



European
Research Area

EUROPEAN POLICY BRIEF



INGINEUS

European Firms' Reasons for Taking Part in Global Innovation Networks

Ongoing project

June 2010

SUMMARY

Objectives of the research

During the past decades, large firms and especially multinational firms have been developing innovation networks with a true global reach. In these networks, innovation is created in different locations and shared among different partners in order to open, adapt, maintain or exploit new market opportunities. The objective of this research project is to investigate what global innovation networks are and what policy implications these trends pose for Europe.

Scientific approach/ Methodology

The early steps of the INGENEUS scientific approach have been based on a literature review, descriptive statistical data, and the preliminary results of the project survey.

New knowledge and/or European added value

Global innovation networks are typically created on the top of pre-existing global production networks. Upstream and downstream interactions in these production networks are now complemented with co-creation of knowledge-intensive innovation-related activities.

Key messages for policy-makers, businesses, trade unions and civil society actors

- There is an acute problem of data availability on the globalisation of European STI. Policy makers must generate more and better data sources.
- The engagement of EU firms in global innovation networks is mainly limited to accessing human resources and knowledge capabilities. EU policies should aim at positioning Europe upfront on the global map of skills and knowledge.

Main questions

The leading research questions are:

- What are global innovation networks and why are they created?
- How are European firms generally performing in terms of creating and participating in these global networks?
- Is Europe an important node within those networks in terms of knowledge competences and knowledge sources?
- What can European policy makers do in terms of reaping the benefits and reducing the potential costs and risks associated with the current trends towards global innovation networks?

Scientific approach/ methodology

The early steps of the INGENEUS scientific approach have been based on three different sets of data:

1. Descriptive statistical data collecting the very scarce information on inward R&D investment made by non-national firms.
2. Literature review on the different policy-related institutional issues that affect global innovation networks.
3. Preliminary findings of the project survey, which focuses on the internationalisation of companies' R&D and innovation activities.

Introduction

There is today a wide understanding among scholars and experts that the globalisation trends of our economies and societies are also taking place in the fields of science, technology and innovation. Firms, universities, public research organisations, and individual researchers are more than ever operating globally. Admittedly, the world of science, technology and innovation has to some extent always been global. Chinese inventions (e.g. paper or gunpowder) have rapidly expanded in Europe in the late Medieval Ages, when Europeans first started to have direct contact with the Chinese culture. Likewise, natural scientists and other empiricists of the 19th Century like Charles Darwin travelled the globe in search of evidence to their evolutionary theories.

Yet, there are at least two fundamental differences between these historical anecdotes and today.

Firstly, the sheer size of the phenomenon. Globalisation is not just an issue of some adventurous capitalists or individual visionaries travelling the world, but a widespread phenomenon of interactions among all sorts of organisations, most notably firms.

Secondly, and no less important, a fundamental difference is that the advanced network of transport infrastructures and information and communication technologies has made communication and interaction much faster, cheaper and reliable (Lundvall and Borrás 1998).

However, we still know very little about the dimension, the dynamics and the patterns of the globalisation of science, technology and innovation. This is in part due to the scarcity of

appropriate measurement and indicators, not only in Europe (Edler and Flanagan 2010), but also in the USA and elsewhere (Magazine 2009). National statistical data sources are often too aggregated, and/or they measure some specific forms of outputs (patents) and inputs (inflows R&D FDI) to the detriment of other dimensions of the phenomenon. They provide interesting approximations describing the globalisation of STI and identifying some general trends through time. Yet, more firm-level data about firms' preferences for some types of globalisation, or firms' reasons to globalise their R&D and other knowledge-intensive activities, continue to be largely non-existing. Part of this is because these types of questions are not included in conventional innovation surveys.

This policy brief brings forward and discusses some recent statistical material on European firms' trends in outsourcing and off-shoring globally their R&D activities. It also presents succinctly some of the preliminary findings of the survey conducted by the INGENEUS research project. The survey provides some interesting preliminary results about the reasons why European firms take part in global innovation networks.

What do we know?

Archibugi and Michie have provided a useful taxonomy of the globalisation of innovation (Archibugi and Michie 1997). They distinguish between:

- The international exploitation of nationally produced innovations
- The global generation of innovations by multinational companies
- The global techno-scientific collaborations

The first category is perhaps the less interesting of the three, as it 'only' reflects the export of nationally-created knowledge, saying little about the global dimension of interactions. Regarding the two other categories, much of the literature devoted to these topics has focused on the second, namely, the multinational companies concentration/ dispersion of R&D activities worldwide (Narula and Zanfei 2005), often in relation with company-level studies and analyses of the strategic dimension of innovation management. The third category seems to be less studied, namely, the collaborations between firms and other organisations. Arguably, this might be because this category is most difficult to study due to limited data availability and its relatively high degree of heterogeneity (encompassing different types of phenomena, namely, international scientific projects, big international infrastructure cooperation, flows of doctoral students, etc).

