



A study on the Current Role of SME's in the Indian IT Industry
and Hypotheses on an Ecosystem for their
Sustenance and Evolution

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W.P. No.2008-03-05
March 2008

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A study on the Current Role of SME's in the Indian IT Industry and Hypotheses on an Ecosystem for their Sustenance and Evolution

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Abstract

This paper looks at the current challenges faced by the SME's in the Indian IT industry and formulates hypotheses on how an intermediary can create an ecosystem to ensure the sustenance and evolution of these firms. The play out in the industry is expected to such that the larger companies in the Indian IT sector will move up the value chain and as they do so they will increasingly move out of the body shopping mode that constitutes the lower end of the outsourcing spectrum. This creates an opportunity and a necessity for the emerging companies and SME's to fill the void.

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TABLE OF CONTENTS

INTRODUCTION	4
Study methodology:	5
I. IT INDUSTRY TRENDS	5
Projections:	5
Global Delivery Models:	6
II. STRUCTURE OF THE INDIAN IT INDUSTRY	6
Evolution of the Indian IT industry:	7
Size Structure of the Indian IT industry:	8
Transitions:	9
Offshoring:	9
III. GROWTH TRENDS FOR THE INDIAN IT INDUSTRY	10
TREND 1: Increase in offshore-centric contracts	10
TREND 2: Increase in Share Of Small To Medium Sized Contracts	11
TREND 3: Increase in Multi Vendor Sourcing.	11
LABOR POOL	11
DISTRIBUTION OF GROWTH AMONG THE VARIOUS SEGMENTS	12
IV. CHALLENGES FOR SME'S	13
Challenges for The IT Industry	13
Risks related to billing rates:	14
Challenges for SME's Amplifying Risks	16
Reputation	16
Visibility in Desired Markets	16
Access to Labor Force	17
Sustainability In Terms Of Margins	17
Consolidation	17
V. BUILDING AN ECOSYSTEM FOR SME SUSTENANCE	18
A Fabric of Sustenance for SME's:	18
Facilitate Knowledge Buildup and Transfer	19
Brokering	19
Rating:	20
Economies of Scale in Advertising And Marketing	22
A CASE FOR CLUSTERING	23
Challenges faced in India as a developing economy:	24
Constituents of a cluster:	24
Innovation and the relation of clustering as a solution:	25
Relational Assets, Untraded interdependencies, Social Capital:	26
INTERNATIONALISATION vs. DOMESTIC MARKETS	27
VI. EMERGING RESEARCH AGENDA	29
TABLES AND IMAGES	30
LIST OF SOURCES:	37

INTRODUCTION

The Indian IT industry has been growing by leaps and bounds and has firmly established itself as a force to contend with in the world of IT/ITES. A significant portion of this growth is driven by the Tier I IT companies which account for a huge chunk of the total turnover in the country and the top 5 firms had a share of 45 per cent of the total IT/BPO export revenues. While it is widely accepted that the SME sector in the IT/ITES space has been largely ignored, there are surprisingly few studies carried out to understand the realities of this market and the challenges that are faced by the sector. NASSCOM has recently established initiatives towards addressing the challenges faced by these firms. This paper will present hypotheses on the possibility of creating an integrated ecosystem in the country which will serve the specific purpose of addressing the requirement to sustain and grow these companies.

We start by understanding the definition of an SME. There is a general lack of consensus as to which parameters shall be considered in the definition of an SME². Various parameters like the number of people employed, revenue are considered along with the level of investment. In India, the “*Micro, Small and Medium Enterprises bill, 2006*” has laid down the definition of an SME. Small enterprises are defined as those companies with not more than an investment of INR 50mn and medium enterprises as those with an investment of over 50mn but less than 100mn.³

SME’s have emerged as growth engines in economies around the world and especially so in developing and emerging countries. These companies are recognized as being the most significant contributor to the GDP, industrial production and exports. They also play a very significant role in the generation of employment. With the emergence of the ‘knowledge economy’ in India, the role of the SME’s in the IT sector takes on a renewed significance.

