Indian IT Industry Firms: Moving towards an Active Innovation Strategy

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Abstract. This paper aims to describe the changing innovation strategies of Indian IT industry firms. Indian firms are responding to global technological discontinuities proactively and faster, compared to the past. Innovations continue to be process driven, however, there is significant focus on non-linear, products & platforms-led growth strategies. There has been an upward shift in R&D/IP emphasis, as empirical data suggests, and emphasis on collaborative innovation. Firms are willing to make riskier investments compared to past. The paper also discusses some of the challenges the players face, as they build the next generation innovations and offerings. Nature of emerging technologies provides further scope for firms to come up with innovative products, services and solutions. Key conclusion is that the innovation strategy of Indian IT industry has changed from 'reactive' to 'active'.

Keywords: Innovation Strategy, Indian IT industry, Open Innovation, Non-Linear Growth.

1   Introduction

The Indian IT industry has been a remarkable success story for the country in the last 2 decades, growing from $150 million in 1990 to $100 billion in size in 2012. The industry has secured its own place in the global map of Information Technology players, comprising product vendors, consulting firms, system integrators, and services providers. This growth has been facilitated by the ability of the industry to continuously move up the outsourcing value chain.

When it was set up, the industry was a disruptive innovation as defined by Clayton Christensen (Christensen, 1997). The offshore business model served an existing customer need, through a different, low-cost based value proposition. However, in recent times, need for non-linear revenue models, changing customer expectations, challenges in talent availability and competitive pressures are forcing the Indian IT firms to shift their innovation strategies.

How do you define innovation strategy? As defined by Dodgson, Gann and Salter, the Innovation Strategy of firms can be categorized into 4 types (figure 1). The Key Research Proposition to be investigated here is that the Indian IT industry is advancing its innovation strategy from 'Reactive' to 'Active' mode.

	Proactive	Active	Reactive	Passive
Objectives	Technology & Market leadership	Not the first to innovate; prepared to follow quickly	Wait and see; Follow a long way behind	Do what is demanded by customers or dominant firms
Type of Innovation	Radical & Incremental	Mainly Incremental	Entirely Incremental	Occasionally incremental
Knowledge Sources	Science; In-house R&D; Collaboration with technology leaders; lead customers	In-house R&D, Collaboration with technology leaders, customers and suppliers	Competitors, customers, purchase of licenses	Customers
Risk acceptance	High risk	Medium-Low risk	Low risk	No risk

Fig. 1. Innovation Strategies - Adopted from (Dodgson, Gann, & Salter, 2008)

2   Innovation Objectives and Type of Innovation

In the early years, the business models of Indian IT firms were primarily dictated by their customer requirements. Innovations were primarily passive and reactive in nature. Customer requirements in of process, productivity and quality improvements influenced the innovation objectives of firms. Consequently, most of the innovations were incremental process improvements. Capabilities to recruit and train large number of engineering graduates, Quality certifications and standards, project management expertise and global delivery model were all examples of such innovation. Dominant firms such as TCS, Infosys and Wipro set the standards, which became de facto practices in the industry. New technology development usually happened in developed markets (primarily the US). Dominant IT firms in India utilized these technological discontinuities to offer services including Application Development and Maintenance, Testing, Systems Integration and Technology Consulting. However, in recent times, there has been a notable shift in the pace of technology diffusion from global majors to Indian firms, as shown below (Fig 2).

As can be seen from recent adoption of emerging technologies (such as Big Data Analytics and Mobility) by Indian firms, the time lag between emergence of a new technology (in a developed market like the US) and development of services/solutions based on the same by Indian IT firms is decreasing. Additionally, smaller Indian IT companies are building solutions of their own, reducing their dependency on the dominant Indian firms for expertise and ideas.

