

# **The Role of Offshore R&D in Strengthening Competitive Advantage: Chances and Challenges in India**

By

**Rajnish Tiwari**

Research Project Global Innovation  
Institute of Technology and Innovation Management  
Hamburg University of Technology (TU Hamburg-Harburg)  
Schwarzenbergstr. 95 E, 21075 Hamburg, Germany

Tel: +49 – (0)40 – 42878 – 3776  
Fax: +49 – (0)40 – 42878 – 2867  
E-Mail: [rajnish.tiwari@tuhh.de](mailto:rajnish.tiwari@tuhh.de)  
Internet: [www.global-innovation.net](http://www.global-innovation.net)

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**Dipl.-Kfm. Rajnish Tiwari**

Hamburg University of Technology (TU Hamburg-Harburg)

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Schwarzenbergstr. 95, 21073 Hamburg, Germany

Tel: +49 (0)40 428 78 – 3776, Fax: +49 (0)40 428 78 – 2867

E-Mail: [rajnish.tiwari@tuhh.de](mailto:rajnish.tiwari@tuhh.de)

Internet: <http://www.global-innovation.net>

## **Abstract**

A recent phenomenon of globalisation has come to be known as “Knowledge Process Outsourcing” (KPO), whereby knowledge-intensive R&D work is outsourced to an outside firm or an offshore-subsiary. Primary motives of KPO are thought to be availability of highly-skilled labour, location of industry-specific clusters, product development costs and the incentive to develop products designed to suit the specific needs of a target market, physically and culturally distant from the home market of a firm. This synopsis outlines a proposed doctoral dissertation that seeks to identify and fully utilize the chances presented by India by integrating her in the firm’s innovation process.

## **Reference**

This synopsis was presented at the *Third Rexroth Doktoranden Kolloquium*, organized by the firm Bosch Rexroth AG in Lohr am Main, Germany, May 10-11, 2007 and published in the proceedings thereof. It should be referred to as following:

Tiwari, R. (2007): "The Role of Offshore R&D in Strengthening Competitive Advantage: Chances and Challenges in India", in: *Innovationen und Produktentstehung in der Antriebs- und Steuerungstechnik*, Proceedings of the Third Rexroth Doktoranden Kolloquium, Lohr am Main, Germany.

## **1. Introduction**

The ongoing integration of world economies (globalisation) has opened up an array of business opportunities and challenges for firms, e.g. in the form of access to new markets on the one hand and increased competition on the other; see for instance Bhagwati [2004] and Friedman [2005]. The intensified competition is forcing economists and business leaders to increasingly recognize the need to shift focus in business competition. Competitive advantage especially for firms from developed, industrialised nations is ever more, and almost compulsorily, innovation-driven [Tiwari, 2007], since they are at a disadvantage to compete with low-cost producers from emerging markets, see for instance EIU [2004], Marwaha et al [2005], Rammer et al [2005], Spielkamp et al [2006]. Innovations are however also necessary to cater to differing needs and/or demands of new markets [Beise, 2001; IBM, 2006].

