Entrepreneurial India: Reengineering West or Rediscovering Self [1]

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ABSTRACT

This paper discusses the approaches and typologies of entrepreneurship in the emerging markets, using the case of India. Theoretical issues around the use of foreign technology vs. traditional knowledge are examined. Then, typologies of entrepreneurship are examined over different phases of history. The discussion is organized chronologically - pre-British era, British colonial era, early independence mixed economy era, and reforms era. The real-world facts assembled, and insights gained are pregnant with meaning for entrepreneurship in the emerging markets.

[1] Entrepreneurship is broadly defined to include all innovative endeavors. The term "West" is defined to include all industrialized nations. Technology is broadly defined to include all intellectual property.

INTRODUCTION

This paper investigates entrepreneurial strategy during the national development process, using the case of India. India is an ancient land. She enjoys several diverse and well-established cultures. India was a British colony from the 18th century. In 1947 she gained her independence. As a legacy of the British administration, widespread, poverty, disease, and illiteracy prevailed. During several Soviet-type five-year plans India acquired technology for some heavy industry both from the industrialized nations. However, the acquisition and absorption of foreign technology involved considerable costs, including an over-reliance on the public sector. As a result, India was pushed to reflect and experiment with an alternative paradigm of Self-discovery. The alternative paradigm was initially applied in selected domains where the government policy of acquiring and absorbing Western technology was not paying off. Thereafter, India sought to promote the two paradigms together, along with an emphasis on promoting technological exchange between the local and the foreign firms. This policy led to the Indian firms taking over in few niche technologies growing to become worldwide suppliers. India became a dominant destination for IT software outsourcing by all multinationals in the business. Over the recent years, policy has shown increasing concern with protecting and leveraging the indigenous knowledge of those disadvantaged by the policies to acquire and absorb Western technology. The real-world facts assembled in this paper, and insights gained from results of fairly simple statistical analysis of hard data, are pregnant with meaning for socio-economic science practitioners and researchers alike.

The role of "Reengineering West" in the entrepreneurship of developing markets

Many scholars have considered the process of technological growth, and thus entrepreneurial strategy, in developing markets (e.g. Westphal, Kim & Dahlman, 1985; Lall, 1987; Enos and Park, 1988; Bell and Pavitt, 1993). These studies suggest that developing markets should rely on imported inputs and on export-oriented growth, and should do so rather heavily during the early phases of technology accumulation. For rapid growth, they need to exploit and build upon the local capacity to assimilate, absorb, and improve upon the acquired foreign technologies. *We refer to this paradigm of research as "Reengineering West" theory.*

"Reengineering West" theory has specific implications for entrepreneurial strategy. Specifically, the entrepreneurs should be focused on trading technology from the industrialized

markets to the developing markets. And, if the market for trading technology is imperfect, as is the case in the international markets, then the entrepreneurs may be successful only by finding substitutes of trading for transferring technology. Some of the substitutes of trading include imitation, poaching, and reverse engineering. If moral or legal restraints preclude these substitutes, then another direction for entrepreneurship is to try developing the market for trading technology, such as by investing in the industrialized markets or inviting firms from the industrialized nations to invest locally. Such investments for trading technology, however, add to the cost of reengineering foreign technology, and erode the cost advantage of the developing market entrepreneurship.

As a paradigm of research, "Reeginering West" theory has gone largely unchallenged. The costs of trading expensive technology from the industrialized markets has been implicitly assumed to be worth bearing. While the issues of market imperfections and legal failure are sometimes discussed, morality cost is rarely considered as a factor guiding entrepreneurial initiatives. Similarly, the options of investing overseas, or of inviting investments from the international partners, are often on the table as potent vehicles for technological learning in the developing markets. However, the cost analysis of these options has been incomplete. Most investment models focus on the informal knowledge spillovers (Cantwell, 1990), a jargon that means flow of technology from the industrialized firms/ the industrialized geography to the emerging market firm/ developing market geography. What is ignored is the fact that if this flow involves trading, then the developing market firm has to bear the cost of technology as well as the cost of investment that enabled trading of that technoogy.

What is this cost of technology that an entrepreneur has to bear? We have already alluded to two costs: compensating for the financial cost of industrialized technology, and the morality costs of transfering technology without due compensation. In addition, the cost of technology also includes the cost of social polarization within a nation, and of political polarlization between nations.

First, industrialized technology is prone to generate "social polarlization" within the developing markets. Industrialized technologies tend to be capital and scale intensive, and require large markets and sophisticated infrastructures. Industrialized technologies tend to be more appropriate for large, professionally managed and male dominated firms, for activities that can be systematized and routinized (Nelson & Winter, 1982). They are less appropriate for the

smaller businesses, family owned businesses, women owned businesses, rural communities, and for the groups that operate smaller scales and have limited capital. Dependence on the industrailized technologies may therefore result in significant inequalities and polaralize a diverse society based on the capital various groups have, the scale at which they wish to operate such as because of their work life balance priorities or because of their debt vs. equity priorities, and the moral costs they are willing to accept.

Second, industrialized technology is also prone to generate political polarization between nations. The recognition and exploitation of industrialized technologies require substantial prior knowledge and research experience (Cohen & Levinthan, 1991). Effective improvement of technology is feasible only when a nation has a substantive prior base in related technologies, and in the disciplines associated with them (Cantwell, 1990). Considerable costs are required for even trying to transfer technology to partners that do not have a similar level of technological base (Teece, 1977). Further, the original developers of international technologies tend to enjoy well-established markets, and well-endowed resources and capabilities, for rapid, continuous innovation (Porter, 1990). And, they have limited incentives to transfer their entire package of technology and techniques. The local entrepreneurs in the developing markets are rarely able to develop capabilities for fundamental innovation and engineering based on a single generation of know-how transfer. Rather, technological capabilities are accumulated over a period of time by working on multiple successive generations of inter-related know-how (Cantwell, 1990). In addition, the industrialized technologies are fundamentally targeted to meet the needs of the customers in the industrialized markets (Porter, 1990). Therefore, the entrpreneurs in the developing markets become politically dependent on the industrialized markets for both inputs as well as outputs (Teece, 1977).

In order to mitigate the financial, morality, social, and political costs that the entrepreneurs must bear to successfully Reengineer Western technology, a popular solution is to bear the costs of institutional biases. Typically, the government and government supported institutions seek to play a major role in financing imports of foreign technology. Their role is often at the cost of the independent initiatives of the private sector (Chandra, 2002). Moreover, the the government-supported institutions tend to suffer from bureaucratic and policy mandates that make their transfer of technology to the private sector costly.

In summary, we have identified five costs of the Reengineering West entrepreneurial strategy: (1) financial cost of technology, (2) morality cost of acquiring technology without due compensation, (3) social cost of within polarlization as a function of adoption contigent on the specific nature of technology, (4) political cost of polarization as a function of the depenendence of the developing nation on the industrialized nation, and (5) cost of institutional biases, arising from the substitution of private inititaives with the public initiatives. One must account for these costs in the overall benefit cost analysis of the Reeengineering West model. In many contexts, these costs may outweight benefits. In such contexts, entrepreneurial strategy requires self-discovery of an alternative to the Reengineering West theory.

Is "Self-discovery" a Viable Alternative for Entrpereneurship in the Developing Markets

Self-discovery is an empowering way of learning. Peer interactions in regional markets can be a source of powerful innovations. These innovations typically rely on the regional resources, regional know-how, and regional markets, and address fundamental needs in of the regional community. The value of peer interactions are recognized in the industrialized markets (Porter, 1990). It is less recognized for the developing markets, and for the groups disadvantaged by the industrialized technology – such as family owned businesses, women owned busineses, small and micro enterprises, and rural communities.

