



Inclusiveness and Innovation – Challenges for Sustainable Growth of Emerging Economies: An Experience of India

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1. Introduction

In recent decades, there have been significant changes in the way corporate innovation is performed. They include changes in the innovation process, flexibility to outsource innovation activities, and most importantly, the location of innovation. There are mainly two new trends: First, location of globally strategic research and development (R&D) by the multinational corporations (MNCs) in some developing countries; second, more recently, some companies from the emerging economies have also started performing R&D to develop products and services for global markets. *Global Innovation in Emerging Economies* examines the dynamics of the globalization processes and the emergence of new locations for innovation and its implications.

The paper is based on secondary sources; organized in five sections with aim to review the experiences of India on inclusiveness **and innovation of emerging economies**. The first section deals with the introduction, second section will presents the select review of the literature emerging economics. The third section reviews the **global innovation of MNCs in emerging economies- determining factors**. The fourth sections will examines and discuss the main concerns to the **challenges for sustainable growth of emerging economies:**

based on Experience of India” and the last fifth section presents the conclusions.

2. Emerging Economies

2.1 Multinational Corporations (MNCs) Forms of Globalization of Corporate in Emerging Economies

Exploring twenty in-depth case studies of MNCs, local companies, and research institutes/universities based in Brazil, China, India, and South Africa (the so-called BRICS Group), (Reddy, 2011). The main concerns relate to the two new trends:

1. The new trend of multinational corporations (MNCs) locating strategic innovation activities in some countries outside the industrialized world, which can be referred to as 'emerging economies';
2. Since 2000, some companies from the emerging economies have started entering the global markets with innovative products and services, developed through their own R&D.

Forms of Globalization of Corporate R&D in Emerging Economies include:

1. Establishment of wholly owned R&D subsidiaries;
2. Establishment of joint venture R&D units with local or MNC partners;

3. Technology alliances with local or MNC partners in emerging economies;
4. Outsourcing of basic research components to local universities/research institutes abroad;
5. Outsourcing of parts of the innovation to local service providers;
6. Outsourcing of complete innovation to service providers.

In addition to the liberalization of macro policies on trade and investments, countries worldwide have also adopted better micro policies that directly affect the operations and value creation by companies in specific sectors. Some of the sector-specific policy changes that have a bearing on high-tech sectors include:

- 1. Enhanced intellectual property (IP) protection:** with minimum global standards; a dispute settlement mechanism; extension of intellectual property rights (IPRs) to a greater variety of products, processes and services;
- 2. More liberal rules on FDI:** permission for foreign investments across almost all sectors of the economy, including in private health care insurance; mergers and acquisitions (M&As), which are important for ICT, biomedical and financial services companies;
- 3. Health care products and needs:** standardization of regulations to make them more transparent; permission for early phase clinical trials by foreign companies; adoption of global standards such as good manufacturing practice (GMP) and good clinical practice (GCP); growing affluence in emerging economies demands superior medical products; shift from hygiene-related profile toward chronic and lifestyle-related diseases; with growing transport links and movement of people across regions local diseases are becoming global diseases requiring collective

response from health authorities worldwide (e.g., emergence and spread of severe acute respiratory syndrome (SARS), avian flu, swine flu, tuberculosis);

4. Growing demand in emerging economies: growing income in emerging economies is promoting demand for sophisticated products and services, with advanced features, high quality, safety and reliability as prominent features.

2.2 Cycles of the Technology Systems: *Phases*

The life cycles of the technology systems approach as conceptualized in the following phases:

Phase I: Introduction: involves original design and engineering, with the product in focus. Therefore, the S&T knowledge required will be high, whereas relevant skills and investment required will be low. The level of locational advantages required may be high for successful introduction.

Phase II: Rapid market growth: with the product development completed, the focus shifts to the production process and improvements to the product. Because the technological solution is already embodied in both product and production equipment, the S&T knowledge required will be low, but the skills and investment required will be high. Location and infrastructural economies generated by the innovation itself would also grow, making them more easily available to the late entrants.

Phase III: Productivity and firm's growth: the focus will be on managing the firm's growth and capturing market share. Scaling up the plant and incremental innovations to improve productivity become important. The capital costs and management skills required can be



very high. Entry at this stage for new entrants will be extremely difficult.