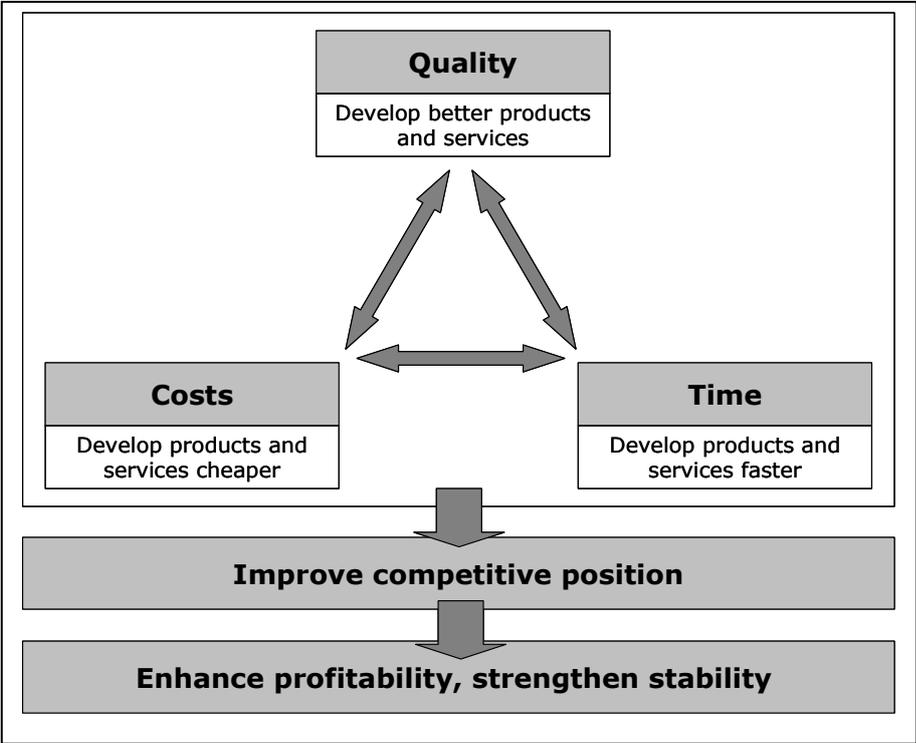
This synopsis, titled “The Role of Offshore R&D in Strengthening Competitive Advantage: Chances and Challenges in India” (working title) lays the foundation work for a doctoral dissertation at the Hamburg University of Technology conducted by the author under guidance of Prof. Cornelius Herstatt at the Institute of Technology and Innovation Management. The dissertation is a part of “Research Project Global Innovation” at the above mentioned institute, which, co-led by the author, is aimed at understanding the impact of offshore research and development (R&D) work. This aim is sought to be achieved by observing and analysing and later forecasting developments in the field of globalisation of innovation.

The synopsis is structured on the following lines: A case is made for globalisation of innovations in section 2, after this short introduction. Section 3 deals with opportunities and challenges for global innovation in India. Section 4 shades light on the proposed methodology. Section 5 deals with industry sectors which are of interest to this project. The pursued objectives and expected results are discussed in section 6. A summarized draft of project proposal is attached in section 7.

## **2. Globalisation of Innovation**

One of the most prominent features of globalisation has come to be known as “Business Process Outsourcing” (BPO), whereby firms outsource their routine, standardized activities to an entity outside of the firm’s boundary. This entity usually

enjoys cost advantages e.g. on account of specialization and/or geographic location [Meyer, 2006]. A logical extension of this trend has resulted in “Knowledge Process Outsourcing” (KPO), whereby knowledge-intensive R&D work is outsourced either to an outside firm or an offshore-subsidiary. A combination of these two methods is naturally also possible. Primary motives of KPO are thought to be availability of highly-skilled labour<sup>1</sup>, location of industry-specific clusters and/or the incentive to develop products designed to suit the specific needs of a target market, physically and culturally distant from the home market of a firm, see for instance Boutellier et al [2000], DIHK [2005], Arvanitis et al [2006], Blinder [2006], Ernst [2006], Fabian [2006] and Wyke et al [2006]. Incentives of global innovation can be summarized as illustrated in Figure 1:



