Understanding R&D offshoring strategies of Northern and Southern firms: Lessons from India

European Union's FP7 research project on
Impact of Networks, Globalisation and their Interaction with EU Strategies
Belo Horizonte
2-4 May 2011

International Institute of Information Technology,
Bangalore, India
Balaji Parthasarathy
V Ranganathan

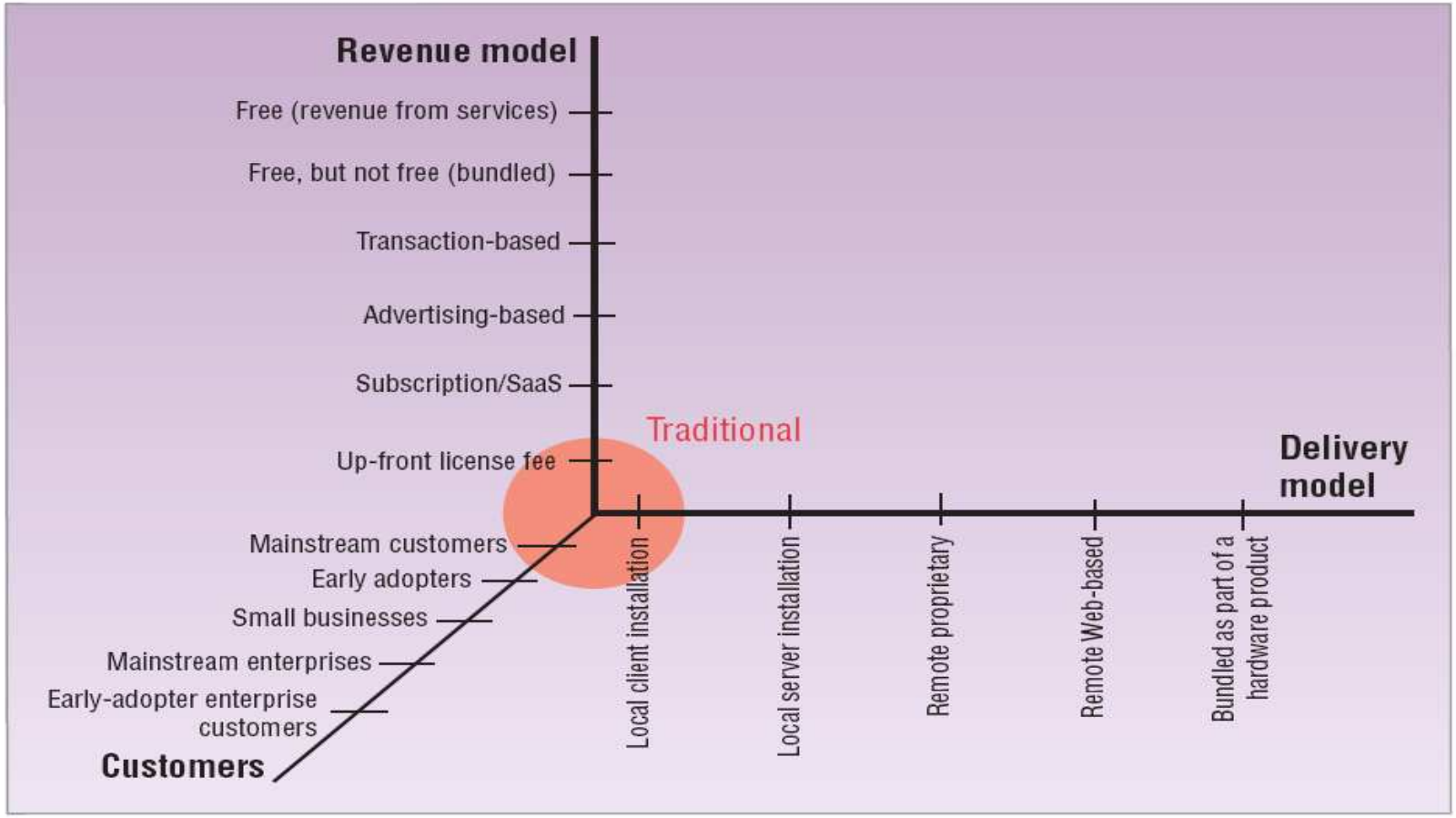
Changing context for innovation

- growing economic dependence on services at the expense of agriculture and manufacturing, especially in advanced industrial economies, calls for new approaches to innovation (Chesborough 2010).