² The reference to the term SME appears predominantly in management literature in the EU and India. The term SMB, Small and Medium business is now quite commonly used as well.

³ Source: http://www.smallindustryindia.com/publications/circulars/GazNot/MSME_Act.pdf

This report is divided into five main segments. The first segment on IT industry trends takes a look at the growth of the industry across the globe. The second segment covers the size structure of the Indian IT industry. It will contrast the contribution of the large Tier-1 companies with that of the SME's in spite of being in significantly smaller numbers. The report then focuses on the growth trends in the industry globally setting the context to explain the challenges that the smaller players will face. The last segment then puts forward some hypotheses on how an ecosystem could be built that shall facilitate the growth of the SME's in the Indian IT industry.

Study methodology:

The paper is based primarily on information in industry reports and informal interviews with experts in academia and the industry. Due to limited time, the opportunity for primary research was limited and has not been used extensively in preparing the report.

I. IT INDUSTRY TRENDS

Projections:

World wide IT spending has maintained a steady increase in 2005 and into 2006. The primary geographical drivers of growth have been the increased spending in USA and Europe. The year has also witnessed a drastic scaling up of Indian operations of MNC's like IBM and Accenture while Indian multinationals in turn spread their operations elsewhere round the globe.

The global IT industry is expected to continue to grow at a CAGR of about 5% over a five year period from 2005-2009. Figure 1 outlines the projected growth of the global IT industry.

Global Delivery Models:

Global delivery models have been vindicated with the emergence of this trend and they now include increasingly complex activities placed significantly higher up on the value chain of services.

In an interview to the Financial Express, TCS CEO S. Ramadorai referred to the global delivery model (GDM) as the company's "ability to deliver the same quality on a global basis"⁴. John McCarthy in his report 'Low-Cost Global Delivery Model Showdown' sets the context by focusing on the increasing user sophistication and shifting industry economics that are responsible for the ramping up of operations by the IT vendors. The leading IT vendors have made significant investments in skills, processes, tools, locations and infrastructure to realize the concept of a more distributed, process-centric, low-cost global delivery model.⁵

Industry trends reveal that Indian IT service providers' strategy of deploying GDM has been successful to the extent that considering the last three years of IT services delivery has moved from having both India and Canada as a major offshore destinations (the Bipolar model) to India emerging as the primary key destination (the Unipolar model).⁶ As a consequence of this move, the market for the SME's has also increased taking into account the spill over effect from the above.

II. STRUCTURE OF THE INDIAN IT INDUSTRY

In this section we follow the journey of the Indian IT industry since its inception to understand the drivers behind the trends currently witnessed.

⁴ Source: 'Flexibility in the delivery model is critical', Interview with S.Ramadorai, Financial Express, January 02, 2004

⁵ Source: Low-Cost Global Delivery Model Showdown, August 6, 2004. Forrester Research

⁶ Source: Annual review, Software, CRIS INFAC, May 2006, Pg 6

Evolution of the Indian IT industry:

The evolution of the Indian IT industry can be broadly classified into three distinct phases. Though companies like TCS were setup as early as 1968, it wasn't until much later that an industry evolved. The first phase lasted for a decade from 1985 till 1995 and the industry was largely in a nascent stage. Most of the companies present were in the staff augmentation mode of operations providing application development and maintenance services to a few Fortune 100 companies. The peak contract size at this time was well under USD 5 million and the main value proposition was cost arbitrage and the companies were primarily positioned as small time exporters to the USA. Figure 2 shows the evolution of the Indian IT industry across the years.

In the next phase which lasted till the turn of the century, the industry witnessed a boom and the industry size increased to just under a billion USD. There was consistent growth across the industry and the top five players witnessed strong growth and so did the SME's in the sector. The peak contract during this time was under USD 5 million and the value proposition shifted to high quality and improved productivity. This time frame also witnessed the change of perception of the Indian companies from being small exporters to software service providers.

In the last six years since the Y2K driven boom subsided, the Indian IT companies have grown at a dramatic pace. The industry has grown several times over and is now projected to be in excess of USD 13 billion. The peak contract size in 2007 has been as high as USD 1 billion. The companies present in this sector have also been involved in a rapid transformation from being involved in low value activities like application development to high end activities like system integration and packaged software implementation.