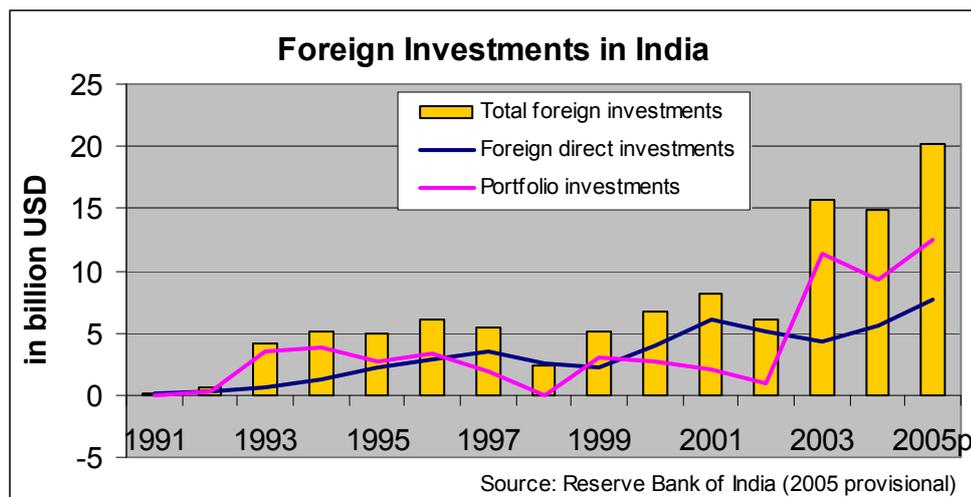
**Figure 1: Incentives of global R&D activities**

(Source: Tiwari et al, 2007)

The potential advantages of offshore R&D thus seem to be obvious. Many Fortune 500 firms have established R&D centres abroad; see for instance UNCTAD [2005a and 2005b]. More recently the emerging markets of India and China have

<sup>1</sup> Asia is often thought to possess an edge in the field of education, see e.g. Guo [2005].

attracted substantial foreign direct investment (FDI) in R&D sector.<sup>2</sup> India alone had reportedly attracted over 100 of the Fortune 500 firms to conduct a part of their R&D activities by 2003 [GOI, 2003]. Between 1998 and 2003 India received R&D investment worth US\$1.13 billion. Planned investments in the R&D sectors at the end of 2003 totalled to US\$ 4.65 billion. The largest investing country was the USA followed by Germany [TIFAC, 2006]. Figure 2 shows the growing pattern of foreign investments, including foreign direct investment (FDI) in India:



**Figure 2: Foreign investments in India since 1991**

India is even reputed to enjoy a considerable advantage vis-à-vis China in this field. The emergence of India as a leading R&D hub as against China is remarkable as the latter enjoys a far superior advantage in the manufacturing sector and generally possesses better infrastructural facilities. This fact throws up two interesting research issues:

- i) What are the factors, whose endowment is crucial or at least beneficial for an (overseas) R&D location?
- ii) Is the impact of these factors of universal nature or does it vary for particular industries?

An answer to these questions becomes even more critical as we consider that only a small number of companies involved in offshore R&D activities is able to actually generate advantages that are originally expected of their offshore operations,

<sup>2</sup> Both of these countries are undertaking concerted efforts to build cutting-edge scientific capabilities, see e.g. OECD [2006]. The EU counts them among “major R&D performing countries in the world”, see INNO METRICS [2006].

owing to several problems that arise in such an operation; see e.g. McKinsey [2003], Farrel [2004], and Fabian and Schmidli [2006]. As the globalisation process intensifies (e.g. the expected opening up of the services sector with the completion of Doha round of the WTO) and the pressure to rationalise (internal) cost-structures increases, more and more small and medium-sized enterprises (SMEs) that form the back-bone of the industry in many western countries such as Germany, will be confronted with the choice / opportunity / threat to make use of offshore R&D; see e.g. Herstatt et al [2007], Rammer at al [2005], and Spielkamp et al [2006]. Since SMEs generally do not enjoy same level of organizational slack as bigger corporations, their scope to make expensive experiments with uncertain outcomes is limited.

**3. Opportunities in India**

India has emerged as a prime location to conduct offshore R&D [Srinivasan, 2004]. A recent study conducted under the aegis of “PRO INNO Europe”, an initiative of the European Union, discovered that India has bagged most of the R&D projects offshored from EU-countries; followed by China and far ahead of US and other countries [LTT Research, 2007], as shown in Figure 3.