Phase IV: Maturity: the whole system is by now standardized and further investments in technological improvements result in diminishing returns. Firms would be willing to sell the technologies to others. Firms and locations with low costs of production will become competitive, but fixed investment costs will be high. The threshold of entry at this point is low, even though costs of entry could be high.

2.3. The Beginnings of Internationalization of R&D: Waves

The international corporate R&D classified activities into Technology Units includes Technology Transfer, Indigenous Technology, Global Technology, Corporate Technology Units and Regional Technology.

First Wave - Prior to the 1970s

The number of firms performing R&D abroad in the 1960s and earlier was extremely small. Most of the R&D performed abroad prior to the 1970s was that of TTUs. The driving force for internationalization of R&D during this *first wave* was to gain entry into a market abroad. This needed adaptation of the product and process technologies to local conditions and the need for continuous support of technical services.

Second Wave - The Growth of International Corporate R&D in the 1970s

By the 1970s, firms had started performing R&D abroad in a significant way. The main driving force was to increase the local market share abroad. This required increased sensitivity to local market differences to enhance competitiveness and the firms' general move toward world market orientation.

Third Wave - From Internationalization to Globalization of R&D in the 1980s

A number of major changes have been taking place since the 1980s in the nature and scope of R&D undertaken abroad by MNCs. Hence, the change in the term from internationalization to globalization, reflecting the characteristic differences from the earlier waves. The main driving forces for this phenomenon had been: first, the increasingly globalized basis of competition, aided by the convergence of consumer preferences worldwide, creating a need for worldwide learning; second, the increasing science base of new technologies, necessitating multisourcing of technologies; third, the rationalization of MNCs' operations, which assigned specific global roles to their subsidiaries abroad.

Fourth Wave - The New Patterns of Globalization of R&D in the 1990s

The key driving forces for globalization of R&D in the 1990s have been the increasing demand for skilled scientists and the rising R&D costs. These forces are triggering the *fourth wave* of globalization of R&D, encompassing non-OECD countries (emerging economies) as well. The categories of industries involved are microelectronics, biotechnology, pharmaceuticals, chemicals and software.

Fifth Wave - The Evolving Patterns in Globalization of R&D in the 2000s

Since the 2000s, emerging economies have been witnessing rapid economic growth rates, increasing the incomes of their populations. Consumers in these markets are demanding more sophisticated products as the consumers in the industrialized world. These products are not meant just for local markets, but global markets, where such market segments exist. The

category of industries involved includes both conventional and new technologies ranging from automobiles through ICT to biopharmaceuticals.

3. Global Innovation of MNCS In Emerging Economies- Determining Factors

3.1 Demand-side Factors

By the mid-1970s, in order to increase the market share in host countries, a need for increased sensitivity to local conditions became apparent. Along with the expansion of production facilities, some localized innovation activities were established to develop products exclusively for local markets (ITUs) (but basically derived from the parent's technologies). However, most of such R&D was located within the industrialized host countries. Only a few large developing countries, such as India, were locations for even these limited functions.

3.2 Supply-side Factors

Supply-side factors in emerging economies are also favoring such a move. Some developing countries possessed supply side factors. Until the early 1990s, such efforts, instead of resulting in rapid economic development, mostly resulted in increased unemployment among the educated or in brain drain. The twin reasons for such a situation have been: (a) mismatch between the requirements and human resources development (HRD) planning; (b) the low level and slow pace of industrialization. Even the limited industrialization in such countries mainly took place through transfer of ready-made technologies by MNCs.

In the early 1970s, one of the main reasons that MNCs did not locate strategic R&D abroad was the difficulty involved in coordinating and

supervising such activities. But by the mid-1970s, the improvements in ICT had vastly facilitated the scope for international sourcing of knowledge. The new technologies have become not only driving forces, but also enabling forces for the globalization of innovation.