This begs the following question: are the developing markets, and the groups disadvantged by the industrialized technology, really devoid of useful knoweldge? Based on the insights from the various disciplines as noted below, we do not believe so.

Descriptive history research suggests that the pre-industrialized nations had rich endowments of knowledge. The the ancient Chinese, Indians, Greeks, and Egyptians had advanced knowledge of mathematics, astronomy, biology, chemistry, metallurgy, and other arts and sciences. They were able to apply this knowledge to create and exploit various technologies.

Similarly, descriptive anthropological research shows that, in contemporary societies, all tribal groups – even when isolated from the modern education - are repositories of deep knowledge about the flora, fauna, resources, and geography of their region, and are able to apply that knowledge for variety of ends for survival, healing, and enjoyment. Since the resources of different regions vary, the knowledge base of these groups also tend to vary. Even the illiterate women in rural communities use knowledge that lies outside the modern industry. For instance,

the environmentally friendly use of cow dung for moderating the temperature inside the hut made out of straw, and also as a source of renewable and non polluting energy.

There is a need to grow out of our entrenched mental frames that associate the emerging markets with deficiency, primitiveness, and backwardness. And, that requires a dramatic shift in our mental models. Emerging markets are repositories of authentic "traditional knowledge" and because of the challenges they face in daily living are often very innovative. Traditional knowledge refers to knowledge passed from generation to generation. It includes various forms of cultural expressions, such as songs, dance, stories, artworks, and crafts; forms of conceptual expressions, such as symbols and marks; agricultural, scientific, and medical knowledge; and spiritual knowledge (Finger & Schuler, 2004).

Boyle (1996) challenged the notion of romantic authorship of intellectual property rights – the idea that corporations research and develop new products and innovations out of thin air. In reality, corporations borrow from a rich domain of sources and inspirations that they get for free from the commons. Boyle (1996) discussed the case of Eli Lilly, who discovered the lore of shamans in the poverty-stricken Madgascar, who used the indigenously grown rosy periwinkle for therapeutic uses. The company used this plant and the lore to develop a drug to treat Hodgkin's disease, generating benefits valued at $100 million annually.

Traditionally, it was believed that the knowledge of the emerging markets has existed for millennia, and has remained static over time. This belief discounted the creative capacity of the emerging markets for developing knowledge, and so the only way for them to deevlop was to receive technology, training, and knowledge from the industrialized world, and to participate in the activities of the industrialized world as suppliers, employees, and partners. However, the reality is that the emerging markets are a source of significant knowledge whose value needs to be discovered.

A 2005 World Intellectual Property Organization report affirms that knowledge – traditional or modern – requires constant human effort and creativity to sustain it, as emerging markets innovate around them to meet current needs and solve contemporary problems. What many in the emerging markets lack is the understanding of the global markets, and how to apply their knowledge to serve the needs of the global markets. Consider, for example, the case of Neerja International, in Jaipur. The owner, founder, Leela Bordia, visited a village nearby where she saw impoverished craftsmen making exquisite blue pottery. The pottery was painstakingly

handpainted in traditional patterns, but the poor craftsmen had few clients, their craft was dying, and many were migrating to cities in search of labor jobs. Bordia spent two years watching and talking to the potters, and convinced one to work with her designs to make utility items. She got an order from a French buyer for extravagant Blue Pottery bead curtains. As the potters had over the years adapted to the low income clients, their beads could not match the quality expectations of the French market, and so had to be turned into necklaces that were instantly bought and paid for in cash by film actresses. She then designed hundreds of new products every year, which retained the authenticity of the Blue Pottery craft, and fostered high quality standards that took the business to the new levels. Thus, recognition of the knowledge rights and creative potential of the emerging markets, and mainstreaming of traditional knowledge, can help rejuvenate the maturing markets in the industrialized nations, and help introduce fresh and creative options that allow consumption of the traditional knowledge in more than a museum or exotic setting.

Descrptive data are also available showing that the cultural practices and values differ across nations and regions. GLOBE program investigated if the cultural practices and values of the nations may be clustered based on their history, geography and other factors that influence knowledge base (Gupta and Hanges, 2004). The answer was in the affirmative, and ten regional clusters of nations were identified that had rather homogenous orientaiton of cultural practices and values. These ten clusters were then grouped into two meta-clusters: Western world, and Eastern world. Varying cultural practices and values imply that the nations not only have different knowledge bases, but they also approach their knowledge differently. The knowledge base may, for instance, be used for supporting gender balancing roles (e.g. enabling men to take up more household roles, and lightening the demand for muscle power in the field), or for gender biased roles (e.g. pushing women out of the fieldwork, and making household chores more time consuming for women), as a function of the degree of gender egalitarianism in a nation's culture.

Traditional knowledge resides in the community, and is owned by the groups. Research suggests that learning effectiveness in groups is compromised by groupthink and other factors, including social loafing, overdependence on a dominant leader, over-commitment to goals, and diffusion of responsibility (Adams, Keyes, and Kolb, 2005). An effective antidote is reflective observations. According to Kolb's four-stage learning cycle (1984), immediate or concrete experiences are the basis for observations and reflections. These reflections are assimilated and

distilled into abstract concepts, from which new implications for action can be drawn. These implications can be actively tested and serve as guides in creating new experiences.

Thus, self-discovery may be a powerful technique for entrepreneurial strategy. Conceptually, self-discovery becomes an even more potent technique when combined with the opportunities for trading international technology. The knowledge generated through self-discovery can be offered in exchange for the knowledge traded from the international markets. The investments made to offset the imperfections in the market for trading technology could be used for exchanging self-discovered knowledge also. The absorptive capacity created by the self-discovered knoweldge would also allow for cost-effective and complete grasping of knowledge as well as transforming of knowledge.

Entrepreneurial India – Reengineering West or Self Discovery?

India is a unique case to examine the effectiveness of Reengineering West and Self Discovery theories of entrepreneurial strategy. At first sight, India is an unlikely candidate for self discovery, because it stands out quite poorly on the elements deemed critical for entrepreneurship. We may categorize these elements into two groups: First, factor sequences, which is a theoretical list of personal traits that an entrepreneur ought to have. Second, factor consequences, which are the empirical outcomes of entrepreneurial functions.

Theoretically, entrepreneurship rests on three core factor sequences or personal traits. 1) Risk taking propensity (e.g. Cantillon, 1755); 2) achievement motivation (e.g. McClelland, 1961), and 3) human capital (e.g. Romer, 1990).

Empirical studies of different Indian regions indicate that both male and female entrepreneurs in India score rather low on risk-taking propensity measures (Rutten, 2006). This low risk-taking propensity serves as an explanation for the traditional preference in India for service ventures - which have lower initial capital outlays and shorter breakeven periods compared to the manufacturing ventures (e.g. Berna, 1960). Still this explanation is at odds with the studies, such as Chadha (1986) and Streefkerk (1985), documenting how several artisans, such as blacksmiths, masons, and carpenters, set up small industrial workshops during the 1980s and gradually became industrial entrepreneurs.

Empirical studies also indicate that Indian entrepreneurs have low levels of achievement motivation (McClelland & Winter, 1969). However, Kairos Future (2007) reports that Indian

youth (16-29 year olds) are the happiest in the world, and put highest priority on work, followed by a good career and higher status.