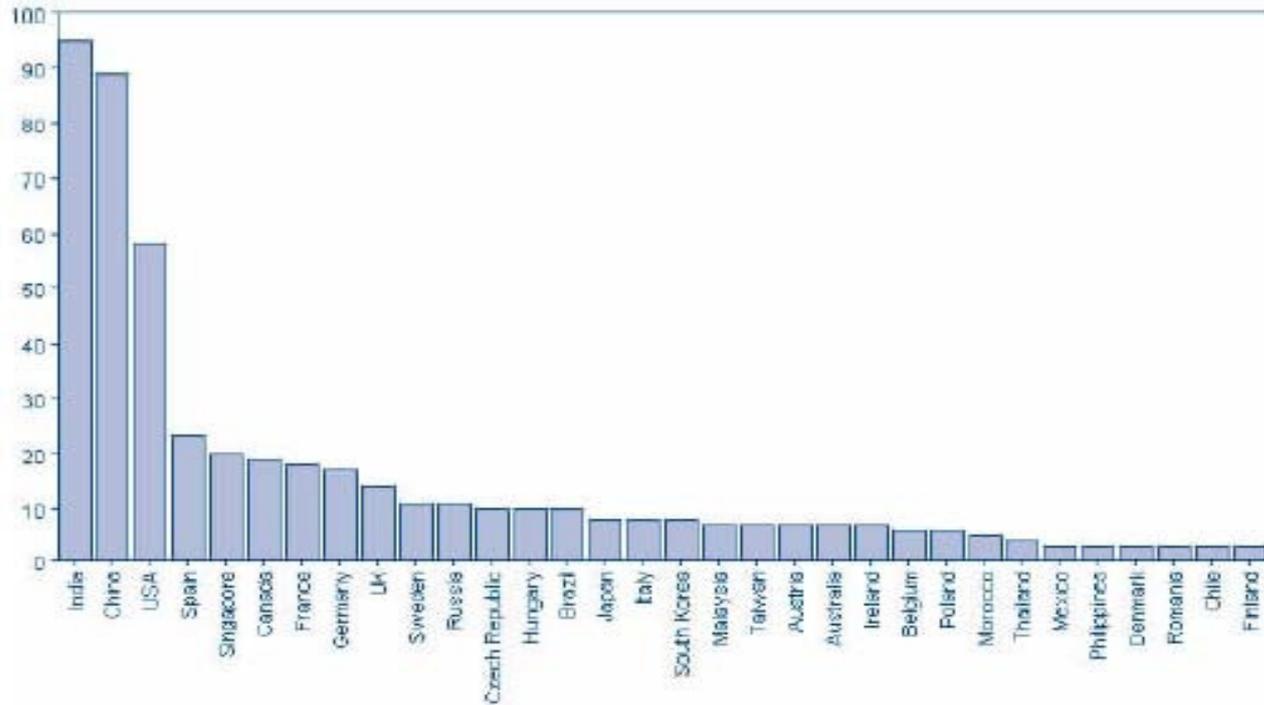
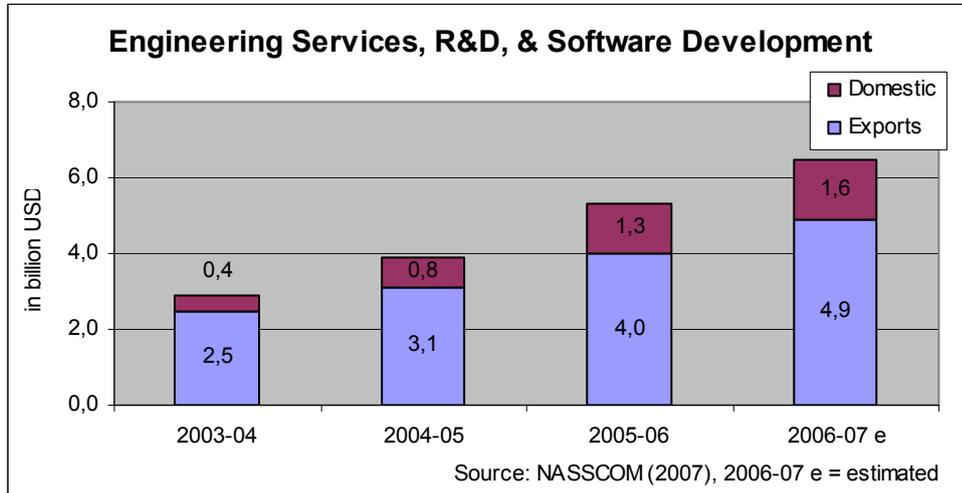


