OVERCOMING DEVELOPMENT ADVERSITY:
HOW ENTREPRENEURS LED SOFTWARE DEVELOPMENT IN INDIA

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Abstract

In many developing countries, firms confront a highly adverse business environment. In these cases, development (in theory) ‘should not’ occur and observers tend to recommend government policy reform. The World Bank ranks India 116th out of 155 countries according to the ease of ‘doing business’. Indian managers spend a great deal of their time dealing with government regulations and bureaucracy. However, despite these difficulties there has been an explosion of technology-based entrepreneurship in India’s software and IT industries. In theory, the Indian software industry ‘should not’ have developed in the way it did. This paper shows how Indian software entrepreneurs overcame institutional barriers to development and how they themselves initiated institutional change, despite Government’s restrictive policies. Contrary to conventional wisdom, Indian software firms were able to circumvent government imposed restrictions to growth and lead institutional reform in India. If India’s entrepreneurs can do it perhaps others can too.

Keywords: Software, Development, Entrepreneurship, Bureaucracy, Innovation
Introduction

In many countries of the world large scale, effective business development through entrepreneurial activity ‘should not occur’. Research by de Soto (2000) and Djankov and McLiesh (2005) and others show that starting and running a business is extremely difficult in many developing countries. Furthermore, Djankov and McLiesh (2005, p3) argue that reform of the business environment could have a positive impact on the growth of some of the poorest countries. They contend that there is positive relationship between the ‘ease of doing business’ and the human development index.

In India, the problem of an adverse business climate is especially acute. India is ranked 116th (out of the 155 countries) in a ranking which shows how difficult it is to do business according to a series of criteria (Doing Business in 2006). The country also ranks 130th in terms of difficulties in trading across borders and 138th for the ease in enforcing of contracts. Indian senior management spent 12.9% of their time dealing with requirements of regulations compared with 6.4% average worldwide. Indian officials' interpretations of regulations are highly inconsistent and licensing laws in India have been notoriously difficult to navigate.

The problems posed by an adverse business environment can go much deeper than the mere inconvenience and costs of delays caused by regulation. As Krueger (1974) and Baumol (1990) argue, excessive government regulation and intervention often function as a means of rent extraction by particular groups in society. For example, the granting of licences by government officials frequently leads to competition for large rents, encouraging bribery and diverting entrepreneurs into rent seeking and away from innovative activities. In extreme cases, the perception that businesses become successful by exerting influence or bribing officials ‘to do what they ought in any event to do’ undermines both the link between pecuniary reward and business efficiency and trust in the motives and actions of government (Krueger, 1974, p302). Favouritism towards certain business groups can lead to the perception that government policy is a mechanism for rewarding the already rich and influential and erode values for doing business legally and ethically.

Nevertheless, despite the many difficulties of an adverse business environment, in recent years we have seen an explosion of technology-based entrepreneurship in India’s software, information technology (IT) and business process outsourcing (BPO) industries. But how can we explain this? The kind of techno-entrepreneurship witnessed in India faces numerous institutional constraints, only some of which are imposed by or presided over by Government. Serious constraints arise from underdeveloped financial markets, poor protection for property rights and weak contract enforcement. These constraints should erode profitability, restrain market entry and impose high transactions costs on new entrepreneurial ventures, thereby stifling creativity and innovation. In theory, the Indian software industry ‘should not’ have developed in the way it did.
This paper shows how the Indian software industry achieved its astonishing results despite the adverse conditions facing entrepreneurs.\(^1\) India provides vital lessons for other countries because it shows how, when given the economic opportunity, entrepreneurship can develop new world class business models, and start a demonstration effect for other industries to follow. In turn, these changes can create the conditions for institutional transformation in the economy.

Part 1 of the paper reveals how Indian software entrepreneurs overcame the huge institutional barriers to development and how they themselves initiated institutional change despite the Government’s restrictive policies. Part 2 discusses some of the economic benefits achieved by the software entrepreneurs, relative to other kinds of firms, and their wider impact on other service sectors. Part 3 concludes.