Hence, the Innovation Objectives (quick-to-follow strategy) and the Nature of Innovation (still incremental, primarily) point to an 'Active' stage of Innovation in the Indian IT industry.
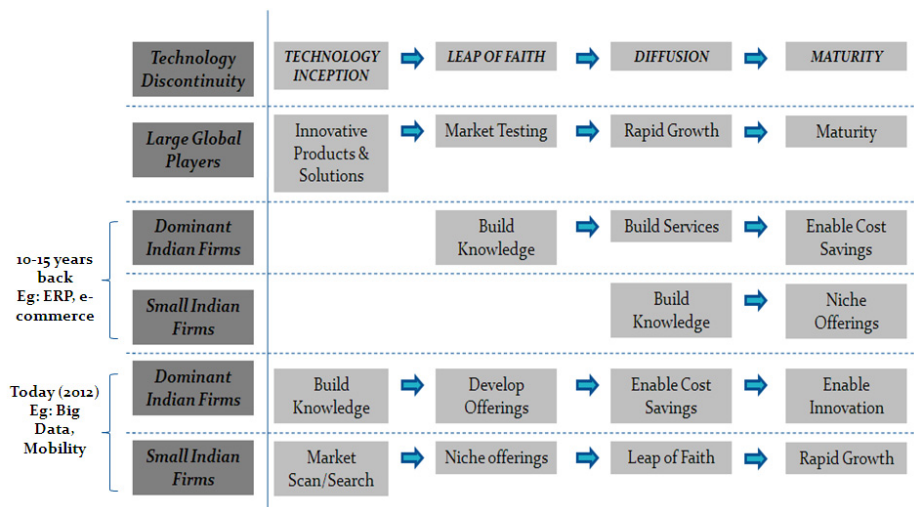
	TECHNOLOGY INCEPTION	LEAP OF FAITH	DIFFUSION	MATURITY
Technology Discontinuity				
Large Global Players	Innovative Products & Solutions	Market Testing	Rapid Growth	Maturity
Dominant Indian Firms		Build Knowledge	Build Services	Enable Cost Savings
Small Indian Firms			Build Knowledge	Niche Offerings
Dominant Indian Firms	Build Knowledge	Develop Offerings	Enable Cost Savings	Enable Innovation
Small Indian Firms	Market Scan/Search	Niche offerings	Leap of Faith	Rapid Growth

10-15 years back Eg: ERP, e-commerce

Today (2012) Eg: Big Data, Mobility

Fig. 2. Quick-to-follow strategy of Indian IT firms (Source: Own Research)

3   Knowledge Sources

Upping the Ante on R&D: Figure 3 below suggests an increase in the R&D intensity of key top players in the industry. TCS and Infosys have significantly increased the number of patents filed in recent times. Firms have publicly stated the need for IP driven growth. An example is the increased focus on products and platforms in the case of some of the larger IT companies.

Collaborative Innovation: The Indian IT firms have a long history of collaborating with industry actors. However, in recent times, the linkages have grown stronger, with more emphasis on leveraging the linkages for innovation. Linkages with customers have evolved from transactional relationships to collaborative partnerships, joint IP creation, joint value discovery and revenue sharing agreements. A case in point is Infosys' strategic relationship with P&G that started in 2007 in achieving business transformation and co-creation of innovation (Source: Infosys Annual Report 2012). Supplier linkages with educational institutions and students (human resources are the key input to IT companies) now incorporate faculty/student training, industry spon-sored labs, R&D partnerships & Research sponsorships. IT companies have also forged several strategic partnerships with third party product vendors, which have contributed in technology transfer. For instance a few years back, Wipro launched its ambitious 10x initiative, to train 10000 faculty members across 1500 engineering colleges. The company is involved with more than 1000 schools across the country, and is an active education ecosystem player including periodic meetings and discus-sions, regular e-mail exchanges, Annual Education Forum, Faculty Workshops, and interactions on the Mission 10x collaborative portal (Source: Wipro Technologies Annual Reports 2008, 2012). TCS has a trademarked co-innovation platform known as COIN for collaborating with several network actors, and also supports (through Research Scholarship) 80 PhD students from about 25 educational institutions

(Source: TCS Annual Report 2012, company web site). Web sites of many IT companies have dedicated sections that talk about Innovation strategies and strategic alliances. This is a clear indication that the industry perceives and has adopted open innovation as a beneficial strategy.

	2012	2011	2010	2009	2008	2007	2006
TCS							
Patents	460	223	87	58	26	25	17
R&D Expenditure (Rs Cr.)	405.06	281.78	77.58	43.92	38.78	33.64	32.04
R&D Intensity (R&D Expenditure/sales) %	0.83	0.75	0.26	0.16	0.2	0.22	0.28
Infosys							
Patents	143	91	31	79	10	38	20
R&D Expenditure (Rs Cr.)	660	527	440	267	201	167	102
R&D Intensity (R&D Expenditure/sales) %	2.1	2.1	2.1	1.3	1.3	1.3	1.1
Wipro							
Patents	15	7	7	13	17	13	3
R&D Expenditure (Rs Cr.)	190.4	165.5	99.3	49	40.5	26.77	20.23
R&D Intensity (R&D Expenditure/sales) %	0.60	0.63	0.43	0.23	0.23	0.19	0.20
HCL Technologies							
Patents	NA	NA	NA	NA	NA	NA	NA
R&D Expenditure (Rs Cr.)	NA	93.16	40.53	40.86	19.44	12.07	4.13
R&D Intensity (R&D Expenditure/sales) %	NA	1.37	0.8	0.87	0.42	0.32	0.14

Fig. 3. R&D and Patenting of Large Indian IT companies (Mukundan & Thomas, 2012)

Hence, the Knowledge Sources of the Indian IT firms (R&D, collaborations) today correspond to an 'Active' Innovation strategy.

