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Reorganising global value chains and building innovation capabilities in Brazil and India

Rasmus Lema[a,*], Ruy Quadros[b], Hubert Schmitz[c]

[a] Department of Business Management, Aalborg University, Denmark
[b] Department of Science and Technology Policy, Instituto de Geociências, University of Campinas, Brazil
[c] Institute of Development Studies, University of Sussex, United Kingdom

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ABSTRACT

This paper is concerned with global shifts in innovation power. It shows that Brazil and India are accumulating significant innovation capabilities. Most explanations concentrate on factors within these rising powers. This paper concentrates on explanatory factors which have their origin in the old powers (Europe and USA). In order to understand the build-up of innovation capabilities in Brazil and India, it examines their linkages with firms in Europe and USA, concentrating on the value chains which connect them. It shows how the organisational decomposition of the innovation process emanating from the old powers contributes directly and indirectly to the build-up of innovation capabilities in the new powers. The empirical evidence comes from the Brazilian auto and the Indian software industry and the value chains which link them to the United States and Germany. Two very different industries show a core of common findings on processes which contribute to building advanced innovation capabilities in India and Brazil.

1. Introduction

One of the clearest and best documented transformations in the global economy is the rapid build-up of *production* capabilities in China, India, Brazil and other rising powers. What is less clear is whether these countries are also succeeding in building up significant *innovation* capabilities. Altenburg et al. (2008) show that China and India have embarked on the transition from production to innovation but that the break-through is uneven; cutting edge innovation remains rare but adaptive innovation is significant in an increasing number of sectors. Many other studies have been carried out since then confirming that the picture is highly varied between and within sectors. While the variations are enormous, the trend seems clear. Enterprises in the rising powers are no longer just restricted to peripheral innovation activities. Some have accumulated advanced innovation capabilities and are approaching ever more strategic areas. This paper provides evidence for this advance from the Brazilian car industry and the Indian software industry. The main objective of this paper is to show how the reorganisation of global value chains has contributed to this advance. It examines the changing relationships between the old innovative powers and the rising powers with the aim to explore whether and how these changes contribute to the accumulation of innovative capabilities in the latter.

The recent literature points to a number of factors which explain the emerging shift in the global distribution of innovation activities. On the side of the new powers, these include:

- Big state and private investment in higher education.
- Low wages (compared with old powers) for highly educated workers.
- The return migration of engineers, scientists, and managers.
- The co-location (clustering) of local firms and support institutions.
- The increasing significance of lead markets in Asia and Latin America
- Governments 'trading market access for technology'.
- Local enterprises circumventing intellectual property rights of foreign firms.

* Corresponding author. Tel.: +45 99402708.
E-mail addresses: lema@business.aau.dk (R. Lema), ruyqc@ige.unicamp.br (R. Quadros), h.schmitz@ids.ac.uk (H. Schmitz).

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- The enormous financial resources which government agencies and enterprises can mobilise to buy technology or research teams.

The relevance of these factors varies between countries and sectors. Even if all of them are considered, they are unlikely to provide a sufficient explanation for the build-up of innovation capabilities in the rising powers. The old powers contribute to this build up too. The most visible example is European and American firms setting up R&D facilities in China, India or Brazil. There are also less visible ways in which they contribute to the shift in innovation power. Our research shows how this occurs in number of different of ways. We provide a conceptual framework for analysing these changes and evidence from the auto and software sectors, in particular the value chains which connect the USA and Germany with India and Brazil. This paper brings together the key conceptual and empirical points from comparative research examining the automobile and software industries.

A brief clarification of concepts used in this paper will help the reader. We find it useful to distinguish between production capabilities and innovation capabilities. The former refers to using and adapting existing knowledge. The latter refers to creating new knowledge and putting it to productive use.[1] Admittedly, there are cases when it is difficult to apply this distinction because of overlaps: knowledge adaptation can be considered both a part of the production and of the innovation capabilities. Often, there is a continuum between the two, but there is no *automatic* continuum. On the contrary, over recent decades the two have decoupled. While products and services made in the rising powers conquered world markets, there was no corresponding accumulation of innovation activities (Schmitz, 2007, p. 153; Parrilli et al., 2012; 5). They had production power but little innovation power. This is now changing in some sectors and firms. In this paper, we are examining sectors and firms in which this is taking place. The overall aim of the paper is to examine whether and how the reorganisation of global value chains contributes to the increasing innovative capability of the rising powers.