3.3. Experiences of the Post-Socialist Republics 28 Transition Economies:

Gorodnichenko Yuriy, Jan Svejnar and Katherine Terrell (2008), in view of the recent theoretical literature on globalization and innovation, To test the predictions the study uses the data from the 2002 and 2005 Business Environment and Enterprise Performance Survey (BEEPS), a joint initiative of the European Bank for Reconstruction and Development (EBRD) and the World Bank Group. These are large surveys of enterprises (6,500 in 2002 and 7,900 in 2005) in 28 transition countries (including 28 transition economies of the post-socialist republics : 16 from CEEE (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Former Yugoslavia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia and Turkey) and 12 from the CIS (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan). The study tested the important predictions about the effects of competition in the product market and linkages with foreign firms on domestic firms' innovative activities, taking into account heterogeneity in firms' technological capabilities. The study focus on innovation is motivated by the fact that innovation is widely regarded as a channel through which local firms try to stay competitive in the new global economy. Economists tend to champion the



positive effects of globalization and competition.

3.4. Global R&D in Emerging Economies

The product life-cycle model was based on the hypothesis that innovation activities are almost always carried out in the home country of the MNC. The reasons for this have been:

1. Economies of scale are important in R&D activities and therefore may need to be concentrated in a single center;
2. Locational economies of integration involved in R&D, as the development of new products or processes requires close interaction between R&D, manufacturing and marketing; and
3. Innovation is perceived as a demand-led process, where the special demands of sophisticated consumers and skill-intensive downstream facilities in the home countries are seen as providing stimulus for innovation.

4. Emerging Economies: An Experience of India

Lynn Leonard, and Salzman Hal (2007) draw on data from a large study of the globalization of technology development to emerging economies to focus on the three areas are: the motivating **the factors, processes and the outcomes**. The study is based on 190 interviews at 67 sites of 38 MNEs in eight countries includes US, Europe, Japan, South Korea, Brazil, China, Mexico and India. Interviews were also conducted at eight IT firms in India. The findings shows that the MNCs motivating activities includes cost cutting, gaining access to new markets, gaining access to human

resources/technology from new areas. As geographical boundaries and attractive forces change, so, too, are organizational boundaries. Core technological innovation activities are carried out far away from MNE headquarters (and perhaps far from the observation and control of headquarters).

4.1. Present Scenario: India

India has now gained a reputation as a 'global R&D hub' for MNCs. Based on a global survey, the Economist Intelligence Unit (EIU) starting with the establishment of global R&D units by Texas Instruments (TI) and Astra Research Center India in 1985, India has been attracting R&D-related Foreign Direct Investment (FDI). Companies like Motorola and Hewlett-Packard followed in the early 1990s. By the end of 1999, there were 196 global R&D units, including wholly owned units and technology alliances in India. A World Bank study estimated that by the end of 2007, there were about 370 R&D units set up by MNCs (World Bank 2008). The global innovation activities of MNCs are increasing rapidly in India. Among the MNCs that set up global R&D facilities in India are: Caterpillar, Cisco Systems, DaimlerChrysler, DuPont, General Electric, IBM, Intel, Lucent, Microsoft, Oracle, Philips, SAP. GE's John F. Welch Technology Center in India, with an investment of US\$80 million and 1,600 researchers, is the company's first and largest R&D center outside the US. According to Technology Information, Forecasting and Assessment Council (TIFAC), between 1998 and 2003, foreign companies have spent US\$1.1 billion on R&D in India, (Reddy, 2011).

4.2. Indian Companies

1. QuEST Global

QuEST Global is a product-engineering design

and solutions company incorporated in the US, with operations in the US, Europe, Japan and India. In 2007 It has even promoted the development of an aerospace supply chain cluster in Belgaum (Karnataka, India) through its 300-acre precision engineering SEZ (Special Economic Zone) there, namely QuEST Global SEZ. QuEST's core industries includes Aerospace industry, Power generation industry, Oil and gas industry, Industrial products solutions and QuEST's customers include global majors such as GE, Rolls Royce, Pratt & Whitney, EADS/Airbus, Toshiba Industrial Power, Hitachi Power Systems, Technicas Reunidas and others. At Aero India 2007, QuEST announced a 50–50 joint venture with Magellan Aerospace Corporation, Canada, to set up India's first independent processing facility for aerospace manufacturing. It established a key processing facility for aluminum, titanium and stainless steel alloys to meet the needs of aero structure and aero engine components.