Studies, including one by Leeuwen (2007), show that India lagged behind in human capital during the 20th century, making it difficult for entrepreneurs to adopt new technologies, and for politicians to support new technology-based entrepreneurship without causing social unrest. Again, women of India are considered to be particularly deficient in human capital (Shivani et. al., 2006). However, there is a growing evidence of women taking powerful leadership and entrepreneurial positions in India, and moving into the ranks of the world's most powerful women in Forbes and other surveys.

All prior studies thus suffer from serious shortcomings, and perhaps deploy constructs that are Western framed and do not appropriately capture the innate potential of the people of India, and account for the structural and situation variables that may be at play.

Further, empirically, major consequences of entrepreneurship are innovativeness and growth (Schumpeter, 1934). Many scholars have mistakenly cited India's religion as an impediment to innovativeness and growth (e.g. Weber, 1905). They believe the caste system in India inhibits social mobility and Hindu spiritualism inhibits pursuit of material growth (Anstey, 1952; Morris, 1967). Many empirical studies also indicated a generally low level of innovativeness amongst both men and women entrepreneurs; exemplified by the fact that most entrepreneurs in India were less likely to develop new products or new production methods (Shivani et al, 2006).

A new study by Debroy and Bhandari (2007) has found that 52% of the workforce in India is self-employed. Indian entrepreneurship is thus helping to create new sources of income for even the poorest members of society. Between 1993 and 2004, the average income for the bottom 20% of the population grew by 10%. This is nearly at par with the 12% for the top 20% of the population in rural and urban areas.

Below we assemble the real-world facts, construct typologies of entrepreneurship in India, and derive insights that are pregnant with meaning for socio-economic science practitioners and researchers alike.

Until 1750 - Crafts Entrepreneurship of the Pre British India

Ancient India had a strong crafts form of entrepreneurship - community groups specialized in varying class of crafts or services. The rural communities in India came to be the repositories of deeply embedded cross-generational craft insights. And, many traders actively specialized in sharing this with the international markets. Both written and archeological artifacts document trade with the Middle East (Mesopotamia) as far back as 2600 BC (Parpola, Parpola, & Brunswig, 1977). Bundled merchandise from India was sealed with clay impressions. An adaptation of Indian motifs and scripts subsequently emerged on Mesopotamian seals – one of the earliest documented instances of intellectual property piracy (Brunswig et al, 1983). Hunter (1932: 469), looking at the seals, observed, "the square seals (see Figure 1) are in the Indian language, and were probably imported in the course of trade; while the circular seals, although in the Indus script, are in a different language, and were probably manufactured in Mesopotamia for a Sumerian- or Semitic-speaking person of Indian descent."

Figure 1: Square Seals of Ancient India

Source: Phoebe A. Hearst Museum of Anthropology, University of California, Berkeley

Urbanization in India went hand-in-hand with trade prosperity. Artisan communities sprung up in the cities. Raw cotton was brought in bales to the cities to be spun, woven, and

dyed –a development of rural-urban linkages (Wheeler, 1968). Knowledge was transferred via a "gurukul" system of education. In the gurukul system, the learner lived in a hostel with a proficient teacher for several years. Training was provided in all aspects of life, including self-discipline (Gupta, Surie, Javidan, & Chhokar, 2002).

On the eve of British colonialism, Western scholars were in awe of India's knowledge. Pierre Sonnerat (1745-1814) noted, "We know that all peoples came there to draw the elements of their knowledge…. India, in her splendor, gave religions and laws to all the other peoples; Egypt and Greece owed to her both their fables and their wisdom." (Danino & Nahar, 1996: 18)

In India today, numerous grassroots innovations are now being discovered – all intended to reduce drudgery particularly for the children, women and the disadvantaged. For instance, micro-entrepreneurs Chitagopakar and Harshangi have developed a modified stick for the visually challenged, that can sense can sense obstructions with different alarm signals. And Saidullah developed a bicycle that not only travels on land, but can also float on water. This helps people easily cross over ponds and rivers (National Innovation Foundation, 2005).

1750-1950 - Glocal Entrepeneurship of the British India

After colonializing India, British introduced a new educational policy focused on the superiority of British techniques, language, and values. Farquhar (1914/1967: 21) noted, "The new educational policy of the Government created during these years the modern educated class of India. These are men…. whose intellectual life has been almost entirely formed by the thought of the West, large numbers of them enter government services. Postal, telecommunication and railroad systems were notably introduced in the 1850s as engines of social improvement (Bear, 1994). New towns were formed along the railroad lines for the purpose of exporting Indian raw materials to England, and importing British ready-made textiles and other goods. English machine made goods, made from Indian raw materials, squeezed out skilled Indian village artisans, and forced them into subsistence living as unskilled workers in British factories in India (Bear, 1994).

The colonial era resulted in the transformation of the traders of the crafts era into glocal entrepreneurs – those who connect the global market with the local knowledge, and vice versa. Ranchhodlal Chhotalal took a position as a clerk in the British colonial government in 1842. While working, Chhotalal obtained cost information from London to determine that a local

cotton textile mill would be profitable in Ahmedabad. He then found a British investor and a local banker who were each willing to finance 50% of the necessary funding. His success motivated the local Hindu/ Jain bankers and traders to set up their own mills, as a viable alternative to the English factories (Oonk, 2007). While this was an instance of the use of global knowledge, here is an example of the use of global markets. As the World War I cut off the supply of finished consumer goods from the British factories, the shortage of goods created a demand for rails to support the needs of the British in the war. JRD Tata seized the opportunity to make his new iron and steel factory thrive (Oonk, 2007).

Today, 'glocal' multinationals are thriving in India, one friend or family member based in India and another overseas in countries such as the US. Many have used new technologies or global markets for making local impacts. For instance, Mahindra & Mahindra noted that in the US and Europe, most tractors are high horsepower, as a result of the farms being much larger. It then first targeted other emerging markets with smaller farms, and then cultivated a dealer network in the US and Europe to open up a new "hobby" farmer segment (farmers who work on farms during weekends and holidays) using lower horsepower tractor models. This resulted in a 40% market share in that niche (BBC News, 2001).

1950-80 - Extension Entrepreneurship of the Early Independent India

At independence time, India's agriculture was growing at a mere 0.3 %, and its manufacturing sector was miniscule (INSA, 2001). To correct the situation, Prime Minister, Jawahar Lal Nehru, advocated adoption of the Soviet type Five Year Planning system (Nehru, 1936/1972). Nehru's scientific resolution identified technology's critical role in overcoming a lack of resources. He observed, "The future belongs to those who make friends with science" Nehru (1937). The scientific resolution was a blue print for creating universities, policy institutions and publicly funded R&D laboratories.

During the First Five-Year Plan (1951-56), Depleted wartime rail-net and rolling stock was repaired, fresh irrigation water augmented, and idle industrial capacity was brought into use for rapid growth in national income. The 1948 and 1956 industrial policy resolutions entrusted heavy industry projects, such as steel, cement and hydro-power, to the public sector. The Second Five-Year Plan (1956-61) aimed to triple outputs of iron ore, double that for coal, and for electric power. It laid down the framework for the separation of roles between the private and

public sectors, and introduced a "license raj" to regulate private sector companies. Investment funds were offered to the large public and private sector borrowers only if the relevant production was pre-approved; and in such cases, funds were offered at rates substantially lower than the market rates. Most foods, steel, coal, and other basic commodities were subject to price controls, pegging prices well below world prices (Chandra, 2002). Additionally, the government 'reserved' a large number of industrial products for the small sector, thereby fragmenting the market, and forcing the concentration ratio in many industries below the Western levels by the 1980s (Chandra, 2002).