Figure 3: Number of R&D FDI projects from EU 25 by destination country, 2002–2006\*

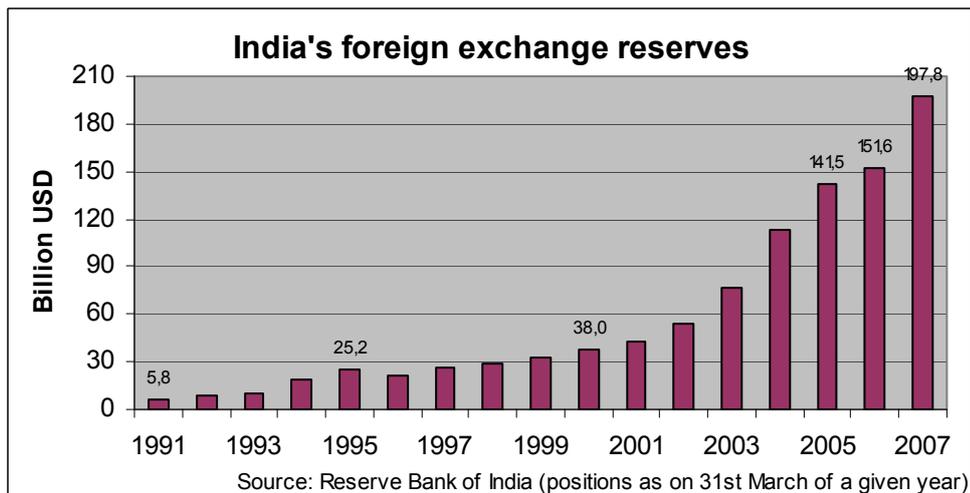
(\* The 2006 figures refer to January; Graphic: LTT Research, 2007)

Figure 4 illustrates India's revenue generation through high-end IT services and the impressive growth it has generated in past few years.



**Figure 4: India's revenues with high-end IT services**

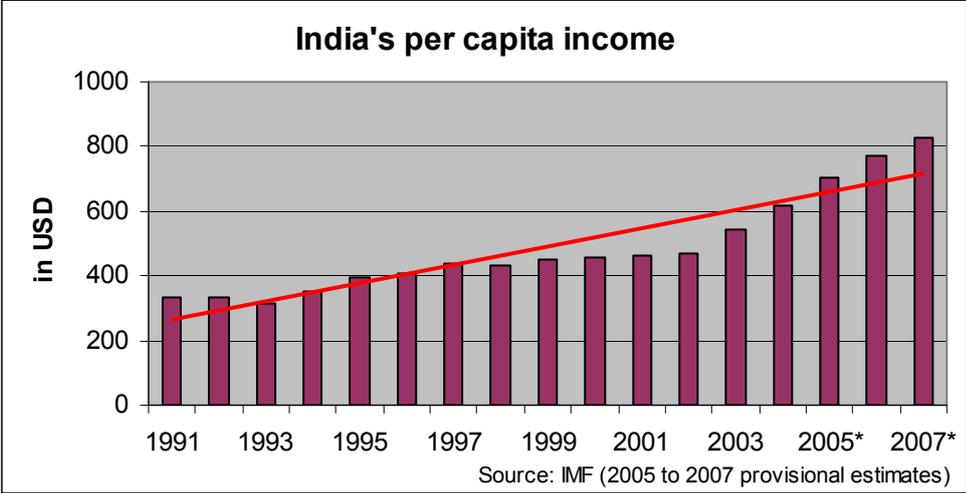
According to World Trade Organization (WTO) India's export of commercial services increased over six-fold from US\$ 6.3 billion in 1994 to US\$ 39.7 billion in 2004 [WTO, 2006]. This growth is also reflected in India's accumulated foreign exchange reserves, which registered a phenomenal growth between 1991 and 2007: from US\$ 5.8 billion to US\$ 197.8 billion, see Figure 5.<sup>3</sup>



**Figure 5: Growth in India's foreign exchange reserves since 1991**

<sup>3</sup> India's fiscal year runs from April of a given year to March of the following year.