4   Risk Acceptance

There are several industry trends that indicate the willingness of Indian IT firms to accept more risks. These include cross-border acquisitions, flexible pricing models (linked to value delivered to clients), and investments in products, platforms & emerging technologies. Barclays, one of the leading global Investment Banks, interacted with several industry experts to compile its 'India Tech Tour Report (2013)'. One of the key findings of this study was increasing willingness of Indian Tech firms to take on more risk on their Balance Sheets (Economictimes.com, 2013).

A report jointly done by consulting firm KPMG and CII (Confederation of Indian Industry) in 2012 elaborates on the emerging trends of the leading Indian IT firms adopting new, 'non-linear' pricing models compared to the traditional Fixed-Price and Time-and-Material models (KPMG/CII, 2012). The non-linear pricing models (outcome, usage, license based) are inherently riskier compared to the traditional pricing models.

Many of the leading firms are making substantial investments in 'Products & Platforms', in an attempt to generate non-linear revenue models. Infosys, in its Annual Report (2012) mentions accelerating growth in products, platforms and solutions, doubling investments in Product Research & Development Center, and strategic acquisitions of domain-specific platforms. TCS Annual Report (2012) discusses elaborately on the firm's investments in platforms, products, Research (in areas such as Green Energy & Social Media), Sponsorship of PhDs, and the Co-Innovation network. An analysis of web sites of TCS, Infosys, Cognizant, HCL Technologies and Wipro Technologies suggests that all 5 companies have invested in the emerging areas of Cloud Computing, Big Data Analytics, Mobility, Knowledge Services and Green IT/Sustainability.

Therefore, it may be concluded that Indian IT firms, in their endeavor to achieve non-linear growth models, have increased the willingness to take calculated risks. It may be argued that the firms have not yet taken bets on radically new, unproven technologies and business models. This 'Medium' level risk-taking willingness corresponds to an 'Active' Innovation strategy.

5   Key Challenges

The industry faces the following challenges.

Leveraging Internal Collaboration & Knowledge: This will be a key challenge for the large and medium sized firms. The pioneering firms have all been in the industry for over 2 decades, and some of them have more than 100000 employees. Past research has highlighted the need for Technology firms to share internal knowledge, and that internal knowledge flows has an inverse relationship with organization size (Serenko, Bontis, & Hardie, 2007). The large IT companies have huge amount of internal knowledge that can be leveraged to create disruptive and breakthrough ideas and innovations. A recent survey done among a sample of IT companies indicated that about 80% of companies identified 'achieving competitive advantage' as the key objective of Knowledge Management (Chaudhuri, 2011). Despite the fact that Indian IT firms have higher awareness and adoption levels of Knowledge Management vis-à-vis other industries (Sanghani, 2008), challenges remain. Internal collaboration challenges include the following: (a) collaboration between various vertical/industry service groups (b) collaboration between vertical and horizontal competency groups (c) and structure and the operating models of the new competency development teams. These collaborations are important, considering the trend of convergence of technologies such as Analytics, Big Data, Mobility and the Cloud (Griffin & Danson, 2012). The large firms could look at limiting the number of employees within a business unit to a certain level, so as to facilitate better knowledge flows (Serenko, Bontis, & Hardie, 2007).

Taking Innovation Capacity to the Next Level: Companies such as 3M, Google and Apple are considered among the most innovative global firms. One of the reasons for their success is their ability to create and sustain unique corporate cultures that foster innovation. Infosys and TCS have made it to the list of top 50 most innovative companies globally, as ranked by Forbes (Forbes, 2012). Most of the scalable innovations

in the industry pertain to process improvements. It may be argued that services-driven model that the Indian IT industry follows fosters process excellence than breakthrough innovations (Deodhar, 2012). The business models of the successful Indian IT companies are based on offshore cost arbitrage, ability to recruit and train thousands of skilled employees, program and project management capabilities, quality & productivity benefits offered to customers, and proven global delivery models. Large, successful organizations are built to support repeatable processes that are part of their core business model (Govindarajan & Timble, 2010). Having focused on process-led innovations for several years, the challenge for the large, established IT companies is to create the right organizational culture that would take their innovation capacity to the next level.