India's Third Plan (1961-66) sought to mobilize foreign aid and technical collaboration for developing basic industries. After the independence, India had adopted a non-alignment policy. As the Soviet bloc extended help in diverse sectors including steel, oil, machinery, power generation equipment, and tractors, the US and other Western nations also encouraged their private multinational sector corporations to set up new plants in India, as a policy to counter-balance the possible rise of communist influence in India. These initiatives exposed India to diverse techniques and technologies, and cultivated a scientific interest in developing local versions rooted in local capabilities and suitable to local climatic conditions. Consequently, India became largely self-sufficient in capital goods by the late 1970s, importing only 10% of its annual requirements (Chandra, 2002). India's industrial base became highly diversified.

Two kinds of experiments were conducted – one with an overwhelming reliance on the Western technology, and one where foreign technology was imported and then efforts were made for self discovery. The first approach was used in the steel industry. Starting in 1955, the USSR provided help in constructing a public sector steel plant in Bhilai. The Soviet assistance led the UK and West Germany to also help construct one steel plant each at Rorkela and Durgapur respectively. These too were state owned. However, all these plants were highly inefficient. Only in the 1980s, when the private sector set up steel plant did India became self reliant in steel (Chandra, 2002).

The second approach was used in defense and allied informatics, transportation, and space technology sectors. For instance, in 1965, India was assembling 13,000 tractors annually, using mainly imported components. India wanted to up it to 20,000, but no foreign partner was interested in transferring the technology needed. Hence the Central Mechanical Engineering

Research Institute (CMERI), Durgapur, proposed that an indigenous technology be developed. CMERI incorporated the best design concepts of competing models, and studied international patents to avoid infringment. It then developed its own designs and pioneered the concept of a `unified series', similar to the `common platform' concept used in passenger cars today. Common sub-assemblies, such as hydraulics and gear boxes, were used across tractor models sold at a range of prices (Mohan, 2003). In tractor and other industries, local versions were made possible by the public efforts to extend capacity building to private entrpreneurs, and promoting partnerships with the private sector – particularly the small and medium sized industries. However, these efforts were confined to mostly capital intensive sectors. Therefore, by the late 1970's, India faced substantial consumer goods supply constraints, along with economic stagnation, inflation, educated unemployment, and growing poverty.

In agriculture, another approach was evolved – open exchange with the West, made possible by the suport of the United States Agency for International Development (USAID), the U.S. Department of Agriculture, and the Ford and Rockefeller Foundations, allowed for a blend of Western knowledge and self-discovery. India secured US assistance in several domains, including procurement of fertilizers, financing construction of fertilizer plants, developing rural electricity infrastructure, and establishing modern irrigation systems for reducing dependence on rain-fed irrigation. The US universities sent several educators and agricultural advisors for collaborative work with scientists and students in India, and invited many Indian agricultural specialists for learning about farm technologies employed by the US (Mulford, 2004).

With the help of the US, India adopted high yielding breeds, new pesticides, new agricultural implements, and the collaborative scientist-farmer extension model. The result was a rapid growth in agriculture productivity, referred to as Green Revolution. India made innovations in areas where the US approaches were not in tune with her climates. New varieties were developed for crops grown by poor farmers in less favorable agro-ecological zones. Among these were sorghum, millet, barley, cassava and pulses. Given Indian's diverse climatic zones, a majority of state governments R&D funding even in mid-1990s was devoted to agriculture. In 1996-1997 it was 93.3 percent of total (Ministry of Science and Technology, 1997).

India was thus able to attain food self-sufficiency and resilience, while effectively withstanding a severe drought in 1979. By the 1980s, India's agricultural growth had risen to

three percent, for the first time since independence outpacing population growth, and facilitating a dramatic fall in rural poverty from 60% in the late 1960s to 40% in late 1980s (Mulford, 2004).

The extension entrepreneurship – that was the hallmark of the development of the small and medium entrerprises, and of the green revolution – is a popular approach even currently. This principle of extension is visible in another emerging form of entrepreneurship in India. ICICI, the largest private financial institution in India, has invented a business model to create a distribution base effectively in 600,000 villages in India at one tenth the cost of urban India (i.e. one hundredth the cost of the West). Kamath (2006) notes: "For example, we might partner with a local financial institution, a micro-finance agency or a company -- someone who is already in the village for a business purpose. We might even partner with someone who is selling fertilizer or seed or tractors."

The growth in the interiors of India, however, came at a huge cost: the urban educated unemployment soared, the industrial inefficiency rose, and the overall growth rates stalled. As of mid-1980s, India had world's highest tariff rates, as seen in Table 1.

Table 1: Nominal Tariff Rates As % of Value, 1985

Country	Intermediate Goods	Capital Goods	Consumer Goods	Manufacturing Goods
Hungary	14.2	15.0	22.6	20.9
Argentina	21.2	25.0	21.9	22.9
Morocco	21.6	18.1	43.0	27.3
Mexico	25.5	23.5	32.2	24.7
Thailand	27.8	24.8	8.5	33.6
Turkey	29.4	54.9	55.3	37.1
China	78.9	62.5	130.7	91.2
India	146.4	107.3	140.9	137.7

Source: World Bank, cited in *The Economist* May 4, 1991, Survey page 9

1980-2005 - Jugaad Entrepreneurhip: Private Sector Takes over Reengineering West

By early 1980s, the government of India was beginning to recognize the folly of prioritizing on the public sector for industrialization. Prime Minister Rajiv Gandhi laid a vision for a central role for the electronics industry, and for entrusting the task of technology management to the private sector – where the firms had learnt to be the knowledge integrators – the integrators of diverse foreign and traditional knowledge.

The government policy to computerize its departments and enterprises generated large and complex assignments for the local firms. The most notable was the automation of state-owned railways reservation. In 1983, Indian railways was running the world's second largest railway system, carrying about 100 million passengers a year, involving "7 different categories of trains, 72 types of coaches, 7 classes of reservations, 32 types of quotas, and 85 kinds of concessional tickets." (Mulhearn, 2000) Passengers often had to wait in line overnight for reservations. The contract was given to CMC. CMC, set up in 1976 as a substitute for IBM maintenance to initially service IBMs, had grown to service about 40 foreign platforms and a few local platforms as well (Dataquest, 2002). CMC used state-of-the-art hardware and write indigenous software in DEC's proprietary operating system (taking 35 engineer years for automating the first location – Delhi – alone), to produce a system that was both efficient and far cheaper than what had been quoted by the foreign companies. The average waiting time for the passengers was reduced to less than 20 minutes (Mulhearn, 2000).

Ironically, the most competitive Indian products were based on the traditional design talent, as opposed to being commodities (Mulhearn, 2000). Without a reliable supply base for high-quality low-cost parts and components, the firms, such as CMC, ECIL, and HCL faltered in hardware, but flourished by moving into software. The exports of software from India had started in 1974, reaching $4 million in 1980, $28 million in 1985, and rising to $481 million by 1995.

Many firms set up US offices that served the client's maintenance, basic programming and testing needs onsite, and later moved up the trust curve of the client to gain higher value-added contracts to be performed offshore. Indian firms charged, on average, 70% of Western contract rates for onsite work and 40% for offshore work (Mulhearn, 2000). Through interactions with the Western clients, best practice benchmarking, and self-discovery, Indian firms rapidly built a base of in-house training programs, quality processes, and productivity tools. By 1999, 137 Indian firms obtained either ISO 9000 or SEI-CMM Level 2 certification, and more Indian firms were certified at the highest Level 5 than the US firms.