**PART 1: HOW INDIAN SOFTWARE FIRMS OVERCAME OBSTACLES IN THE BUSINESS ENVIRONMENT**

1.1 Gaps in research on entrepreneurship

Entrepreneurship studies can be traced back to the work of Richard Cantillon (circa 1730) and Jean Baptiste Say (1816).\(^2\) Cantillon saw entrepreneurs as bearers of uncertainty, while Say (1816) saw the entrepreneur as the agent who united all means of production in order to make profits. These ideas about what entrepreneurs did were re-discovered in the 20\(^{th}\) century. Thus, Frank Knight (1921) emphasised the entrepreneur's role in coping with the uncertainty of market dynamics, arguing that entrepreneurs were also required to perform fundamental managerial functions such as direction and control. Harvey Leibenstein in the 1960s and 1970s saw the entrepreneur as the agent which resolved market deficiencies through input-completing activities. A somewhat different twist to the advantages of entrepreneurship was given by Joseph Schumpeter (1934) who saw the entrepreneur as a heroic innovator who implements change within markets through the carrying out of ‘new combinations’ of various kinds. For Israel Kirzner (1979) the entrepreneur is the one who recognizes and acts upon market opportunities. More recent contributions by Rothwell and Zegveld (1982) identified ‘intracorporate’ entrepreneurship (or intrapreneurship) in the modern context, showing how managers can create new businesses within large corporations.

None of these writers explicitly examine entrepreneurship within the context of the developing countries or asked how the modern problems of development described by de Soto (2000) affect the ability of entrepreneurs to operate. These include, as we noted earlier, the presence of underdeveloped financial markets, poor protection for property rights and weak contract enforcement. Most entrepreneurship research today implicitly assumes that there is no difference between the

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\(^1\) Other papers focus on the globalisation of the Indian software sector (e.g. Desai, 2003; Arora and Gambardella, 2004; Athreye, 2005; Bannerjee and Duflo; 2000; and Basu, 2005). Therefore, the focus of this paper is on how Indian firms managed to enter the industry despite their disadvantages.

\(^2\) For an excellent summary of research on this subject see: [http://www.westaaction.org/definitions/def_entrepreneurship_1.html](http://www.westaaction.org/definitions/def_entrepreneurship_1.html)
entrepreneurship being carried out in the most developed nations and that carried out in ‘latecomer’ or developing countries. Entrepreneurs in today’s developing countries are often called upon to perform highly specialised activities in an international division of labour. These ‘latecomer’ entrepreneurial functions differ in many ways from the conventional advanced country (or ‘leadership’) entrepreneurship which focuses on developing new products and technologies (Hobday and Perini, 2005).

1.2 How software firms coped with Indian institutions

Software outsourcing from India grew through the 1980s and 1990s despite weak laws to enforce contracts, poor intellectual property (IP) protection, inadequate capital markets and a policy regime that was generally market-unfriendly. Software services exports from India have grown from a mere $330 million in 1993 to $17.3 billion in 2006, employing around 878,000 people. Estimates in Athreye (2005) suggest that in 2001, entrepreneurial firms accounted for about 38% of sales revenues and 35% of employment in the Indian software outsourcing sector. Six of the top twenty firms were entrepreneurial in origin. The techno-entrepreneurship that sustained the growth of the Indian software industry is thus both intriguing and an inspiring for other countries that are poor, face adverse regulations and institutions.

The simple answer to ‘how did this happen?’ is that the industry exploited its initial advantage in low-cost human capital. As the newly emerging global IT industry boomed in the West, this led to a huge demand for trained engineers and technicians. Indian firms saw this economic opportunity and leveraged their cost advantage by occupying product market spaces and business models that avoided the penalties of their poor institutional environment and competition with incumbent firms.