CRISIL Research states that Indian IT services growth will continue to grow and will clock a CAGR of 26% from USD 13.2 billion in 2005-06 to USD 33.7 billion in 2009-10. This will increase the Indian share of the global IT services market from about 3% to 6.1%.⁷ The IT-ITES industry combined clocked a double-digit growth at a CAGR of 28% and exceeded USD 36 billion in 2005-06. As with

⁷ Source: Annual review, Software, CRIS INFAC, May 2006, Pg 5

previous years IT services continued to contribute a lion's share of the revenues at approximately 47%.

Considering a period from 1999 the Indian IT-ITES industry contribution to the GDP of the country has risen from 1.9% in 1999-2000 to about 4.8%⁸ Riding on the momentum generated by the acceptance of Indian IT companies as global players, the growth for the Indian industry is expected to continue. Figure 3 highlights the expected growth across various sectors.

The Indian IT industry continues to derive a large percentage of its revenue from Financial Services, Manufacturing and Telecom. Contribution from emerging sectors like retail and healthcare are expected to increase over the medium term.

Exports continued to form a large percentage of the market for IT services. (Figure 4) The Americas accounted for in excess of 51% of the worldwide IT spend in 2005 and also as a major destination for Indian IT exports with almost 70% share in export revenues. Increasingly Indian players have started to establish traction in the European market as well.

An interesting trend has been observed in the recent periods in that the industry focus is no longer on English speaking countries alone and a key strategy for the Indian multinationals as an integral part of their GDM strategy has been to hire local talent by tapping domestic markets. This also serves to de-risk the revenue model by avoiding concentration in a single geography. Figure 5 below highlights the percentages of various regions in terms of export revenues.

Size Structure of the Indian IT industry:

The data available for the structure of the Indian IT industry is however quite sketchy⁹. About 88% of the firms in the country have a turnover of less than 100 million. As mentioned before, the industry however is skewed in terms of

⁸ Source: *Indian IT industry fact sheet, 2006, Nasscom*

⁹ Source: *The following paragraphs are based on information in "Small and Medium Enterprise in India Today – Overcoming policy constraints to Achieving Rapid Growth in a Globalizing Economy. – Sebastian Morris and Rakesh Basant. WP No. 2006-07-03, July 2006, IIMA*

market share. The share of MNC's has been steadily increasing and so has the contribution from SME's. Thus there is substantial evidence that the IT labor market would be affected by the links between MNC's and local firms and links between large established firms and small upcoming firms. Studies have been carried out that consider the impact of these linkages and the overall conclusion is that if deep horizontal and vertical linkages can be facilitated it would undoubtedly lead to a deepening of the labor market.

Transitions:

Morris and Basant in their paper "Small and Medium Enterprises in India Today", suggest that distribution of IT occupation workers by type of enterprise suggests that deepening of the market in the form of smaller firms markets' is already taking place. They go onto describe the impact of the transitions that are taking place in the industry.

Offshoring:

Increasingly larger shares of the contracts are being executed offshore. This move has witnessed the capability of companies to leverage qualified people required from institutions that were otherwise not considered. There are two immediate consequences of this phenomenon – (1) There is a downward pressure on labor costs that were rising due to growing demand and (2) People with different skill sets can now participate in the IT industry. This transition brings about the costs of coordinating different types of labor and also the process of evaluating the quality of inputs. The education system in the institutes that have no means of signaling their ability to prove quality of education imparted. Another issue that arises from this trend is the need to create favorable conditions to outsource work directly to smaller companies in India.