As the telecom infrastructure improved by the early 1990s, firms took up more body shopping work offshore. In mid-1990s, two thirds of the work on software exports was done onsite (at client's site overseas), and one third offshore (in India). Further, two-thirds of the projects were body-shopping (low skill programming, requiring only coding and testing services,

often without any strong ties with the client) and one-thirds were higher value-added (systems analysis and design skills, often with client alliances) (Mulhearn, 2000).

Rajiv Gandhi invited foreign multinationals to set up software development joint ventures in India. Because of stronger ties with the MNCs, these joint ventures were able to take far more offshore, turnkey work, than were the local Indian firms. By 1992, nearly all major Indian firms had formed a joint venture with a major MNC: Hiditron with Digital, HCL with HP, PSI with Bull, Modi with Olivetti, DCM-DP with Control Data Corp, IBM with Tatas, and Wipro with Acer. Though by 2000, most joint ventures had been dissolved, both the MNCs and the local firms were able to operate independently with their distinct capabilities (Dataquest, 2002).

By 2000, a majority of the Fortune 500 companies outsourced IT services to India. Around the mid-1980s, the government had decided to lower its commitment to R&D, and instead shifted its focus on supporting the private sector in its technical collaborations with the foreign firms. But by the mid 1990s, to support the competitiveness of the private sector, the government introduced several programs to support the absorption of imported technologies, as well as to develop, demonstrate, and commercialize indigenous technologies, and to encourage technology-based entrepreneurs. Consequently, the share of private sector in national R&D expenditures, rose to 20-25% during the late 1990s, as opposed to 15-20% during the early 1990s (Department of Science and Technology, 2002).

As shown in Figure 2, India plowed back an ever higher percentage of her GNP into her domestic R&D until mid 1980s.

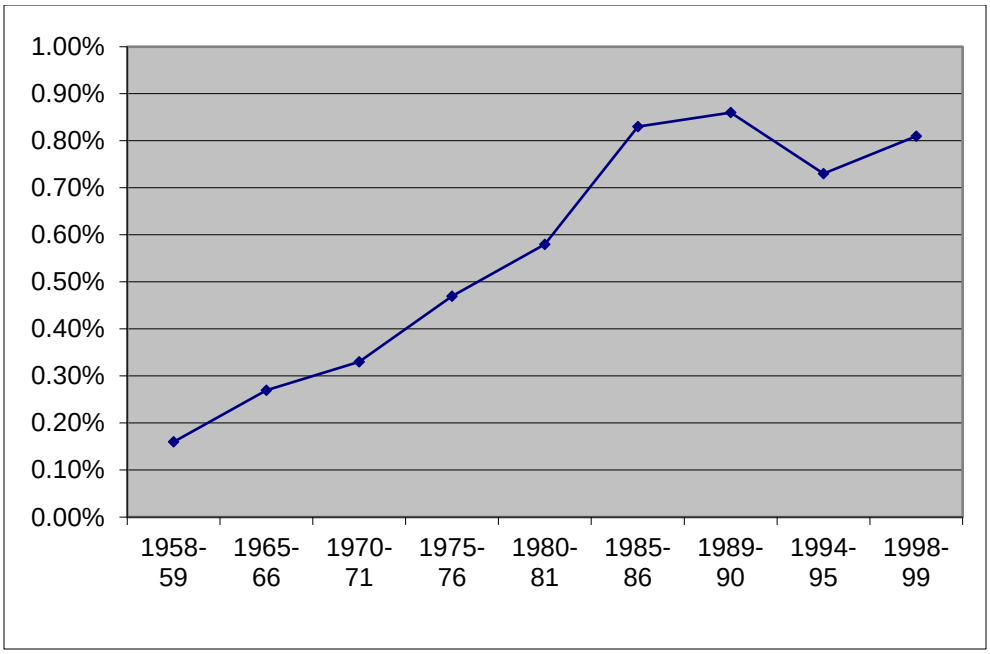

Figure 2. India's science and technology expenditures as a % of GNP

Source: Department of Science and Technology (2002).

Moreover, as the private technology sector grew her share of R&D plowback increased at a most impressive rate as is shown in *Figure 3.*

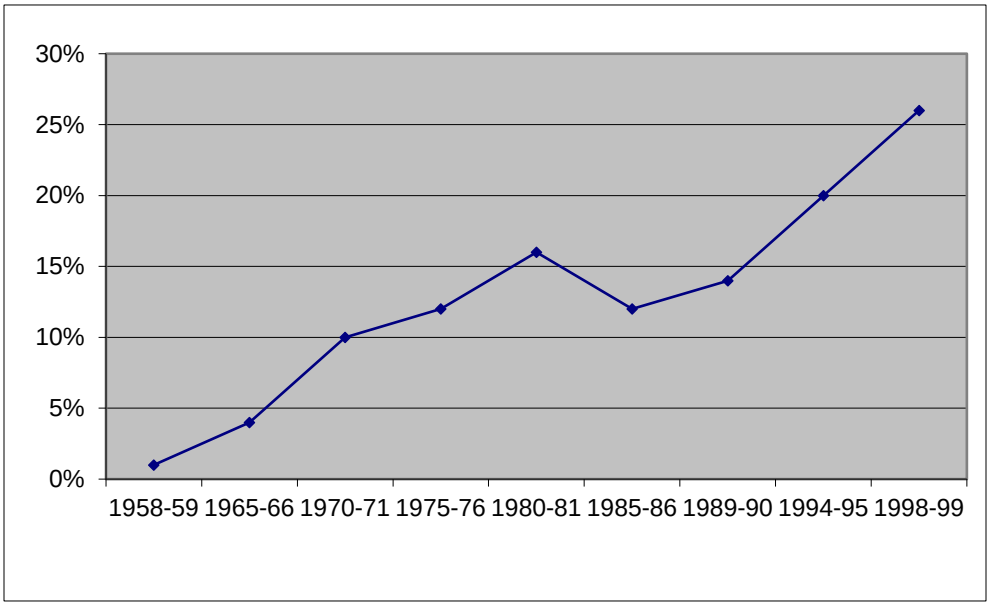

Figure 3. India's private sector science and technology expenditures as a % of total science and technology expenditures

Source: From Department of Science and Technology (2002).

Thus, one may conclude that the institutional support did eventually facilitate the private sector growth. However, this support also resulted in significant social polarization. The total factor productivity growth in Indian manufacturing industry, which had been positive during 1981-95, stagnated and perhaps started declining during the late 1990s (Thirwell, 2004). Significantly, the Vajapayee government – that oversaw the support for the urban private sector from the mid 1990s to early 2000s - was thrown out of power in the 2004 national elections. In rural India people voted in greater numbers, while the urban areas that benefited most from the market oriented policies had low voter turnout.

During the 1980s and early 1990s, in the backdrop of diminishing national-level R&D, jugaad entrepreneurship was born. Jugaad refers to workarounds. Currently, jugaad entrepreneurship is best illustrated by the case of bio-technology. Many entrepreneurs have leveraged the diversity and depth of Indian's medical community to cut the cost of clinical trials to a fraction of $150 million – the cost in the US (Basu, 2004). They have also pioneered reverse patenting of knowledge. In the West, if there is a disease, firms search for New Chemical Entities (or NCEs) that would cure/treat and then patent them. Conversely, in India, many jugaad entrepreneurs now use the nation's software capabilities to scan for all non-patented NCEs, then patent what they discover, and finally license them to Western firms for further analysis. Additionally, as the venture funds to support private sector R&D have grown since the mid 1990s, many entrepreneurs are venturing into modifying NCEs and discovering new forms and new drug delivery systems. For instance, Hepatitis B, after its development in late 1980s, was priced by the US drug companies at $50 per day of dose. Shantha Biotechnics, an upstart by a computer scientist with no pharma background, developed the drug with less than $1 million investments over a five year period; it was then marketed for $5 per day of dose (Varaprasad, 2001). All this has inspired more than 100 multinational firms, including GE, General Motors, Intel, Texas Instruments, Microsoft, and IBM, to set up R&D operations in India (Sinha, 2007).