This occurred initially through the development of customised software designed for foreign MNCs within a business outsourcing relationship, in a manner very similar to the original equipment manufacture (OEM) arrangements of East Asian latecomer entrepreneurs in Korea and Taiwan (Hobday, 1995). In the 1970s and 1980s the hurdles imposed by Government regulations and institutional difficulties meant it was far easier for Indian software firms to move teams of engineers abroad- a practice that is sometimes referred to as ‘body-shopping’. In this way, the IP rights always belonged to the client firm and they could monitor the programmes directly. However, soon some firms gained reputations for timeliness and product quality and started attracting more work (Banerjee and Duflo, 2003). They also began to be trusted to do the work in India where they could deliver the same quality of software at an even lower price.

There were waves of experimentation with other kinds of business models, particularly the higher value-added software product model growth. Firms such as Sonata, Mastek, and NIIT, in the mid 1980s, experimented with new value adding propositions - Sonata tried to develop software products for the domestic market and Mastek became the first company to use tools to speed up product development again for the domestic market. NIIT experimented with combining training needs with software services and enjoyed much success. However, the pioneering firms largely failed - due to the small domestic market and lax IP laws. The lack of venture capital

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3 Estimates from the National Association of Software Services companies (NASSCOM).
support also made the higher value-adding product model a very risky one for entrepreneurial firms to adopt.

The late-1980s saw a renewed exploration of the product market but this time aimed at foreign clients rather than domestic ones and carried out by larger firms who had deep pockets for such sustained investment. Ramco (a business house subsidiary) and CITIL (a spin-off from the multinational firm Citibank) began to produce products for foreign clients. While CITIL’s product i-Flex became a huge success, Ramco’s product Marshall was overtaken by solutions by Western companies like SAP and other ERP product producers. In interviews both firms emphasised the huge up-front investments needed and the important role for marketing capabilities in developing successful software products for overseas clients.

Experimentation with new value added propositions continued in the 1990s, the most prominent of which was the application of the software services delivery model to administrative functions of companies (the so-called Business Process Outsourcing or Offshoring, BPO). A more recent wave has focused on R&D outsourcing in the telecom domain.

1.3 Institutional reform and adaptation

The spectacular growth of the 1990s was also marked by an improvement in the institutional infrastructure surrounding the software outsourcing industry, which generally served to ease the constraints on the industry’s further growth. These included capital and labour market reform, better access to finance, improved IP right protection and contract enforcement.

Capital market institutions did not understand how to evaluate the finance needs of the emerging software industry. Infosys, India’s most famous entrepreneurial firm, was refused a bank loan when it was being set up in 1981 and had to borrow the start-up money from the wife of one of the founders. It was probably not the only one. Faced with a situation where bank finance was not readily available and venture capital was not forthcoming, software firms were conservative in their own cash-flow calculations but experimented with importing the use of capital market institutions in the US. Many software firms voluntarily listed on stock exchanges in the US and in Europe with more stringent disclosure norms in order to raise money for investments and acquisitions. The compliance of some firms to international norms was a powerful force for improved corporate governance with the chairman of Infosys being involved in committees to promote these changes.

The combined effects of liberalisation and the success of software industry drew US venture capital into India after 1993. Dossani and Kenney (2002) show that a significant portion of the sevenfold increase in funds from 1993-1998 was accounted for by the entry of foreign investors after 1995, through investment arms of foreign banks, and venture firms that had raised capital abroad. Indian Silicon Valley entrepreneurs encouraged new business plans within India and exploited the new exit routes made possible by the international listings of Indian software firms on NASDAQ, NYSE and the LSE. According to recent estimates from the Indian Venture Capital Association, domestic and foreign venture capitalists invested $774 million in 2003 in India up from $590 million in 2002 (Nair, 2004; Basu, 2005).
Training and the supply of human capital also improved. As the software industry grew in the late ‘80s and early ‘90s, labour markets for software programmers became tight due to global market expansion and fierce competition. In this period, scores of privately funded and organised educational and training institutions emerged to meet the demands for skilled labour, expanding supply beyond what could be produced through the state-funded educational establishments. Desai (2003) shows that while engineering capacity increased six-fold from 61,000 in 1987-88 to 341,000, the supply of graduates with IT degrees saw a ten fold increase, from 25,000 in 1987-88 to 258,000 in 2002-03. Privately financed training institutes such as NIIT and APTECH, sprung up to provide software training throughout the 1990s – a dramatic institutional departure in a country where reliance on publicly funded training institutions had been the norm. As Table 3 shows their incidence increased all over India, especially post 1995.