Also India's Gross Domestic Product (GDP) increased over three-fold in the same period, from US\$ 281 billion in 1990-91 to US\$ 854.5 billion in 2005-06, leading to a substantial increase in per capita income, which grew in absolute terms from US\$ 335 in 1991 to an estimated US\$ 829 in 2007.



**Figure 6: India's per capita income in absolute terms**

This fact points out to opportunities presented by the large and growing Indian market, which is thought to comprise of the world's largest middle class. Additionally, India is thought to have a large pool of English speaking high-skilled labour while at the same time possessing the cost advantage. These factors are supplemented by other advantages too, such as a vast number of institutions of higher education, some of them belonging to the best world-wide, an independent judiciary and a comparatively good situation of law & order under a democratic form of government.<sup>4</sup>

**4. Proposed Methodology**

As an initial step, it is proposed to conduct 3-5 case-studies of firms either already active or proposing to get active in India for relocating parts of their innovation (especially R&D) activities. For this purpose, following means are proposed to be applied:

- i) Identification of suitable candidates (via: literature review, industry contacts)

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<sup>4</sup> For India's attractiveness as a R&D location, see Müller [2004], Hirschfeld [2005], UNCTAD [2005a/2005b], BCG [2006], Fabian [2006] and Kaufmann et al [2006].

- ii) Preliminary information (desk research)
- iii) Interviews at the headquarters to ascertain motivation factors / induce cooperation
- iv) On-site interviews in India
- v) Interviews at the headquarters to validate the data, if thought appropriate

Results of the case-studies shall be utilized to deduce hypotheses on India's "Innovation System" and the possibilities of its integration in a global innovation network. These hypotheses shall be put to test in an (industry-specific) empirical survey. The hypotheses on India's innovation system are to be ascertained via large-scale expert interviews in India and abroad. The involved experts would cover a wide range of fields so as to cover all aspects of an "innovation system"<sup>5</sup>. This study would help to:

- i) Comprehend inherent strengths and weaknesses of India's innovation system
- ii) Work out an resource upgrade plan, if desirable/feasible from the firm's point of view while offshoring R&D

These steps are crucial to fully exploit the chances presented by India by integrating her in the firm's innovation process. This project seeks to do so by applying a conceptual framework introduced by Ernst [2005]. Hereby it proposes to identify the "Pull", "Policy" and "Push" factors in an India-specific context for selected industries. In a third step, it might be useful to integrate the "Technological Units" model proposed by Reddy [2000], if found appropriate. This could help in identifying and assigning suitable roles (regional, global or corporate level technological units) to Indian subsidiaries within the global innovation network.

## **5. Industry sectors in focus**

Following sectors, in which India is reported to possess strong capabilities, build the focus of Research Project Global Innovation:

- i) Information and Communication Technologies (ICT)

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<sup>5</sup> For a discussion on innovation systems, see Nelson [1993], Edquist [2005], or Peters [2006]. Also Porter [1990] dwells upon a comparable concept albeit without calling it an "innovation system".

- ii) Automotives and Automotive Components
- iii) Life sciences (Pharmaceuticals, Biotechnology & Medical Devices)
- iv) Aerospace Industry (Civil Aviation and Space)
- v) Mechanical Engineering

This dissertation would probably concentrate on one industry sector, in order to fully concentrate the available resources and to examine as many relevant aspects as possible in breadth and depth, going on the level of process management in the firm and thereby addressing the organizational aspects. A final choice of the industry sector has not been made as yet.