By late 1990s, India's industry had become significantly more competitive in the international market. Table 2 shows how economic liberalization resulted in a more globally integrated Indian economy:

Table 2: Economic Effect of the 1991 Reforms

% of GDP	*1991*	*2002/2003*

Average tariff rate	128	29
Trade (exports + imports)	17.2	30.5
FDI and portfolio investment	0.0	1.0
Current account balance	-3.1	0.8
External debt	26.5	19.8
Short-term external debt	4.6	3.0

Source: Salgado (2003)

By the late 1990s, the variability in the growth rate and the volatility of inflation rates declined significantly compared to the earlier periods. The share of agriculture and allied activities in GDP fell from 55% in 1950-51 to only 25% in 1999-2000; while the share of services had risen from 32% to 53%, with information technology emerging as the leading engine of growth for exports, employment, and national income (Kelkar, 2002). The growth in exports of different manufactured sectors and their share is in Table 3:

Table 3: India's manufactured exports ($ million)

	1960-61	1970-71	1980-81	1990-91	2000-01
Cotton yarn and fabrics	136	188	516	1170	3509
Readymade garments	2	39	696	2236	5577
Leather and leather goods	59	106	493	1449	1951
Gems and jewelry	2	59	782	2924	7384
Handicrafts	21	37	422	513	1116
Chemical and related goods	15	39	284	1176	5002
Machinery, transport, metal, and electronic products	46	261	1045	2158	6976

Total manufactured goods	610	1021	4738	13229	35181

Source: Government of India (2005b).

Supported by a rise in economic growth, human resource development, and farm wages, and by lower inflation, the poverty ratio – the proportion of the population below the poverty line— also declined from 36 percent in 1993-94 to 26% in 1999-2000; and the social indicators of development improved substantially (see Tables 4 & 5).

Table 4: India's Economic Indicators of Development

	1950-51	1960-61	1970-71	1980-81	1990-91	2000-01
Gross Domestic Product (current prices) Rs. Billion	95	162	422	1302	5110	19030
GDP (1993-94 constant prices) Rs. Billion	1405	2061	2963	4011	6829	11986
Per Capita Income (1993-94 constant prices) Rs.	3687	4429	5002	5352	7321	10308
Gross domestic savings (% of GDP)	8.9	11.6	14.6	18.9	23.1	23.5
Food grains production (million tons)	50.8	82.0	108.4	129.6	176.4	196.8
Finished steel production (million tons)	1.0	2.4	4.6	6.8	13.5	30.3
Electricity generated (billion kw-h)	5.1	16.9	55.8	120.8	264.3	499.5
Exports (Rs. Billion)	6	6	15	67	326	2036
Exports (US$ billion)	1.3	1.3	2.0	8.5	18.1	44.6
Imports (Rs. Billion)	6	11	16	125	432	2309
Imports (US$ Billion)	1.3	2.4	2.1	15.9	24.1	50.5

Source: Government of India (2005b)

Table 5: India's Social Indicators of Development

	1950-51	1960-61	1970-71	1980-81	1990-91	2000-01
Population (million)	359	434	541	679	839	1019
Birthrate (per 1,000 population)	39.9	41.7	41.2	37.2	33.9	25.4
Death rate (per 1,000 population)	27.4	22.8	19.0	15.0	12.5	8.4
Life expectancy at birth (in years) – male	32.5	41.9	46.4	50.9	58.6	63.9
Life expectancy at birth (in years) – female	31.7	40.6	44.7	50.0	59.0	66.9
Education – literacy rate (%) – male	27.2	40.4	46.0	56.4	64.1	75.9
Education – literacy rate (%) – female	8.9	15.4	22.0	29.8	39.3	54.2
Registered medical practitioners/10,000 population	1.7	1.9	2.8	3.9	4.7	5.6

Source: Government of India (2005b)

International Comparisons and Linkages

Despite considerable progress, India still lagged behind major emerging markets on most measures of globalization and socio economic development. Table 6 reports selected measures for the large emerging markets that had liberalized their economies.

Table 6: India's Comparative State of Globalization (2001)

	Trade/GDP	Inbound FDI/GDP	FDI /Person ($)	Per Capita GDP ($)
India	24%	0.5%	2.24	449
Egypt	41%	1.2%	17.00	1,216
China	41%	4.0%	30.87	915
Mexico	63%	2.5%	121.42	7,068
Poland	61%	4.9%	188.10	4,553

Non India				
Average	51.5%	3.2%	89.35	3,438

Source: IMF (2002).

India remained comparatively less open in terms of both trade and foreign direct investment. Table 7 reports India's comparative state of global competitiveness among the same group of emerging markets. As is evident, India's growth competitiveness index was lower than China, Mexico and Poland, and was higher than only Egypt. India was behind China on macro-economic environment, particularly stability of macro-economy and credit rating. In comparison to Mexico and Poland, India was behind in the technology index, particularly the spread of information and community technology, and in innovations. India's strengths were in its contract and legal system, though its public institutions suffered lower transparency, i.e. higher corruption. However, India, along with Mexico, was ahead in receiving and absorbing foreign technology.

Table 7: India's Comparative Global Competitiveness Index and its components (Scale of 1 to 7), 2007 data

	Brazil	Russia	India	China	Egypt
Overall	**4.1**	**4.3**	**4.3**	**4.7**	**4.0**
1. Basic factors	**4.0**	**4.5**	**4.2**	**5.0**	**4.2**
a) Institutions	3.6	3.3	4.2	4.2	4.2
b) Infrastructure	3.2	3.7	3.4	4.2	3.7
c) Macroeconomic stability	3.9	5.6	4.3	5.9	3.6
d) Health and primary education	5.3	5.6	5.0	5.7	5.2
2. Efficiency enhancers	**4.3**	**4.3**	**4.5**	**4.4**	**3.7**
a) Higher education and training	4.1	4.4	4.1	4.1	3.6
b) Goods market efficiency	3.9	3.9	4.5	4.5	4.0
c) Labor market efficiency	4.2	4.7	4.2	4.5	3.3
d) Financial market sophistication	4.4	3.6	5.0	3.6	3.7
e) Technological readiness	3.6	3.4	3.3	3.2	3.0
f) Market size	5.5	5.7	6.0	6.6	4.7
3. Innovation and sophistication	**4.0**	**3.6**	**4.3**	**4.2**	**3.5**
a) Business sophistication	4.6	3.7	4.8	4.5	3.9
b) Innovation	3.5	3.4	3.7	3.9	3.2

Source: World Economic Forum (2008)

Measures of Business sophistication

Local supplier quantity 4
Local supplier quality 37
State of cluster development24
Value chain breadth 28
Control of international distribution 29
Production process sophistication 41
Extent of marketing 28
Willingness to delegate authority 25

Measures of financial sophistication

Financial market sophistication. 33
Financing through local equity market 8
Ease of access to loans 42
Venture capital availability 27
Strength of investor protection 26
Regulation of securities exchanges 25
Legal rights index 29

India also enjoyed highest levels and rates of remittances from abroad. By 1999, these remittances surged to $12 billion, or about one-fifth of total export earnings. They helped reduce traditional external economic volatility and vulnerability to oil prices and to cross-border economic crisis (Kelkar, 2002). Moreover, these remittances had a multiplier impact on the livelihoods of the grassroots – by increasing the funds and resources available to support the lower income rural and urban households.