Table 1: Regionwise Break-up of Privately Financed IT Institutes in India

<table>
<thead>
<tr>
<th>Region</th>
<th>Year</th>
<th>East</th>
<th>Central</th>
<th>North</th>
<th>West</th>
<th>South</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1987-88</td>
<td>12</td>
<td>25</td>
<td>5</td>
<td>80</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>1995-96</td>
<td>13</td>
<td>42</td>
<td>26</td>
<td>80</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>2002-03</td>
<td>84</td>
<td>76</td>
<td>82</td>
<td>86</td>
<td>92</td>
</tr>
</tbody>
</table>

Source: Adapted from Arora and Gambardella (2004, Figures 2 & 3) based upon data from the All-India Council on Technical Education.

Intriguingly, all of these changes occurred after the software growth opportunity had been spotted by entrepreneurs with some initial success. India’s software firms did not wait for institutional reform. On the contrary, software success caused the reform to take place.

1.4 Creating Business Friendly Policies

A very important driver for institutional reform was the National Association of Software Service Companies (NASSCOM), the largest and most important business association for software services and now BPO. NASSCOM was set up in 1988, with just 38 members who collectively accounted for 65.0% of the industry revenues. Many of these members were small companies, and the total industry revenue in 1988 was a little over $100 million. By 2003-04, the number of members had risen to more than 800, collectively accounting for about 95% of the industry output of about $21 billion.

NASSCOM operates as a collective body representing the interests of the software sector with functions of lobbying, advocacy and public relations (Kapur, 2002). NASSCOM has been extremely effective in: lobbying for policies favourable to the industry’s continued growth; collective marketing at a time when Indian companies did not have an international reputation for delivering quality service; and providing information on the industry for insiders and outsiders. Collective marketing involved organising trade fairs and producing directories of firms and their areas of business for potential customers, bringing together demand and the eager small entrepreneurial
firms\(^4\). The difficulties of ‘selling’ India software at the time cannot be overstated as a founder-member of NASSCOM told us:

“When I was out there in 1991, the country was bankrupt. We had three governments in one year, an assassination of a prime minister, and we were hawking our gold. You know, selling overseas was not a piece of cake…. if I have to present ten slides, the first eight had to be to sell India and the ninth one would say we do have an IT industry in India and unless the guy bought those nine slides, your tenth one about your company was meaningless. Because who are you anyway? So we had to building up the [Indian] brand from day one.”

The attitude of NASSCOM towards engagement with the government on policy issues is a dramatic break with past practice. Older industry associations, such as the Federation of Indian Chambers of Commerce and Industry (FICCI) and the Confederation of Indian Industry (CII), had a more hands-off approach to policy engagement. NASSCOM engaged the Government with facts to ensure that business was given a free hand to take initiatives. This approach has made for better industrial policy and improved corporate governance. The NASSCOM lobbying model has been emulated in other fast-growing sectors, notably biotechnology and automotive components, which speaks volumes for its effectiveness.