2. NATCO Pharma Limited

Natco pharma was established in 1984. Natco has employee strength of 1,500, since 2003, Natco went for branded marketing of its products, particularly in the case of its oncology products, and within a span of five years it has achieved a significant reputation in the market. Natco was one the pioneers in the country to introduce 'timed release formulations' (i.e. extended/controlled release mechanisms). Natco's *Research and Development* (R&D) focus is in the area of chemistry. Natco's R&D center has 100 scientists. By the beginning of 2006, it had filed about 100 patents under the Patent Cooperation Treaty (PCT). Most of them are for process and formulation innovations, with nine filed for new chemical entities

(NCEs). Prior to the World Trade Organization (WTO) agreement in 1995, the R&D focus of Indian pharmaceutical

companies was on process development.

3. Sai Life Sciences

Sai Life Sciences was established in 1999, as an R&D outsource service providing company. By 2006, Sai Life Sciences had grown to staff strength of 300 people; The company focuses exclusively on chemistry research. Sai Life Sciences has a customer base of about 40 foreign companies, with 80 percent of them based in the US and the rest in Europe and Japan. It has executed over 200 projects by 2006. Its customers now feel confident in the company and are assigning it development projects even in their core areas.

4. Tata Motors Nano Mission

The creation and design of the world's cheapest car is an excellent example of innovation and ingenuity, both inside and outside the organization. The Nano mission began back in 2003, when the chairman of Tata Motors India gave its engineers a challenge to build a 'people's car.' He set three requirements for the new vehicle: (1) It should be low-cost; (2) it should adhere to regulatory requirements; and (3) it should achieve performance targets such as fuel efficiency and acceleration capacity. The early designs developed were close to a scooter on four wheels, and they were quickly discarded. The chairman wanted a real car. Moreover, the Nano could promote entrepreneurship not only in terms of assembler, but also repair and service outlets in rural areas. The Nano could be used as taxis by individual entrepreneurs in places where currently three-wheelers, with questionable safety, are being used.



5. Conclusion

In recent decades, there have been significant changes. First, location of globally strategic R&D by the multinational corporations (MNCs) in some developing countries; second, more recently, some companies from the emerging economies have also started performing R&D to develop products and services for global markets. These trends are occurring in a dynamic business environment that consists of mutually reinforcing economic and technological changes. These trends have managerial implications for companies and policy implications for the emerging economies where such R&D is performed, as well as for the industrialized home countries of the companies. Further, innovative products and services resulting from R&D activities in emerging economies seem to better address the needs of consumers at the bottom-of-the-pyramid in other developing countries. The literature on international economics as the global economy becomes more and more closely interlinked, MNCs have been seeking new advantages by establishing global value chains, where product development, production and logistics are located around the world, in terms of cost considerations (e.g., labor-intensive operations in low-cost countries) or considerations of access to knowledge resources (e.g., R&D operations in knowledge-intensive regions)

Selected References

German Federal Ministry for Economic Cooperation and Development (BMZ)(2008), “**Financial Innovation and Emerging Markets Opportunities for Growth vs. Risks for Financial Stability**” Hosted by the German Federal Ministry for Economic Cooperation and Development (BMZ), convened by the, Div. 2.01, Economic

Policy/Good Governance, Capacity Building International, Germany and the German Development Institute (DIE), **Proceedings**

3–4 July 2008, Berlin.

Gorodnichenko Yuriy, Jan Svejnar and Katherine Terrell (2008), “**Globalization and Innovation in Emerging Markets, Discussion Paper Series**,” Forschungsinstitut zur Zukunft der Arbeit Institute for the Study of Labor, IZA DP No. 3299, January 2008, Bonn.

Lynn Leonard, and Salzman Hal (2007), “**Innovation Shift to the Emerging Economies: Cases from IT and Heavy Industries**,” April 2007, Sloan Industries Conference.

Mashelkar, R. A. (2006). “Beyond Bangalore? The Changing Landscape of Indian Science and Innovation.” Presentation, June 27, 2006.

<http://www.csir.res.in/External/Heads/aboutcsir/leaders/DG/Presentations/BeyondBangalore.pdf>

Reddy Prasada (2011), “**Global Innovation in Emerging Economies**,” **International Development Research Centre**, Routledge, New York.

Tiwari Rajnish and Herstatt Cornelius (2011), “**Technology and Innovation Management Lead Market Factors for Global Innovation: Emerging Evidence from India**,” April 2011, Working Paper No. 61, **Hamburg University of Technology**, Schwarzenbergstr. 95, D-21073 Hamburg, Germany.

www.tu-harburg.de/tim www.global-innovation.net