2005 onwards: Grassroots entrepreneurship - Mobilizing the traditional Knowledge

In February 2005, Manmohan Singh government launched a major plan, through the Union budget for 2005-06, to rebuild village infrastructure in irrigation, roads, housing, water supply, electrification, and telecom connectivity (Government of India, 2005). Termed Bharat Nirman (Constructing India), the plan sought to unleash rural India's potential as a growth engine. The budget also introduced special, higher income tax exemption brackets for women and senior citizens, and allocated Rs. 144 billion for women's development, while introducing the concept of gender budgeting for all government departments. It sought to strengthen the manufacturing sector with a focus on SMEs, with an income tax relief to firms having annual turnover of Rs. 40 million (Government of India, 2005). Government also decided to pursue reforms in the cooperative banking sector, to promote microfinance and credit linking, and to use non-government organizations and self-help groups as micro-insurance agents (Government of India, 2005).

Patents had been issued in the US and European union, for instance, on wound healing properties of turmeric, hypoglyceimic properties of bitter gourd, and fungicidal properties of neem, all of which have been part of the traditional knowledge of India. The government created a Traditional Knowledge Digital Library (TKDL) covering 35,000 Ayurvedic formulations involving medicinal plants and sent that to international patent offices to help check biopiracy (Srivastava, 2002).

Honey Bee - GIAN (Grassroot Innovators Augmentation Network) collected over 10,000 examples of contemporary innovations and outstanding examples of the use of traditional local knowledge in the sustainable management of natural and other resources. This knowledge was shared with communities in 75 nations through the Honey Bee newsletter. The Honey Bee network requires the formal sector to use the traditional knowledge only after acknowledgment, citation, and prior informal consent of the knowledge holder.

Consider the experience with Kani – a tribal community in the Kerala Stae. In 1987, a team of scientists from the Tropical Botanic Garden and Research Institute (TBGRI) noticed that the Kani tribals frequently ate certain fruits which kept them energetic and agile. After probing, the team discovered interesting ethnomedical information on a wild plant locally called "Arogyapacha." The team identified the plant as Trichophus zeylanicus, and detailed chemical

and pharmacological investigations confirmed the anti –stress, anti-hepatoxic, and anti-fatigue properties of compounds contained in its leaves (Gupta, 2000). A polyherbal formulation named "Jeevni" was formulated, and the manufacturing license was transferred to the Aryavaidya Pharmacy Coimbatore Ltd. for a license fee of Rs. 1million (approximately 21,000 US $) for a period of 7 years. Half of the license fee and royalty was shared with the tribal community, for welfare and development activities and promoting biodiversity (Gupta, 2000).

At the village level, People's Biodiversity Registers were set up to document local people's knowledge – acquired a part of their daily subsistence activities such as grazing, fishing, and basket weaving – on the status, properties, uses, and management of a variety of biological resources. The knowledge includes, for instance, draught resistance of certain varieties, methods of preservation of foods, or use of certain plants in treating human or livestock diseases. Most of this knowledge until now has been almost exclusively orally transmitted. Moreover, for systematically integrating all these efforts, a National Innovation Foundation was established. Its mission is to provide institutional support in scouting, spanning, sustaining and scaling up of grassroots innovations, and to enhance technical competence and self-reliance of grassroots innovators.

India's efforts to tap culturally-embedded knowledge are gaining international attention. A Chicago Tribune article recently stated, "In farm sheds and machine shops and on small rural plots, India's back-yard inventors are coming up with creations that their backers hope will make it big, solve a few of the world's problems, boost India's exports and continue cutting the country's dismal poverty rate" (Goering, 2007). An example of these back-yard entrepreneurs is Conserve in New Delhi, which employs poor urban rag-pickers to collect, sort, weigh, and clean the plastic bags that litter the streets. The bags are melted together to create a thicker material. Since the bags come in all colors, different designs can be created using strips and cutouts of bags. This recycled trash is then turned into chic handbags that are sold for $50 in European boutiques. By tapping rag-pickers for their business, Conserve helps grassroots women earn three times what they previously made (World Resources Institute, 2007).

DISCUSSION

In this paper, we examined the role of Reengineering West and of Self-Discovery paths to development of India. We challenged the traditional notions in the literature that the emerging

markets are deficient in original knowledge. We also reviewed the case of India, and challenged the notion that the factors supporting entrepreneurship are lacking in India. We then reviewed evidence over different phases of history, and identified typologies of entrepreneurship in each of the phases. We also drew parallels of those historically situated typologies with the contemporary and emerging forms of entrepreneurship in India.

India was notable for her the depth and breadth of her indiginous knowledge during the ancient times. The British strived to push alternative technology and learning systems intended to strengthen their supremacy and control of India. Since independence, the policy efforts have focused on reenabling the Self-Discovery process – initially with a greater emphasis on Reenginering West, but increasingly prioritized on Self-discovery and technological exchange.

The Reenginering West paradigm dominated during the British era and the early post independence era. India relied heavily on foreign technology. She reserved all basic and heavy industries to the public sector. Expansion of large-sized private companies in other industries by way of licensing and other industrial controls were closely restricted. As foreign nations withheld key components and services required to productively exploit imported technologies, India became dependent for even the basic foods.

The Self-Discovery paradigm evolved during the 1960s and 1970s. India withdrew into a protective shell of a closed economy, focused on self-reliance and indigenous capability building. Higher education and training institutions in science, technology, and related domains played an important enabling role. Specialized research institutions were created and supported by the government, and were asked to import international technologies and practices, and to develop indigenous versions for applications, particularly in agriculture and defense. While the public sector developed significant technical strengths during this period, the costs of using these technologies and techniques were higher than international levels. The limited spillovers to the economy resulted in high levels of poverty, unemployment, growing disparities in income distribution, and a general decline in the standard of living, except in selected states where local conditions were more suitable to adopting foreign technologies and techniques.

A combination of the two paradigms, along with technological exchange, began shaping up during the 1980s and 1990s. India gradually opened the economy, and invited private sector firms to exploit the infrastructure and capabilities created in the public sector. Private firms were able to discover innovative and creative linkages for productively exploiting the public

infrastructure in domains where the Self-discovery path superimpsed on the Reengineering West path had been failing. This enabled them to rapidly move on the learning curve of servicing a diverse base of costly foreign technology; to confidently expand overseas with onsite maintenance, testing, and other software and information technology services.

In late 1980s and early 1990s, the multinational firms, such as Texas Instruments and Hewlett-Packard, began to catalyze the developmental process, by setting up first offshore software development units in India during the mid-1980s. These became certificates endorsing India's capability for reliable 'offshore' development. In the software sector, more Indian firms got certified at the highest level of process capability maturity than all the non-Indian firms put together in the world. Additionally in most other sectors, domestic firms became able – possibly by virtue of their matured process capability – to retain a dominant share of the market, except where they consented to be acquired by multinationals (as in soft drinks), or where the multinationals were operating in India for a long period in so much they are deemed to be virtually domestic (for instance, Unilever in detergents and cosmetics). The multinational firms also began encouraging their Indian subsidiaries to be first to introduce new products. This contrasted with the past when the foreign firms offered only old and antiquated products with high mark-ups and high maintenance fees.