Transition to value added activities:

Indian firms are rapidly moving from less to more complex, risky, investment intensive IT projects. This transition has been largely facilitated by inter-firm alliances including those of the outsourcing variety (Basant, 2004)

The transition has been along the following lines

- (a) Diversification of service offerings and markets
- (b) Acquisition of knowledge and implementation capabilities in the early stages of the product life cycle
- (c) Specialization in service provision through acquisition of domain knowledge and entry into specific verticals like telecom and banking
- (d) Transition from a low-end “service” firm to a high-end “service” or a “product” firm ¹⁰

Emerging Opportunities to use IT in other sectors

With technology emerging, there are several new opportunities for the IT firms. Knowledge integration is rapidly taking place at different levels evolving from research in diverse fields like biomedical sciences, pharma and IT. New interrelated domains like drug discovery are creating opportunities for relatively small firms to enter the specialized hi-tech areas. Similar processes are underway for firms in sectors like auto to make IP based entry or expansion. Thus an appropriate IP policy becomes crucial for the growth of SME's in these domains.

III. GROWTH TRENDS FOR THE INDIAN IT INDUSTRY

The dollar value of individual deals has been steadily increasing and approximately USD 1 billion of deals is expected to come up for renewal in 2008. Some of the most interested trends in the recent outsourcing of contracts are as follows¹¹: (Figure 6)

TREND 1: Increase in offshore-centric contracts

According to the research study, there has been an increase in the offshore centric contracts in 2005. TPI estimates that over half (52%) of the contracts had a significant element of ‘global services delivery’ or offshoring. This means that there is a visible and established shift towards reducing body-shopping mode of operations. The direct impact of this is the need for outsourcing firms to have an ability to effectively move project or delivery operations offshore. This

¹⁰ Source: *Morris and Basant, 2006. Pg 21*

¹¹ Source: *Annual review, Software, CRIS INFAC, Pg 13*

is understandably also a function of scale of operations of the company in its chosen offshoring destination. Large established players with substantial real estate can do so easily, however this becomes a challenge for SME's.

TREND 2: Increase in Share Of Small To Medium Sized Contracts

The percentage of small to medium sized contracts (USD 50 million to USD 200 million) has increased from 65% in 2004 to about 70% in 2005. The implication of this trend is that a company would arguably need a larger number of contracts to achieve sustainable revenue growth. Again the contracts awarded are a function of perceived capability of the company to fulfill requirements and coupled with trend 1, this becomes a challenge for SME's.

TREND 3: Increase in Multi Vendor Sourcing.

The top 6 IT services firms won only 53% of the deals in 2005 and this has been a steady decline over the past couple of years. As the contracts globally have been growing in size, Indian companies have been increasingly finding traction in deals in excess of USD 50 million.

LABOR POOL

Studies by McKinsey on the supply of global labor force reveal that the employable graduate pool forms a small portion of the large available graduate pool in low-wage nations. The primary reasons attributed to this mismatch between supply and demand are:

- (a) Limited suitability due to lack of language skills and cultural fit
- (b) Dispersion of the labor pool
- (c) Competition for talent from other industries.

Considering the expected growth in the IT-ITeS sectors, CRISIL research estimates that an additional 2.12 million graduates are required to sustain it. It is expected that the current level of graduate turn out by Indian educational institutions is sufficient to meet the required demand. This is extrapolated based on the assumption that India today has a graduate labor pool of 18.75 million and the annual addition of 2.76 million graduates will be able to supply the required 2.12 million graduates required by the industry. (Figure 7)

Already we see trends of companies like TCS training science and commerce graduates to join the industry owing to the shortfall of suitable engineering graduates. This move can also be attributed to the falling margins due to rising wages in the industry.

The figure 8 shows a steadily falling revenue realization per employee since 2002. This means that while there has been a scaling up of operations and an inflation of wages (11% on an average) this cost has not been passed on in terms of increasing billing rates. The combination of dearth of a suitable work force and rising wage rates pose increasing challenges for SME's to attain revenue targets and maintain growth since there is an increasing need to signal higher competencies to achieve higher billing rates.

DISTRIBUTION OF GROWTH AMONG THE VARIOUS SEGMENTS

Data analysis by NASSCOM and other research agencies show that a very substantial portion of the revenue share for the total software revenues belongs to the Tier I and Tier II companies. This implies a heavy degree of polarization in the revenue earning capability of the companies in India and a consequent concentration of capabilities and potential for growth.

