

Understanding the Changes in the Global Distribution of Innovation Activities. A Challenge for Innovation Studies

In recent years, there has been increasing, if still somewhat limited, evidence suggesting that some Asian firms in certain regions and industries are starting to move up the value chain from competing on the basis of low costs to competing as generators of innovations (Parthasarathy and Aoyama, 2006; Altenburg *et al.*, 2008; Chaminade and Vang, 2006). Increasingly more firms are currently locating their R&D departments in Asian countries, notably China and

India (UNCTAD, 2005), while R&D activities and other innovation and knowledge intensity activities have traditionally been retained in the home country of the trans-national corporation (TNC). This is particularly evident for some industries and regions such as the IT industry in India or the

automotive industry in China (Altenburg *et al.*, 2008). Furthermore, in certain sectors, Asian firms seem to be rapidly moving up the value chain by providing R&D services to TNCs. One example is the case of the embedded software firms in Bangalore, India (Parthasarathy and Aoyama, 2006). Moreover, Asian firms have started to locate R&D departments in OECD countries (for example, Chinese or Indian firms locating R&D departments in the US) or even acquiring firms in OECD countries to get hold of their technological knowledge (Saxenian, 2001). This global re-location of R&D activities has run in parallel, and it is closely related, to the growth in internal research capabilities in these countries (China and India). In 2005, China was number three in the world in terms of gross domestic expenditure on R&D in absolute terms, following only the US and Japan (although as a percentage of Gross Domestic Product, the figure is only 1.4 per cent, which is similar to that of southern EU countries) and number two in the total number of researchers, following only the US (OECD, 2006).

In specialised literature as well as in more popular outlets (e.g. *The Economist*), there is growing debate on whether this evidence is indicative of a changing pattern in the global generation of innovation following the global shift in the location of production activities (the “made in China” syndrome). The main concern in the literature is to assess the impact of this global shift on developed as well as developing countries. The key question is whether the literature on innovation is able to provide some explanation about what might be expected from this global shift.

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What do we really know ...

The previous discussion on the possibilities of some Asian countries for becoming innovation powerhouses seems to be anchored in a very old paradigm in innovation studies. In the 1950s and 1960s, it was believed that innovation was the result of a sequential linear process (Arrow, 1962, Nelson, 1959). It was postulated that investments in R&D would almost automatically lead to new products or services. That is, there was a quasi-linear relationship between invention and innovation. This paradigm has been severely criticised. Innovation is not a linear process that starts with R&D, but is a complex interactive process (Kline and Rosenberg, 1984). Moreover, R&D is considered to be only a minor input of innovation activities for certain industries and types of firms (e.g. services and small firms). Consequently, looking almost exclusively at R&D investments in China and India or at their ability to attract FDI on R&D will provide a very narrow and limited picture of their capacity to innovate.

The innovation systems (IS) approach might provide a valuable alternative for assessing the innovation potential of China and India. For scholars in the IS tradition (Lundvall, 1992, Nelson, 1993, Freeman, 1987, Edquist 1997), innovation is not the result of heavy investments in R&D but of the continuous interaction with other sources of information for innovation, such as users (Fagerberg, 2004; Lundvall, 1988), universities (Mowery and Sampat, 2005), other competing or collaborating firms, etc. The IS approach emphasises the social nature of economic and innovative activities. In that sense, it is the institutional setup and relationships with other organisations that determine the ability of firms to innovate. In other words, the IS approach to innovation is not so much about how much the different organisations invest in research but rather how they interact, share and use that new knowledge. According to this alternative theoretical approach to the linear model of innovation, we might expect innovation to occur in well functioning innovation systems, that is, in those with strong and multiple organisations, institutions and relationships.

A closer look at the systems of innovation in certain dynamic regions of India, such as Bangalore, shows that there is a clear accumulation of capabilities, yet the system of innovation remains rather weak and fragmented (Chaminade and Vang, 2006). Collaboration with other firms, final users or universities is very limited. Given the IS approach, we could conclude that some firms in certain regions and industries in China and India are catching up, but that important constraints remain before they can become innovators on a global scale.

Conclusions

China and India are investing significantly in R&D and research-related capabilities. However, this does not necessarily mean that they will become innovators, at least not in the short- and mid-term, as important constraints seem to exist with regard to the functioning of their innovation systems, e.g. limited interaction between firms, users and universities or the low capability level of a large proportion of firms and local universities. Existing indicators based on R&D expenditure or R&D FDI flows are not sufficient to understand the functioning of the innovation systems in these countries. They reflect an old paradigm in innovation studies. Alternative approaches such as the system of innovation (SI) approach seem to be more adequate in theoretical terms, but there is very limited

data available on the functioning of those systems, meaning it is not possible to assess the extent and scope of the global distribution of innovation activities and their impact on developed and developing countries.

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