Over the 1990s, the strategy of large private sector firms relying on imported technologies, services, and capital goods lost momentum. Many technology collaborations with foreign firms fell apart. Some large private sector firms, such as Reliance, started emphasizing internal R&D, rather than continuing to depend on imported know-how. They began pioneering new frontiers of technology at the global level that they then leverage to offer niche services to the foreign firms. The public sector firms also shifted priorities. They made available their own internal R&D results to private firms, locally and globally. The government shifted its role from being the nation's primary financier of knowledge and technology, to a secondary supporter of innovations by well managed private sector enterprises, and then to a tertiary governance and organization of the distributed knowledge in diverse communities.

Like many developing nations using the socialist model India's public sector was created to help the nation reach the 'commanding heights' of the economy, and to conduct activities that would not be performed in the private sector, because of high risks, high investment requirements, or unwillingness to assume the developmental obligations. In this model, the

public sector assumed a development and supportive role so the risk and investment requirements reaped beneficial results that were spread over a large number of private sector enterprises who were able to and willing to respond to the developmental climate, education and training, infrastructure, know-how, and technology offered by the public sector. However, this model proved to be dysfunctional, in terms of high costs, high corruption, and high polarization and dependence on the foreign nations, and had to be eventually abandoned in favor of independent initiatives by the private sector firms as well as by the disadvantaged groups.

Early on, India sought to bring radical breakthroughs to the nation through foreign alliances. A context of denial of critical technology, parts and components encouraged a policy that promoted incremental innovations through business process manipulations. Subsequently, the thrust shifted to nurturing innovative organizations in the private sector. As the public sector dominated structure was dismantled, the private sector responded rapidly and robustly to the call of globalization. By late 1990s, India achieved significantly higher integration with the global market, and the local firms were able to withstand the competition from the multinational firms, despite a sharp reduction in the tariff rates. Interestingly, while the share of the private sector in the national R&D rates grew over the 1990s, the overall R&D spending rate of the nation declined. Though India lagged behind other emerging markets in the innovation rates, her capacity to absorb technology remained one of the best. All this points suggests that the historically situated strengths of the technological base in India were possibly important missing link explaining the resilience and agility of the Indian firms.

Since 2000s, there was a growing interest in the grassroots or micro innovations, which involve artisans, farmers, women in households, slum dwellers, tribals, and other unsung heroes who never obtained credit for their creativity. The emphasis was on engaging and empowering all sections of the society in the technological process. Partly, it was a political imperative as regional parties came to prominence by promising fruits of development for the isolated groups. Partly, it was a competitive imperative, as private sector firms sought to leverage the power of the masses and volumes, by developing and refining customized organizational models to reach the interiors and the grassroots. And, partly, it was a developmental imperative, as several nonprofit organizations – funded by the international remittances and domestic family foundations – took the onus of promoting education, information, and traditional and contemporary skills, and connecting the interiors with the national and global markets.

India is in the process of finding a right balance between the Entrepreneurial Self-discovery and the Reengineering West paradigms. The question remains about the prudence of diverting financial and strategic resources on the Self-discovery. The dominant international paradigm, adopted by several nations, including Japan and China, has been of focusing the national and private sector efforts on Reengineering West. The logic goes that as the leading firms will progress in reengineering more advanced Western know-how, the earlier know-how will automatically percolate to the next level of firms, and this trickle-down process will eventually improve the living standards of everyone in the society. The super-normal double digit growth rates achieved historically in Japan after the World War II, and being generated in China since the reforms of 1978, will validate this logic.

Though China's growth rates remain higher than that of India -- even during the 2008-2009 global economic and financial meltdown -- it is too early to give a definitive verdict in favor of the Chinese model of development. Many commentators have long maintained that fundamentally India remains more strongly positioned for sustainable economic growth, than does China. That thesis is primarily based on the factors such as the democratic institutions, the proficiency of English language, and the importance of private sector and of services sector in India. However, the critics rightly point that China has made significant progress on these factors over the recent years, except on the democratic institutions where it has a fundamentally different philosophy – a philosophy that has apparently served China and many other East Asian nations well, and that the critics credit as strength of the Chinese model, not a weakness.

But Entrepreneurial Self-discovery can also be a source of a distinctive strength for a nation, particularly when the international markets fall in crisis. Indeed, Indian firms have been significantly more resilient to the 2008-09 global economic and financial meltdown than have their Chinese counterparts. In a recent article, the Wall Street Journal (Wonacott, 2009), noted how India has defied global slump, powered by growth in poor rural states, "Growth has slowed in the new India of technology outsourcing, property development and securities trade. But old India -- the rural sector that is home to 700 million of the country's billion-plus people -- shows signs it can pick up the slack. The rural awakening helps explain why India continues to grow even as the U.S. recession drags on the world economy."

Identifying the political roots of the grassroots discovery, it observed, "In poor and largely rural states from Orissa in the east to Rajasthan in the west, many new leaders have

invested in health, education and infrastructure. That has set the stage for the creation of industry and consumer markets and enabled upward mobility." Consistent with the re-discovery efforts since 2000, it affirmed that "The rural economic rise is recent, with few figures yet available for 2008. In the five-year period ending in 2007, rural Indians' consumer spending grew faster than that of city dwellers, according to Indian brokerage IIFL. Rural India has surpassed urban centers in the number of households earning $2,000 a year, above which families begin to have disposable income."

Finally, it noted how the grassroots re-discovery has helped India stand tall amongst the BRICs – the big four emerging markets. "India's economy has held up better than most, in spite of slowing tech sales and falling real-estate and stock markets. The International Monetary Fund projects India will grow 5.1% in 2009, faster than Brazil (1.8%) and Russia (-0.7%). India is also closing the gap on China, whose 6.7% projected growth for 2009 marks a sharp decline from recent double-digit gains."

CONCLUSIONS

In this paper, we sought to examine the entrepreneurial strategy based on the Reegineering West paradigm, and explored the alternative of Self-Discovery paradigm.

India, with over 100 spoken languages but with English as its *lingua franca*, has transformed itself from a third world country to a significant destination for technology. Beatty (2004, pg. 168) suggested two scenarios for classifying a developing country's adoption and diffusion of foreign technology[2]. One where technology imports yield technological dependence, and second where they promote domestic technological capability. Based on these two scenarios, the case of India falls squarely on this "technology imports helped to promote domestic technological capacity." India did so in her unique way of fusing imported foreign technology; fundamentally improving it using indigenous knowledge, adopting it to diverse local conditions, and producing for import substitution and for export by state owned enterprises and a small group of established oligarchs, ultimately leading to SMEs taking over in few niche technologies and growing to become worldwide suppliers.

[2] Based on much documentation he classified 19th century Mexico as falling in the "foreign technology yielded technological dependence" scenario. By inference he suggested that 19th century Japan fell in his "technology imports helped to promote domestic technological capacity" scenario.

However, on deeper reflection, the totality of facts shows that the case of India points to a third scenario: domestic technological capability helped to promote technology imports, and when these imports became cost-escalating, they helped the policy to reorient towards promoting technology exports. India's constructed this new scenario by fusing its indigenous knowledge, fundamentally improve it using technology imports, adopting it to diverse global conditions, and producing for technological exchange by a broadening group of emerging entrepreneurs, established family and other private businesses, and public sector firms, ultimately leading to local firms becoming global contenders in diverse core technologies and growing to become independent but strategic partners for the corporations worldwide.

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