With the changes in IT outsourcing trends described above, it is expected that there will be a perceptible shift in the type of contracts and projects these companies will be willing to enter into. Multi million dollar multi-year contracts will become the norm for the established large players in the industry.

India-based Service Provider Landscape:

Category	No. of players	Share of India's total IT/BPO export revenues	Performance
Tier I Players	3-4	<ul style="list-style-type: none"> • 45% of IT Services • 4-5% of BPO 	Revenues greater than USD 1 billion
Tier II IT Players	7-10	<ul style="list-style-type: none"> • 25% of IT Services • 4-5% of BPO 	Revenues USD 100 million-USD 1 billion
Offshore operations of Global IT majors	20-30	<ul style="list-style-type: none"> • 10-15% of IT Services • 10-15% of BPO 	Revenues USD 10 million-USD 500 million
Pure play BPO providers	40-50	<ul style="list-style-type: none"> • 20% of BPO 	Revenues USD 10 million-USD 200 million (Excluding top provider with USD 500 million)
Captive BPO units	150	<ul style="list-style-type: none"> • 50% of BPO 	Revenues USD 25 million-USD 150 million (top 10 units)
Emerging players	>3000	<ul style="list-style-type: none"> • 10-15% of IT Services • 5% of BPO 	Revenues less than USD 100 million (IT) Revenues less than USD 10 million (BPO)

Coupled with a dearth of skilled resources, there is a strong possibility that these companies would prefer to utilize their trained resources in the more crucial larger projects than keep them involved in the smaller low billing projects. This further reinforces the expectation that these companies will move up the value chain and move out of the lower end smaller projects.

IV. CHALLENGES FOR SME'S

Challenges for The IT Industry

Before considering the challenges that the SME's specifically face, we consider the challenges that Indian IT companies face in general. Since a majority of the revenues in the IT industry come from exports, the challenges faced are quite dependent on this factor. Issues related to diverse environments, varied cultures, unique regulatory issues imposes a degree of information asymmetry thus increasing the complexity associated with entering and sustaining the market for new entrants. Figure 9 highlights the risks faced by IT industries.

Risks related to billing rates:

Risks in billing rate, refers to the risk that companies face with the propensity of firms that outsource to renegotiate billing rates downwards. The companies often do this as a means of reducing costs of the project.

Since there is lack of reliable information related to billing rates for SME's we project the trends among the larger players on to the smaller firms. The assumption here is that the bargaining capacity of the individual smaller firm as a standalone entity would be lower than a Tier-1 player in the industry. There has been a constant pressure on the margins as indicated by the change in pricing over the last eight quarters for three of the leading firms in the country. (Figure 10)

The risk in reduction of billing rates comes from the following parameters:¹²

- (a) Concentration of Verticals: This risk is derived from the concentration of revenues coming in from a particular domain like BFSI or Telecom. This risk will magnify in the case of SME's because they tend to operate in a single domain.
- (b) Concentration of Service Offerings: SME's tend to operate in the lower end of the IT services value chains, with the exception of a few that operate in niche segments. Commoditization of these services might lead to the reduction in billing rates.
- (c) Geographic concentration: Companies might derive a large amount of their revenue from a particular region. This too magnifies in the case of SME's since they usually don't have the capability to hedge their clients' geographical concentration. A downturn or adverse economic movement in the geography can have a negative impact on the company.