- treating every business as a service is the best way of dealing with the commoditization of products and the drift of production to low-wage locations.

- proposes a service life-cycle in which firms differentiate themselves in markets characterized by product commoditization by seeking revenues from the sales of services, or products sold with services, such as consulting, technical support or systems integration.

Service life cycle approach in the software industry



Source: Cusumano (2008:23)

Seeking a spatial division of labor in the ICT industry

- Chesbrough posits a division of labor in which firms in advanced economies innovate by providing services, while emerging economies undertake production, Cusumano does not specify any spatial division of labor in the shift toward services in the ICT industry.

- but in the ICT industry, the evolution of the spatial division of labor has departed from Chesbrough's model.

- the Indian ICT services industry grew from US$81 million in 1985-86 to US$58.7 billion in 2008-09 by integrating itself into global markets as a provider of services – initially, in custom software development before moving to technology support and consulting. With ~80% of those revenues coming from exports, India became the world's largest exporter of ICT services.

From GPNs to GINs in the Indian ICT industry: A demand side explanation

- the competitive advantage of the ICT services industry in India was initially based on relatively low cost but skilled labor.

- but the fortunes of the industry are no longer tied exclusively to low wages. For instance, Bangalore has become a center for innovative firms in embedded systems.

- explanations for the evolution of the Indian ICT services industry from its entry into Global Production Networks (GPNs), and into Global Innovation Networks (GINs), thus far have emphasized supply side factors such as availability of skilled labor.

- this presentation will draw on a long-standing literature emphasizing producer-user interaction (Lundvall, 1988) and user-led innovation (von Hippel, 2005) to provide a demand side explanation for an emerging phase of the ICT industry in India.

The role of a layered architecture

- (i) influences the technical attributes of a system, such as security or ease of modification,

- (ii) gives intellectual control over a complex system:

  "….allowing us to substitute the complex with a set of interacting pieces, each one of which is substantially simpler than the whole. The prudent partitioning of a whole into parts is what allows groups of people - often groups of people separated by organizational, geographical, and even temporal boundaries - to work cooperatively and productively together to solve a much larger problem than any of them would be capable of individually. It's "divide and conquer" followed by "mind your own business" - that is, each part can be built knowing very little about the other parts - resulting in "*e pluribus unum*." (Bachmann et al, 2000:1).

The empirical cases and the argument

- this layering provides the framework to understand the activities of four firms with a presence in India - firm1, firm2, firm3, and firm4 – for WP5 of the INGINEUS study

- although each firms occupies different layers in the technical architecture of the ICT industry, with different product and service offerings, common to them is the effort to stretch their capabilities to reach the customer directly, thereby integrating India into GINs.

- effort to reach the customer itself an outcome of two forces that the technological capability of India's ICT service industry has responded to.

I - The shifting compulsions of technology deployment

- early adopters of ICTs had an gained competitive advantage, merely with enhanced/speedier information flows that followed the adoption.

- but as the increasing affordability and accessibility of ICTs led to widespread adoption, deploying ICTs became just another aspect of doing business and *sine qua non* to compete in the market (Carr, 2004).

- as ubiquitous technology made information availability less of an issue, what differentiated users was not the adoption of ICTs *per se* but the organizational means of adopting technology. Unless well-conceived, IT investments can even lead to a corrosion of competitive advantage.

- this requires the providers of ICTs to show sensitivity to user and customer needs, which typically vary by domain and geography; case of firm1 and the firm1 and firm2.

II - Market saturation and new customers

- With a demographic shift in advanced industrial countries and saturation of demand, the estimated four billion consumers at the 'bottom-of-the-pyramid' (BoP), are becoming attractive.