In order to do this, we bring together disparate but relevant strands of literature: There is a recent literature on the changing geography of innovation (Crescenzi et al., 2012; Fifarek and Veloso, 2010) but reorganising the innovation process does not play a central role in these studies. The latter is, however, the central concern in the work on 'open innovation' (Chesbrough, 2006; Cooke, 2005; Simard and West, 2006). This literature discusses the changing division of labour within and between the old powers, but has little to say about the accumulation of innovation capabilities in the rising powers which – being latecomers – have different starting conditions. This is why, we draw on the literature concerned with learning and capability formation in latecomer economies (Ariffin, 2000; Ariffin and Figueiredo 2006; Bell 2006, 2007; Figueiredo, 2006). These bodies of work are all helpful but what we need most is to understand the connections between them.

These connections in turn are not uncharted territory; there are literatures which have focused on global value chains connecting the old and rising powers. There is an international business literature focusing on investment-based value chains, i.e. chains that run within multinational firms. Parts of this literature have been centrally concerned with the division of labour and distribution of capabilities between parent firms and subsidiaries (Birkinshaw and Hood, 1998; Chen, 2008; Gerybadze and Reger, 1999; Hobday and Rush, 2007; Narula and Dunning, 2010; Saliola and Zanfei, 2009). And there is the value-chain literature that is mainly focused on inter-firm relations. It investigates how the relationships between global lead firms and local suppliers influence the build-up of capabilities in the rising powers (Ernst, 2008; Gereffi et al., 2005; Morrison et al., 2008; Schmitz, 2007). While all of these literatures discuss the internationalisation of innovation, there have been few attempts to pull them together and provide a framework for exploring the global reorganisation of capabilities.

When it comes to this global redistribution of capabilities, the public and academic discourse is hampered by inadequate language. The old distinction of developing–developed continues to dominate internationally but hinders understanding.[2] This is why we tend to name the countries we are concerned with, that is, Brazil and India on the one hand and the USA and Germany on the other. However, to make the paper more readable we also use occasionally the language that is in common use, notably the contrast between old and new powers, or declining and rising powers.

The paper is structured as follows: Section 2 brings out the strands of literature on which we build. Section 3 then goes to the heart of the matter, introducing the conceptual apparatus which gives us an analytical grip on the changes in the organisation of innovation and specifying the value added we seek to provide. Section 4 sets out the research questions which this conceptual framework helps us to tackle and explains how we went out about the empirical work. The empirical core of the paper is Section 5 which presents our main findings. The final Section 6 reflects on the significance of our findings.

2. What can we learn from the literature?

Over the last decade a fundamental change has occurred in the way innovation is organised. It tended to be concentrated at or near headquarters but is now much more decentralised within the company. Equally significant, innovation activities that used to be carried out in-house by innovating firms themselves are carried out by independent suppliers of knowledge intensive business services (KIBS), or are transferred to key suppliers. These organisational changes in themselves are not new; they have attracted a fair amount of discussion in the literature (e.g. Chesbrough, 2006; Coombs et al., 2003). There is however little systematic discussion of how they affect the global division of innovation activities and the building up of innovation capabilities in the rising powers. In order to address this, we draw upon: (1) the international business literature on MNC's globalization of R&D; (2) the global value chain literature focusing on the linkages between global buyers and local suppliers; and (3) the recent literature on global innovation networks and its attempt to develop a comprehensive lens for observing the changing division of innovative labour in an increasingly interconnected global economy.

The international business (IB) literature has evolved from an initial view that multinational firms typically transferred the results of innovation to subsidiaries in developing countries for local market exploitation, but they did not, to any significant degree, transfer the innovation activities themselves (Lall, 1993). R&D was largely absent outside Europe, Japan and USA. (Pavitt and Patel, 1999). This view was gradually replaced by the recognition that MNC's innovation in developing countries was more significant

[1] This distinction draws on the work of Martin Bell and colleagues. The 'capability approach' emerged in the course of a number of articles, notably Bell (1984), Lall (1992), Bell and Pavitt (1995), Figueiredo (2006), Ariffin and Figueiredo (2006).

[2] In continental Europe, the category of industrialized countries continues to be popular even though much of their industry has disappeared. The distinction of rich and poor countries remains more accurate because per capita incomes continue to differ substantially but (rising) intra-country differences between rich and poor regions is now the biggest concern, in particular in the rising powers. Reference to OECD countries is not useful for our purposes since the OECD includes now some of the emerging economies such as Korea, Mexico and Turkey. This paper cannot escape the problem of inadequate country classification. For an in-depth discussion of the problems of country classifications, see Harris et al. (2009).