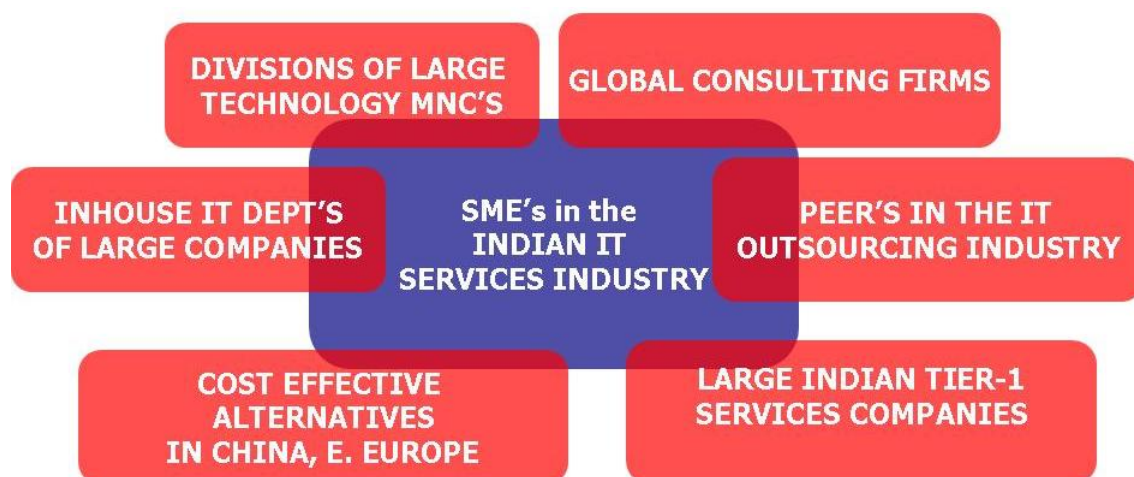
The risk from financial aspects comes primarily from the risk due to exchange rate fluctuations: The industry derives a significant portion of its revenues from

¹² The descriptions of risk for the Indian IT industry has been based on information contained in the reference source: State of the Industry, CRIS INFAC Industry report 2005, Pg 26-27

exports. This means that the earnings fluctuate a lot with the prevalent exchange rate. SME's are adversely impacted since they do not have the capability to do advanced currency hedges in order to mitigate the risk of currency fluctuations.

Companies face environmental risks like political risks and inherent risks due to increasing competition attracted by the profitability of the industry. Deriving in from the risks of having a huge dependency on exports, the companies in the IT industry also face a risk of political backlash in terms of unfair or protectionist policy changes. The SME's lack the capability to lobby against these policies on their own, due to their low bargaining capacity and inherent fragmentation. This issue however is addressed to a large extent by the increasing power of the larger Indian IT firms and involvement of agencies like NASSCOM which lobbies in foreign countries on behalf of the whole industry.

Lastly a major source of risks is the increased competition from various players. With the increased success of the global delivery model, several global players are also now setting up base in India. With the ubiquitous presence of the internet, the playing field has been leveled and the competition for SME's now extends to similar companies in Eastern European countries and China too.



Leading in from the risks associated with all IT companies, the following section investigates in depth the reason for amplification of the risks in the case of

SME's. This discussion will then form the basis for the hypotheses proposed in Section V on the building of an ecosystem to overcome these challenges.

Challenges for SME's Amplifying Risks

Reputation

There are limits to contracting and its subsequent enforceability. This factor is appreciated by the various companies which outsource their IT functions to software firms in India.¹³ The underlying issue mapping to reputation can be explained by the Principal-Agent presentation of the Agency theory. The Positivist presentation is arguably too narrow in its scope in that it primarily focuses on the owner/manager relationship. The Principal-Agent theory while more abstract and mathematical in its treatment, can be applied to a wide range of relationships including buyer-supplier which is the one of interest in this case. The Principal-Agent theory indicates which contract is most efficient under varying levels of outcome uncertainty, risk aversion and information.¹⁴

In the case of large Indian IT firms, over the last decade these firms have established themselves as serious players in the industry and have now assimilated the required social equity to overcome the impediment that reputation might have on the decision of outsourcing firms in awarding contracts. However in the case of SME's this need is pertinent and it is essential that these companies have an effective mechanism to signal their competencies to overcome any skew-ness in their perceived competency to fulfill contracts.

Visibility in Desired Markets

Reputation can also be seen as a function of the visibility of SME's in the desired markets. There are various mechanisms to gain the requisite visibility, however this can be quite an expensive proposition. The need to establish the required visibility thus becomes one of the biggest challenges for the emerging companies in India.