- The BoP is a potentially vast and yet largely untapped market, as the majority owns few consumer products. But challenges when entering the unfamiliar this market include infrastructural inadequacies, socio-cultural diversity, and affordability.

- As existing metrics for "lead' users do not work and needs are hard to identify, technological solutions are difficult to conceive.

- India's size, economic and social diversity translates into diversity in the demand for products and services. The availability of technical skills, make the country a unique location for R&D as the firm4 cases describe.

firm1: “reactive problem solver” to “proactive problem definer”

- To overcome growth pressures faced as a software-services firm, firm1 established Labs to identify emerging technologies and devise innovative applications for customers in the context of their businesses.

- Argument: “technology is not the only differentiator, but technology is the key differentiator”

- 2 aspects of Labs work with customers to help them build ‘tomorrows enterprise’ as part of their strategy of organizational transformation:

  (i) product engineering – using cloud computing, mobility, and business analytics to provide a horizontal foundation (middleware) on which domains such as banking, insurance, retail, can erect their layers.

  (ii) operations - ensuring the process efficiency of, say, Business Process Outsourcing, by linking business goals, predictive models and day-to-day activities with real time data

Organizational transformation through ‘co-creation’

- Labs help customers build ‘tomorrow’s enterprise’, through “co-creation”. This means interacting with firm1 customers on strategic projects being done for the first time. The helps understand the issues that customers face, and to identify possibilities for IP generation.

- Co-creation happens not just with customers but in consortia with universities, research institutes and other technology partners to identify problems of relevance to businesses.

- Labs (from India) and firm5 (from UK) driving the India-UK Advanced Technology Centre. IU-ATC brings together universities, industrial partners and SMEs in both countries. The initiative aims to establish Next Generation Networks, Systems and Services, to provide the support infrastructure to enable the Digital Economy of both countries.

Implications of co-creation

- Engineering: encourages use of multiple technologies in various combinations to develop new applications. For example, a customer should not spend resources understanding, say, mobile technologies; instead he need focus only on devising ways to exploit mobility in their business.

- Organizational: innovation increasingly found at the intersection of disciplines, technologies, domains, markets, and people, i.e., “innovation is no longer possible within the four walls” of any organization.

- For firm1: from a provider of outsourced software services, with a specified role in a transaction, to one of many partners in a collective effort and a contextual relationship to define outcomes i.e., firm1’ does not remain at the receiving end of knowledge flows. Instead, it becomes a producer and integrator in a knowledge ecosystem.

firm4(1) as part of a "network of competencies"

- Seeking growth in Asian markets – combination of commercial pragmatism (saturation in affluent countries) and corporate responsibility (working for the underprivileged/ underserved) – firm4(1) established in 2004 in Bangalore.

- Given India's strengths in ICTs, initial focus was on software engineering, distributed computing, and embedded systems, to reinforce "the structure of Corporate Technologies as a network of competencies".

- But this posed twin challenges in meeting firm4(1)'s goals:

  (i) market segmentation – building global products alone to address local would not suffice. For instance, "you cannot claim to be a leading health care provider….in a country like India when the health care is targeted only to the top 200 million people."

  (ii) innovation challenge - in designing from scratch by understanding local requirements, especially low affordability and limited infrastructure, rather than altering existing products for local markets.

SMART applications for the BoP

- To meet these challenges, firm4(1) devised a SMART approach to address the triple bottom line of economic, environmental and social sustainability : **S**(imple), **M(**aintenance free) **A**(ffordable) **R**(eliable) **T**(imely)

- Yet, for a research lab in a highly process driven firm that undertakes as much as possible in-house, firm4(1) lacked the skills to innovate for the targeted market.

- Forced to adopt an open innovation model to work closely with academic institutions, non-government and not-for-profit organizations.

- firm4(1) is working with health care workers of the public health system to track and automate the health records of rural citizens who may move around for personal or professional reasons. The problem is less a technical challenge than of determining how best to insert technological capabilities within India's rural healthcare system.

