enter the market by offering products and services at a very competitive price level and are backed on a growing national knowledge capability.

Most of the literature on the internationalisation of innovation has not mentioned the different innovation activities carried out at foreign subsidiaries. This paper attempts to enrich the empirical literature by employing a large data set on the internationalisation decisions of German MNEs from various sectors and by considering different types of innovation activities at foreign locations. The location decision of firms in the internationalisation of R&D has not been analysed in detail either. Especially developing regions are underrepresented in these studies. This paper will contribute by identifying the driving forces for the decision to locate research and innovation activities in countries with different levels of knowledge (country clubs, Castellaci and Archibugi (2008)) and specific countries and regions such as China, India&China, Asia, Eastern Europe, Western Europe and North America. The paper explores three research questions:

- (1) What role do firm capabilities, the level of home market competition and local innovation disadvantages play for driving firm's decision to engage in international innovation activities?
- (2) Do these determinants differ by type of innovation activity (R&D, design, production of new products, implementation of new processes, sales of new products)?
- (3) How do these determinants differ by host country and countries with developed or developing knowledge level?

Empirical Analysis

The paper consists of two models each comprising multivariate probit models with marginal effects. The first model estimates the propensity of firms to carry out different steps of the innovation process abroad. In the second model the propensity of firms to carry out R&D and innovation activities at different countries and regions

is measured. For both models the same set of explanatory variables is used to identify the driving forces which influence the propensity in the two models.

The explanatory variables are based on the internationalisation theories within the literature. A main approach is the “eclectic paradigm” or OLI model (Dunning, 1981) which emphasizes the role of ownership-specific (O), location-specific (L) and internalising (I) advantages for a firm’s decision to enter into economic activities outside its domestic market. Based on the OLI-model and further findings in the literature, a set of variables to capture potential driving forces is defined. They consist of firms’ capabilities (absorptive capacities) and international experience (international cooperation, exports). Moreover, variables are included to measure the competitive pressure (Price competition, Number of competitors, New market entries) in the firm’s business environment. In addition, the innovation disadvantages in the firm’s home country (e.g. lack of demand, information, labour, cooperation partners; high innovation costs) are employed to observe their influencing effect on the firm’s decision to set up innovation capacities abroad.

This paper employs data from the German Innovation Survey, which represents the German contribution to the EU’s Community Innovation Survey (CIS). The German Innovation Survey follows the methodological recommendations for CIS surveys and adopts the standard CIS questions. It is conducted by the Centre for European Economic Research (ZEW) in Mannheim. In addition, the German Survey contains a significantly larger number of questions compared to the harmonised CIS questionnaire, which allows for a much more detailed analysis of relations between firms’ innovation activities and their market and innovation environment. For this paper two waves of the survey are used. The wave of 2005 contains all information of the firm’s capabilities, the competitive environment and the innovation disadvantages. In the year 2006 the survey asked firms about their innovation activities abroad. It distinguished between existing activities and whether the firms plan to extend or set up R&D and innovation activities abroad. Firms were also asked to state in which country they plan to set up innovation activities. For the first estimated model a sample of about 1200 innovative firms is retrieved and for the second (location decision) model the sample consists of 705 firms with innovation activities abroad.

Results

This study sought to go beyond the term `R&D abroad` and analysed the impact of the various driving forces of five different innovation activities abroad. Furthermore the study not only distinguished the effects of the driving forces by the different types of R&D activities abroad but also analysed the effects of the drivers on the actual or planned performance of R&D activities in different regions, countries and technology clubs.

The detailed analysis provided extensive results. Overall it can be argued that firms are pushed to international R&D by competition and innovation conditions in the home country to a lower extent than expected. The results show that firms rather use R&D activities abroad to further strengthen their existing innovation and business success. Firms that experience innovation barriers such as lack of demand in the home country are not likely to design and manufacture new products abroad. However, high innovation costs and a lack of labour lead firms to manufacture innovations abroad.

Firms that cite high innovation costs as an innovation barrier are also less likely to carry out R&D and innovation activities in western European countries and countries with advanced knowledge levels. If firms show a lack of appropriate cooperation partners then these firms are also less likely to perform R&D and innovation activities in marginalized countries including Asia and China. This follows our hypothesis that firms need pronounced international experience (by international cooperation and/or exports) when they plan to perform R&D and innovation activities in countries with developing knowledge levels. These hypotheses are supported by positive significant results for international experience for Asian and Marginalized countries.

As for the research intensive activities, it can be clearly shown that internal research activities abroad complement existing and continuous R&D activities in the home country. An existing technological advantage and a strong knowledge base at the firm headquarter is increasing the likelihood for international research and design. It seems that the internationalisation of R&D is a sign of corporate strength and therefore another hypothesis could be confirmed that international R&D and innovation activities are driven by strong firm capabilities.