Managing the Innovation Process: Innovation process '*consists of an idea that comes from some recognized need that is developed into a concept, followed by invention, and then taken through development, production, and diffusion and adoption by end users'* (Gaynor, 2002). Globally proven models exist for managing the innovation process. Consider IBM, which was issued 6478 patents in 2012 for a variety of inventions across technology areas (IBM, 2013). The company topped the list of US Patent recipients in 2012. The company, of course, has a large base of R&D scientists and PhDs. Since 2001, IBM famously introduced the concept of 'Innovation Jams' (collaborationjam.com platform, which is open to its employees). In 2006, IBM brought a massive 150000 employees and stakeholders together in its Jam platform, to successfully take several of its technologies to market (Bjelland & Wood, 2008). This is an example of a structured innovation process. In recent years, Indian firms have evolved their innovation processes significantly, as evident from the Innovation literature available on company web sites. The challenge would be to build the right processes that support the non-linear, products & platforms-based strategy.

6   What Is Ahead in the Next Decade?

The president of India declared 2010-2020 as the 'Decade of Innovation' for India (DST, 2010). IT industry players see themselves amongst the drivers of this innovation wave. The following trends will influence the innovations in the IT industry, and the direction it will take in the coming years.

Cloud Computing: Cloud computing is disruptive in nature. Global Cloud market is expected to grow from $40.7 billion in 2011 to more than $241 billion by 2020 (InformationWeek, 2011). It levels the playing field to an extent, by providing medium and small firms the opportunity to develop and deploy innovative solutions that can be accessed by customers in the global market, at attractive price points. For instance, Zoho Corporation, with operations in Chennai, has a suite of award-winning Business/Collaboration/Productivity applications (Source: www.zoho.com) that can be deployed over cloud environment.

Mobility: The proliferation of wireless devices & smart-phones and mobile platforms, along with the emergence of concepts such as Enterprise Mobility, BYOD (Bring Your Own Device), MDM (Mobile Device Management) has revolutionized the Mobility space. This provides huge opportunities associated with any General Purpose

Technology Transition (Lalvani, 2012). Innovators have the opportunity to build breakthrough products and solutions, as well as solutions for the bottom-of-the pyramid markets.

Business Analytics & Knowledge Services: It is estimated that Business Analytics market will grow at a CAGR of about 9.8% during 2011-2016, to become a $50 billion market by 2016 (eWeek.com, 2011). Knowledge Process Outsourcing (KPO), which includes Research & Analytics outsourcing, is expected to reach a $17 billion global market by 2014 from $9 billion in 2011, and India is expected to garner 70% share of this (informaticsoutsourcing.com, 2012). Several large IT/BPO services players have already established Business Analytics and Knowledge Services as a value-added offering. However, the niche nature of the business also provides a window of opportunity for the medium/small sized players. Evalueserve with more than 2600 employees and significant presence in India (Source: www.evalueserve.com), Mu Sigma with over 2500 professionals and operations in Bangalore (Source: www.mu-sigma.com) and Amba Research (www.ambaresearch.com) are examples of focused players in this space.

The other emerging areas include Big Data Analytics and Green IT. The opportunity lies in the fact that all these areas offer tremendous innovation potential for firms *of all sizes*.

7   Conclusions

The Indian IT industry is at an inflection point of innovation, as it progresses towards a more 'active' innovation strategy. This is evident from an upward shift in R&D/IP emphasis, adoption of collaborative innovation, faster pace of reacting to technology discontinuities, and willingness to make riskier investments. The next few years will separate the innovation leaders from the rest. Emerging areas such as Cloud Computing and Mobility offer huge opportunities for firms to innovate, where Small and Medium size firms will have an equal opportunity.

This study has the following limitations. Firstly, some of the generalizations are based on analysis of select firms, and not based on empirical analysis. Secondly, the study focuses primarily on the large, established firms. Future work should focus on smaller sized firms and start-up firms to understand trends in innovation within those segments. The study has practical implications, particularly to medium/small sized firms looking to understand the innovation trends being set by the dominant firms. Findings of the study will find utility among academic community interested in the strategies of IT industry firms.

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