**PART 2: THE BENEFITS OF ENTREPRENEURSHIP**

**2.1 Economic benefits**

In many developing countries start up entrepreneurs fail to make much headway in terms of employment growth, new technology adoption and capital efficiency (Fehr and Nils-Henrik, 1995; Beck et al, 2003; Shadlen 2004). To assess this issue, we compared some quantitative measures of the business performance of software entrepreneurial start up firms with those of business house subsidiaries and foreign MNCs (see Table 2). Table 2 is based upon a survey of 204 software firms (132 entrepreneurial firms, 27 business house subsidiaries, 45 foreign firms). It shows that while the starting size (indicated by the median number of employees after the first year of business) for entrepreneurial firms was only marginally larger than that of domestic business house subsidiaries, both started smaller than foreign firms. Entrepreneurial firms grew to an employment size almost as large as foreign firms. A similar picture emerges when we compare size by turnover. Entrepreneurial firms showed a slower rate of growth than the subsidiaries of large domestic firms but grew at a marginally higher rate compared with foreign firms.

Turning our attention to initial capital outlays we find that entrepreneurial firms started with very small initial capital outlays compared to both domestic firm subsidiaries and foreign firms, especially the former. This may be related to the scarcity of finance that entrepreneurial firms face when they start-up due to the high

\(^4\) Big business houses already had previous contacts and relationships with foreign vendors which they exploited.
cost of capital. If we look at the ratio of the median turnover to median capital outlays as a crude input-output measure, we find that entrepreneurial firms are the most efficient in their use of capital. This ratio is more than two and a half times that for foreign firms and over three and a half times that for subsidiaries of domestic firms. In a capital-scarce economy, entrepreneurial firms appear to be doing a better job of conserving capital than non-entrepreneurial firms.

Table 2: Economic Impact of Various Software Entrants, 2003

<table>
<thead>
<tr>
<th></th>
<th>New Start-Ups &amp; Spin-Offs</th>
<th>Subsidiaries of Domestic Firms</th>
<th>Foreign Firms &amp; MNE Subsidiaries</th>
<th>All Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of firms</td>
<td>132</td>
<td>27</td>
<td>40</td>
<td>204</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median annual rate of growth of employment (% per annum)</td>
<td>30</td>
<td>42</td>
<td>26</td>
<td>29.7</td>
</tr>
<tr>
<td>Median number of employees at the end of first year of operations</td>
<td>15</td>
<td>12</td>
<td>22.5</td>
<td>18</td>
</tr>
<tr>
<td>Median number of employees in 2003</td>
<td>80</td>
<td>148</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>Revenues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median annual revenue in 2003 (in Rs. million)</td>
<td>80</td>
<td>268</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>Median (revenues/age)</td>
<td>11.43</td>
<td>43.67</td>
<td>12.5</td>
<td>12.86</td>
</tr>
<tr>
<td>Equity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median equity (initial capital outlay in Rs. million)</td>
<td>3</td>
<td>37.5</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Ratio of median revenues to median start-up equity</td>
<td>26.67</td>
<td>7.15</td>
<td>10.00</td>
<td>18.00</td>
</tr>
</tbody>
</table>

Source: Firm origins survey.

Thus, two surprising conclusions emerge from our survey: first, the employment growth of entrepreneurial firms was at least as good as that of MNCs; second, entrepreneurial firms are more efficient than both domestic and foreign firms in their utilisation of capital for the most productive use. These findings should bring cheer to many capital-scarce economies.

2.2 Business model benefits: the propensity to experiment

Our survey also compares the motivations of entrepreneurial firms entering the software business with business house subsidiaries and multinational firms (see Table 3). While the pursuit of a profitable business opportunity was the overriding motive for all firms entering the software sector, the desire for independence and the possibility of technological innovation all figured highly in motivating entrepreneurial
entry. By contrast, subsidiaries of domestic firms were more concerned with diversifying into more profitable areas and the desire to earn foreign exchange through exports.