¹³ Fama, Eugene F., "Agency Problems and the Theory of the Firm", Abhijit V. Banerjee, Esther Duflo(2000), "Reputation Effects and the limits of contracting: A study of the Indian Software Industry"

¹⁴ Agency Theory: Assesment and Review, Kathleen M. Eisenhardt, Academy of Management Review, Vol 14, No 1, (Jan 1989), pp. 57-74

Access to Labor Force

The inflation in wages in the sector has been approximately 11%. Driven by large amounts of recruitment by the Tier I and Tier II companies, along with an increase in wages fuelled by higher pay packages offered by multinational companies setting up development and back-offices in India, there is expectedly a shortfall of required labor force for employment in the SME's. Figure 11 highlights the trends in wage inflation in the Indian IT sector.

Employee utilization has been another domain of concern and while the average wages has increased in the industry the employee utilization has actually declined. Figure 12 highlights the trend observed in the Indian IT industry across the years. Except for players in niche segments, SMEs will increasingly find it difficult to recruit the kind of talent required to sustain operations and grow in the future. This is especially necessary in the case where innovation is proposed as one of the solutions for SME growth.

Sustainability In Terms Of Margins

CRISIL research states that due to a combination of the above mentioned factors, the gross margins of Indian IT companies have declined by 7.1% in a period from 2004 to 2006. The operating margins have declined by 5.1% basis points in the same period.

The difference between the levels of decline between gross margins and operating margins is primarily attributed to the sharp decline in telecom expenses. Interestingly the research also states that this decline can be attributed to scale economy of the companies selling and marketing expenses. While this is understandably the case for Tier I and Tier II players there is little evidence that this factor is true for SME's. With an industry wide decline in margins in the sector, it becomes increasingly difficult for SME's to sustain operations.

Consolidation

With the increasing trend in the industry for multi-year multi million dollar contracts, there is expected to be an increased propensity for consolidation. This might be driven by the need to acquire specialized competencies to fill the

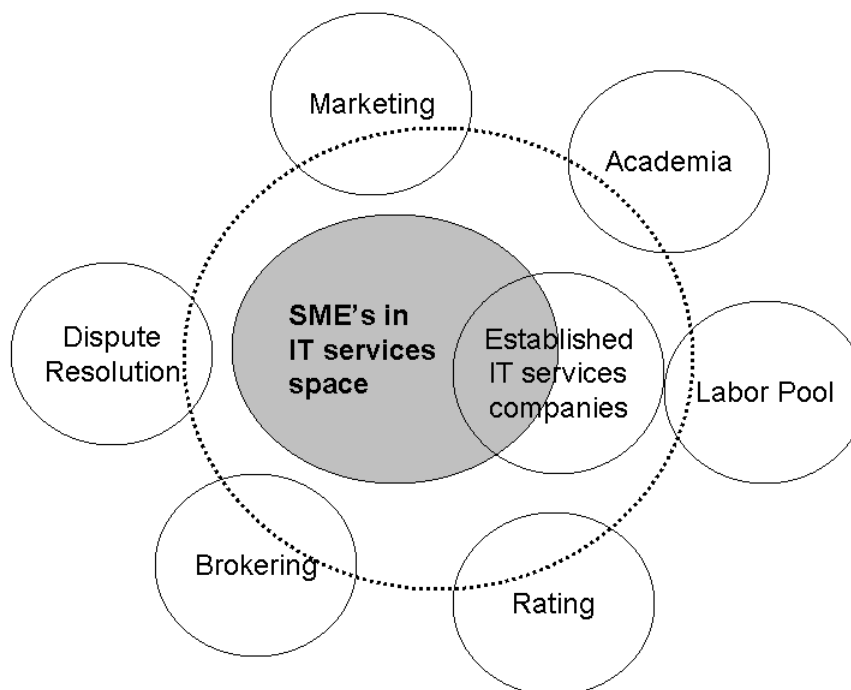
gaps in their portfolio. The challenge for SME's is to participate in a network where there is value add for the larger companies to form alliances rather than attempt to consolidate in the need to develop the required competencies.

V. BUILDING AN ECOSYSTEM FOR SME SUSTENANCE

A Fabric of Sustenance for SME's:

Considering the challenges that face the SME's in the IT sector there is merit in considering models that could provide the buttress helpful for helping to sustain and grow companies. The underlying theme of this paper has been the necessity to build an ecosystem in India that can be the fabric of sustenance.