From the “lab is my world” to the “world is my lab” and its limits

- flows between for-profit and formal, and not-for-profit (and informal) institutions akin to the increasing burring of boundaries in software products as closed source and open source code are increasingly “co-mingled” (Lerner and Schankerman, 2010).

- Despite the learning from the local markets, and the possibility of innovations traveling across borders,

  “….we also have limitations….in terms of core fundamental research. I still don’t see us coming out with the next generation materials which will enhance the efficiency of photovoltaics…. But India, I would say, will always continue to provide a very good way of doing the translation of technologies….[from]….developed economies, we need to bring a level of commercialization of technologies and in the process have an advantage which will be global….because the moment the volume starts kicking in, I think it will bring down the cost of technology as well.”

Mukul Saxena

Senior Vice President, firm4(1) , Bangalore, 27 July 2010

Conclusion: the potential and limits of India's entry into GINs

- Indian experience shows that entry into GINs is neither limited to advanced industrial economies nor is it the preserve of those who make products i.e., "windows of locational opportunity" continue to create provide the means for altering the existing spatial division of labor.

- Market opportunities, derived either from the changing role of technology for users, or the opportunities presented by the hitherto neglected BoP population, have induced firms to innovate with knowledge flows and organizational forms i.e., through reworking the social division of labor.

- But the novelty of this innovation and its impact be exaggerated since India's entry into GPNs of the ICT services industry was itself based on new spatial and organizational arrangements. And the resulting service delivery capabilities were a pre-requisite to the changes in the past decade.

- Finally, as firms have opined, India is as yet an unlikely location from which to expect a seminal breakthrough that alters the technical division of labor radically.

firm2: the gradual movement east

- first came to India in 1995 to establish a representative office
- in 1999, established US20 million Global Engineering Development Center in Bangalore to source “engineering and talent” to develop products/
- acknowledging its San-Jose centricity, despite growth of Asian markets, firm2 realized the need for physical presence to better understand these markets. Thus, pressures to globalize came from customers and the market.
- John Chambers announced an investment of US$1.1 billion in India in October 2005 centered around firm2 Globalization Center East in Bangalore which serves as a “mirror site” to all headquarters functions.
- providing all functions as part of a global team and participating in global work, the Bangalore is no longer only about engineering and development. Nor is it a center for the India market. It is a center for global markets.

Providing platform technologies

- globalization vision to provide products and services of relevance to various markets by drawing on core strengths in networking.

- Emblematic is the promotion of Smart+Connected Communities, that provides a platform to deliver various infrastructural and social functions (eg. security, health, education) for “intelligent and green” cities.

- The provision of such services on an open-architecture platform requires partnerships with both domain experts and systems integrators to tie together customer needs.

- alliance with Apollo Hospitals to deliver health care in rural Raichur district, Karnataka, with the firm2 patented high definition audio and video technology to facilitate end–to-end telemedicine and remote diagnostics.

- offering Telepresence, a technology that provides high-definition audio and video conferencing facilities across a virtual table, to the Westin Tokyo and other hotels belonging to the Starwood Hotels and Resorts group, in partnership with Tata Communications.

Looking further east to China

- firm2 entered China in 1994, and currently has more than 3400 employees engaged in various functions including 16 subsidiaries in China, and a global R&D center in Shanghai established in 2005.

- in November 2007, CEO Chambers announced “innovation and sustainability” as a strategic emphasis in China, and an investment of US$16 billion in 3-5 years to increase local procurement, as well as inputs into education, finance leasing, R&D, sales and service, etc

- in April 2008, firm2 announced strengthening of cooperation with Chinese government and industry including investments of:

  (i) US$350 million in local firms (in addition to US$700 million already made);

  (ii) US$20 million dollars establishing Guanghua-firm2 Leadership Institute with Beijing University;

  (iii) 300 firm2 networking technology academies in vocational colleges.

China for firm2

- China is not only a market, but also a place where ideas come from. “Therefore firm2 wants to be part of China, for China, in China.”

- Issue of concern for firm2 – intellectual property and the different treatment the firm gets from local enterprises.