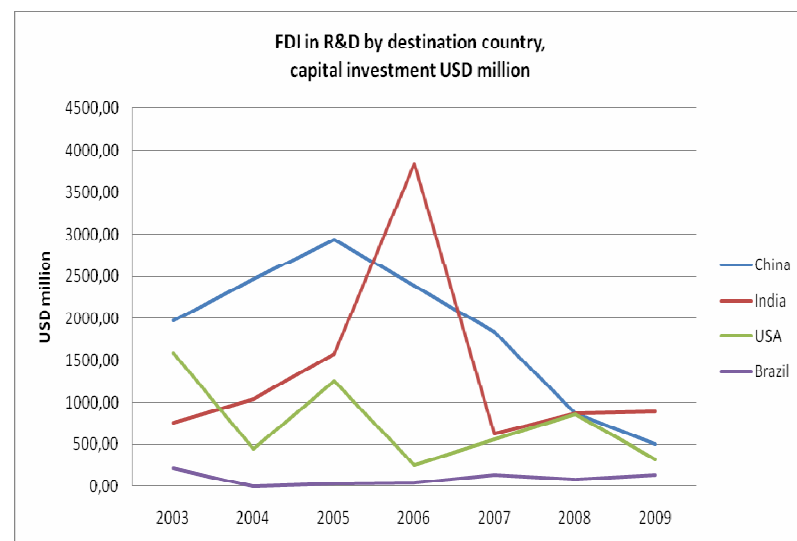
Global innovation networks fall partly under the second and third categories. Global innovation networks are collaborations and

interactions between different firms and organisations producing and exploiting new knowledge in a global scale for purposes of fostering specific innovative activities. It is generally believed that global innovation networks are currently growing in number and are also expanding significantly in their geographical reach.

The growing number of global innovation networks can be seen by the gradual but steady upgrading of knowledge intensity in global production networks (Zander 1999). Suppliers have been 'climbing up' in value chains in what now are truly becoming 'innovation' more than just 'production' networks. Likewise, many companies have been making substantial R&D investments abroad, and multinationals seem to be decentralising their traditionally headquarters-based R&D facilities. This is reflected by the increasing inflow and outflow of FDI in R&D. In 2006 10% of all total business enterprise R&D in EU27 was from abroad, but this is mainly intra-company flows (OECD 2009).

As concerns the global reach of these innovation networks, there are some notable trends. Firstly, the fact that the share of R&D investment outside EU27 is growing quickly. In 2006, 20% of R&D of the top EU R&D investment companies is performed outside EU (Commission 2009). Secondly, the country destination of these R&D FDI investments has been expanding, as well. Traditionally focused on the Triad (US, Europe, Japan), more and more firms are investing R&D in emerging economies like India and China. The figure below shows that for most part of the 2000s large firms' FDI in R&D in China and India has tended to grow, with clear drops in 2007 due to the crisis.

Figure 1: FDI in R&D by destination country, capital investment USD million



Source: FDI 2009

The data above show important trends towards the globalisation of STI. However, there is still a need to understand at a firm level of analysis, the firms’ preferences and the reasons why they globalise their R&D and other knowledge-intensive activities. INGENEUS aims at addressing this main question by conducting a survey among European and non-European firms, and by carrying out a series of detailed case studies of global innovation networks where European firms are actively involved.

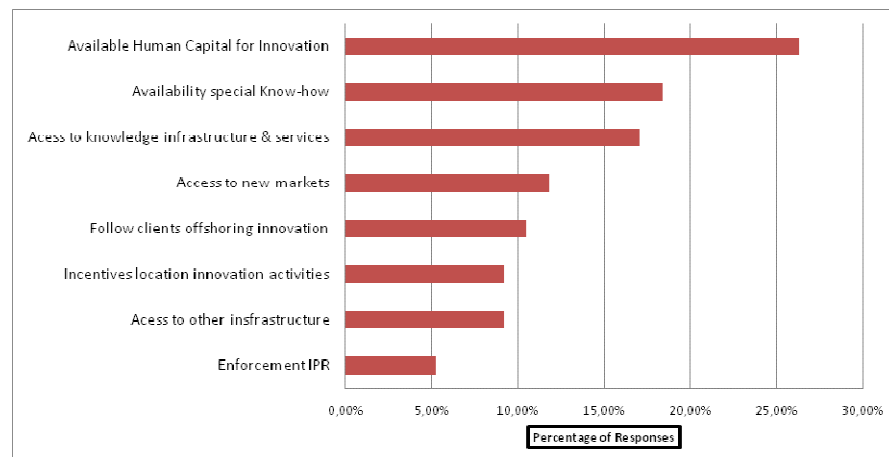
Why do EU firms take part in Global Innovation Networks?

Preliminary findings

From the above, it follows that it is crucial to understand the reasons why European firms take part in global innovation networks. In spite of interesting insights from a growing literature in this field, it is still largely unknown what exactly motivates firms to engage in these global networks. INGENEUS is currently conducting a survey of 488 European firms in Denmark, Sweden, Germany, Estonia and Norway. Here below we present some very preliminary results.