## **6. Objectives and expected results**

It is imperative to undertake a scientific evaluation of opportunities and problems related to offshored R&D activities especially in a potentially attractive market like India, which is additionally a well-recognized R&D location with strong scientific capabilities. Further, an attempt would be made to identify factors that potentially determine the success/failure of an offshore R&D project. These issues, in turn, need to be clarified within the overall framework of the desirability and utility of innovations from a strategic perspective, i.e. their contribution to competitive advantage of a firm. This research hence proposes to conduct a two-tier study. The first tier should consist of a theoretical framework which examines questions such as:

- i) Need for innovations (e.g. competition, cost disadvantages and globalisation issues)
- ii) Means of innovations (e.g. organisational slack)
- iii) Advantages of offshore R&D (e.g. access to highly-skilled labour)
- iv) Disadvantages of offshore R&D (e.g. coordination problems, issues related to intellectual property rights)

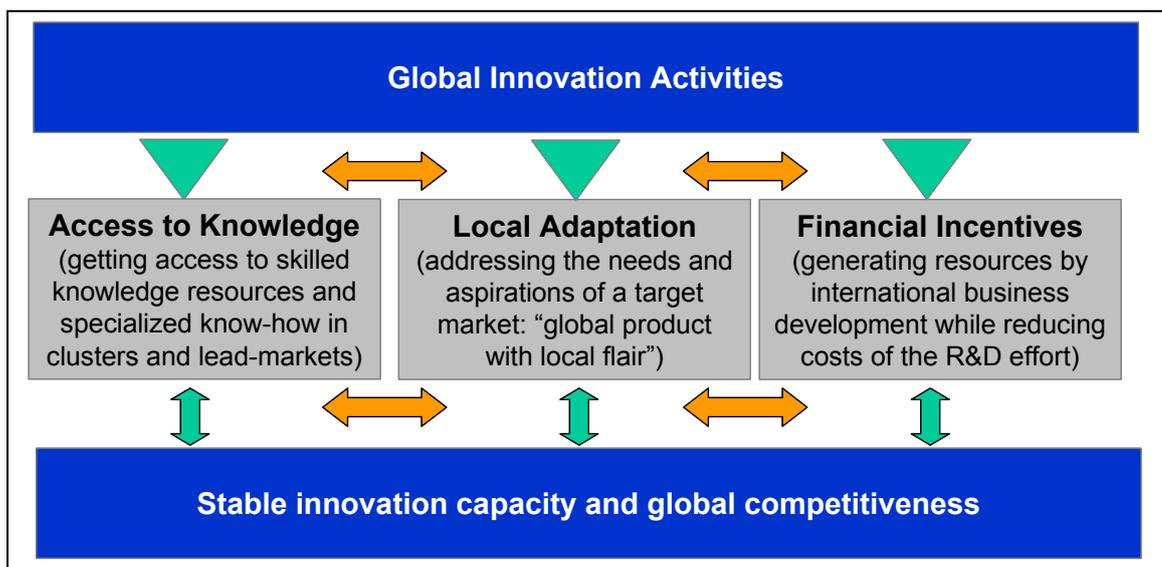
On a second level, an empirical study needs to be carried out, in order to:

- i) Examine the validity of the theoretical framework;
- ii) Identify crucial factors to help determine advantageous locations for different industries;
- iii) Assign suitable roles to different (offshore) subsidiaries.

For this purpose, a comparative survey of business environment conditions in India especially in regard to its attractiveness as an R&D location is proposed. Further, an analytical survey of firms engaged in offshore R&D activities is planned in order to assess their motivation in opting for offshore R&D and selection of a particular location. The primary objective of this research is to contribute to decision-making in firm, whether and under which conditions it may be recommendable to:

- i) Indulge in offshore innovation/R&D activities in India
- ii) Choose suitable industry-specific location, and
- iii) Optimize exploitation of the opportunities while minimizing risks.

A main advantage of this research work would be that the innovation drivers, when identified, would possess a significant practical relevance for the industry sector in question. Figure 7 illustrates the chances and risks that this dissertation seeks to identify and handle via global innovation activities.



**Figure 7: Chances and challenges of “global innovation”**

The project is expected to be completed by year end 2008.

## **7. Summarized draft of project proposal**

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