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Frequency of extreme scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identified new business opportunity</td>
<td>100</td>
</tr>
<tr>
<td>Desire for independence</td>
<td>74</td>
</tr>
<tr>
<td>Stimulated by research possibilities and the desire to innovate technologically</td>
<td>70</td>
</tr>
<tr>
<td>Diversification into a more profitable growth opportunity</td>
<td>19</td>
</tr>
<tr>
<td>Earn foreign exchange through exports</td>
<td>13</td>
</tr>
<tr>
<td>Growing software needs of the parent company</td>
<td>11</td>
</tr>
<tr>
<td>High quality of programmers</td>
<td>35</td>
</tr>
<tr>
<td>Lower cost of programmers</td>
<td>29</td>
</tr>
<tr>
<td>English the international business language</td>
<td>25</td>
</tr>
</tbody>
</table>


Overall entrepreneurial firms had more creative space and were better placed to pursue their individual visions. Entrepreneurial firms were also more likely to experiment with new business models.

### 2.3 Impact of Software Entrepreneurship on Other Sectors

Each of the institutional developments described in the previous sections have impacted other sectors where the outsourcing business model was adopted. Capital market reforms, which began as part of a larger financial reform process, have gathered steam. The successful use of international capital markets by Indian software firms and the simultaneous listing of software firms on both the Indian and foreign stock exchanges have resulted in a realignment of disclosure rules and corporate governance procedures in the Indian capital markets.\(^5\)

The emergence of third-party BPO activities in India led by firms such as EXL Services, 24/7, Spectramind, Daksh e-Services and Transworks, who all received venture capital funding for their seed capital, has impacted on manufacturing, health care, banking and financial services, pharmaceuticals, engineering, and textiles. As a result there seems to be a gradual convergence in India towards the US model of venture capital institutions, initiated and aided by the diaspora of technology entrepreneurs in India and their Silicon Valley partners.

\(^5\) N.R. Narayananurthy, Chief Mentor of Infosys, has been an important member of many of the corporate governance committees set up for the reform of capital markets in India.
The NASSCOM model of industry-government interaction has been adopted by new sectors relying on domestic entrepreneurship. Examples include the Association of Biotechnology Led Enterprises (ABLE), which represents the biotechnology industry, and the older Automotive Component Manufacturers Association, established in 1958. The latter’s activities since 1994 resemble the NASSCOM model quite closely. Indeed, a visit to the web sites of these organisations shows that their strategies and information content are similar to that provided by NASSCOM. This institutional reform has created more visibility about the desirability of more reforms and the part this process could play in supporting entrepreneurial growth in other services and knowledge based sectors.

CONCLUSIONS

Contrary to conventional wisdom, Indian software firms were able to circumvent government-led restrictions to growth and then lead institutional reform in India. Moreover, these firms are bringing about major changes to the way business is being carried out in many other sectors, producing a wide ripple effect which will, hopefully, continue and grow in the future. The impetus for institutional reform has not come from government, international institutions or their advisors, but from the business sector itself, reversing the way development analysts normally think about economic progress.

In the software sector, start-up entrepreneurs played a leading role in creating and disseminating new business models and changing restrictive institutional practices. Indian software firms saw the burgeoning demand opportunity in the international market place and imported new institutional norms from the advanced nations, especially the US, bringing about improved capital inflows and enhanced intellectual property protection. The new entrepreneurs not only helped reform local institutional but also began building new institutions and practices which are now diffusing to other industries. Through their strategies, Indian start-up firms are changing the way business is done in India.

This process of reform was made possible by first tapping into the huge boom in demand for IT services in the world economy and by exploiting the close connections built up by software entrepreneurs with foreign MNC buyers. This both provided a direct channel into the growing international demand for software services and the new technologies which underpinned this demand. Our survey evidence also shows that the new start up firms outperformed the advanced multinational corporations and the large local business house subsidiaries in terms of capital efficiency and were at least as effective in creating employment and developing the new skill base.

This particular story has great relevance to other sectors in India and for other developing countries. Entrepreneurs and their supporters need not wait for government to reform itself – they will wait a very long time for this. Instead, they should reject any notion that ‘development is impossible’ because of government bureaucracy and difficulties of doing business. Firms and business associations should be inspired by the Indian case to take the development lead, identify the
business opportunities ‘out there’ and circumvent any rules and restrictions which attempt to stop them. Indian entrepreneurs can do it. So can others.
REFERENCES