When asked: *“Which regional factors in the host region/ regions to which you moved were important in your company’s decision to offshore production and/or R&D and innovation activities?”* the sample of EU firms of our survey pointed clearly at *‘Availability of human capital for innovation’* and to a lesser extent *‘Availability of special know-how’* and *‘Access to knowledge infrastructure & services’*. It is worth pointing at the fact that these three factors have in common a high ‘knowledge’ component. It seems that ‘knowledge capabilities’ are factors which are relatively more important reasons for firms than strictly market-related factors (like ‘access to new markets’ or clients, market).

Figure 2: Percentage of responses about firms’ reasons for taking part in global innovation networks.



Source: INGENEUS survey, N=76

What do these preliminary findings indicate?

Firstly, they seem to confirm the widespread assumption that the main driver for globalisation of R&D activities and of innovation is largely associated with the access to appropriate and advanced forms of knowledge production. Tapping into complementary knowledge sources in the form of human resources, infrastructure or services that are outside the national boundaries, seem to be a major reason. These are interesting results, but more information is needed about why and how does this happen. According to aggregated data, much of this phenomenon happens within the same firm (multinationals intra-firm cross-border R&D investments) or within pre-existing linkages with 'foreign affiliates' (foreign companies whose administration is under control of the R&D investing firm) (OECD, 2009). Combining our survey results with these aggregated data would suggest that what we are witnessing is a process not only of tapping existing knowledge resources in a decentralised way within pre-existing networks, but also, that there is a genuine decentralized creation of new knowledge largely embedded in specific local contexts (Chaminade and Vang 2008). Locational factors seem to be visible in aggregated terms as well, as patent data show a high degree of intra-country concentration in a few sub-national regions that are internationalised, measured by the number of patents with co-inventors located abroad (OECD 2009).

Secondly, our preliminary findings show that proximity to clients and markets is an important reason to engage in global innovation networks, but less important than accessing knowledge resources. This would need to be confirmed in the future as our research in INGINEUS advances. But it might be an interesting and fascinating finding if market access comes second, not first.

Thirdly, the same happens with the issue of Intellectual Property Rights. There is traditionally large cross-sector variation in terms of propensity to patent, so the particular selection of sectors in our sample might have an important effect on this particular survey result. Yet, sector-specific and more anecdotal evidence tells that even in IPR-intensive sectors, weak IPR protection is not a determinant factor in decisions to off-shore R&D activities in emerging economies (Haakonsson, Mudambi et al. forthcoming). More generally, the weakness and/or unpredictability of institutions in these emerging economies do not seem to represent an unsurmountable barrier hindering R&D FDI (Wooldridge 2010). Our preliminary survey results support this anecdotal evidence, but more careful analysis is required.

Two policy recommendations

The dynamics discussed above raise two very important issues for European policy makers, and hence our two policy recommendations.

First of all, the lack of accurate firm-level data about the

globalisation of R&D and innovation activities is a very serious problem for policy makers. Scarce data represent an important hurdle for evidence-based policy making. Therefore, the heated debates about the likely effects of globalising innovation and R&D are likely to be based on unsustainable opinions rather than on sound scientific analysis. We know for example that in general terms, the more international links of innovation-related activities in a country, the higher its innovation ratio (Taylor 2009). Yet this might not mean that in all industrial sectors alike R&D and production activities are separated from each other without negative consequences (Ketokivi and Ali-Yrkkö 2009). General data about patents' co-invention, scientific publications' co-authoring, and other types of generic internationalization indicators need to be complemented with more sophisticated firm-level data that can tell us more about the determinants, dynamics, patterns, institutional context and effects of why, how and with what consequences are firms globalising their innovation activities.

Second, European policy makers must be prepared to invest more in skills and human resources in Europe for two reasons. The first reason is to strengthen the STI intensive knowledge competences of European firms in an intensified global competition in knowledge-related products and services. With new strong entrants in the global knowledge-based economy, advanced human resources are paramount for successful market competition. This is particularly important for the group of firms where unbundling (separation of R&D and production) is not possible or likely to happen. Acknowledging that European firms compete in global markets and that not all activities are subject to off-shoring, requires a continued effort in life-long learning and knowledge-intensive STI-based human resources. The second reason is to make Europe more attractive to R&D FDI from abroad. The amount of resources that firms from emerging economies are investing in R&D in Europe and the USA has increased substantially during the past few years. This is not likely to decrease in the coming years. But, Europe is also competing for attractiveness in a global perspective. If Europe wants to improve its level of attractiveness it has to put emphasis on skills and human resources.

More than ever, continued levels of public investments in STI skills and human resources are fundamental for the future competitiveness of the European economy. Short-termed budgetary retrenchments that fail to understand this will jeopardize the innovative dynamics of the European economy and its future positioning in world markets.

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€ 2.600.000,00

Website

www.ingineus.eu

Further reading

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