NASSCOM has been at the forefront of supporting the evolution of the Indian IT industry. With the industry standing at the cross roads of evolution the role of NASSCOM becomes more critical than ever. We will now examine some of the actions that this body could take in order to achieve the required sustainable growth.



Graphical representation for an ecosystem for IT SME's involving an intermediary

The figure above is a representation of the ecosystem that organizations like NASSCOM can build to further the growth of the Indian IT SME's. The organization can exert influence in the various spheres shown above while being the overarching influence on how the interactions shall be carried out.

Facilitate Knowledge Buildup and Transfer

Organizations like NASSCOM can put in place a framework for the interaction and knowledge transfer between established players in the Tier I, Tier II categories and the emerging companies. This is crucial since there is already deep knowledge available on aspects like quality, project management, data security, business continuity etc. which take a long immersion in the industry to build up. The industry as a whole will benefit from high degree of interaction between the SME's and the larger players. One can envisage a situation wherein the established players are able to handle (and eventually transfer) the project management and quality aspects of large projects wherein SME's are embedded in the execution phase. Eventually the knowledge build up will facilitate an arms length transaction once the company builds up its social equity in the market in terms of reputation.

Another form of knowledge transfer is between the company doing the outsourcing and the vendor. Research by McKinsey and Company points to evidence that companies prefer that their interaction with vendors have a mix of transactional and high impact relationships, the required trust to facilitate knowledge transfer is often lacking.¹⁵

Brokering

The role that bodies like NASSCOM can play in this arena is to broker the transactions between the large players and the SMEs. Extending the role further, the organization can then act as a neutral broker in the arms length transaction mode to be used in the collaborative effort in executing large projects themselves. In order to illustrate this let us consider two small companies SME1 and SME2. For ease of explaining the model, let us consider that both these companies function in the same segment and are at time $t=t_0$ comparable on all parameters like competency, revenue, access to funding.

¹⁵ Source: *Innovations in IT management, McKinsey on IT, Number 4, Spring 2005*

Under the role desired, a neutral broker assigns a rating to both these companies based on several parameters that might be considered. Some of the parameters considered might be past track record of the promoters, business plan et al. (Figure 14)

Rating:

A very important service that can be provided by the intermediary is that of rating the companies in a segment. A rating serves as an effective signaling mechanism to external parties about the capability to serve a particular function, measured along a set of pre determined parameters. An example of this is the Process 360: Operational Excellence a web-based benchmarking effort launched by NASSCOM and McKinsey, to research the performance of BPO providers.¹⁶

Some of the parameters that could be considered in the rating of SME's are as follows:

Innovation: One of the most important aspects for the sustenance and growth of SME's is their ability to innovate and operate in niche segments or create entirely new markets for their services/products. A standard could be developed along the lines of the Oslo Manual¹⁷ which helps measure the indicators of innovation in firms – both products and processes.

Some of the issues addressed by Community Innovation Survey (CIS) are type of innovation, sources of information for innovation, objectives of innovation, factors hampering innovation, cost of innovation, impact of innovation, R&D, cooperation in innovation and impact of innovation on employment and the environment.

¹⁶ Source: *Benchmarking India's business process outsourcers: Noshir F. Kaka, Shailesh S. Kekre, and Saipriya Sarangan, The McKinsey Quarterly, 28 February, 2007*

¹⁷ *Oslo Manual: is the foremost international source of guidelines for the collection and use of data on innovation activities in industry and is a part of the Frascati manual which outlines the various inputs to innovation (R&D, patents, publications etc.)*

[Source: http://www.oecd.org/LongAbstract/0,2546,en_2825_497105_2367571_1_1_1_1,00.html]

Senior Management: The rating will consider the experience of the senior management in handling the projects in the industry. Commitment from the senior management and the relevant competencies required to facilitate growth.

Fiscal history: Fiscal discipline has always been an important part of the rating parameter of a company. The rating could be a function of the past record of the company in disciplined borrowing from the market. In several of the companies in the SME sector this becomes a challenge since they are not listed companies and thus do not publish their fiscal information. There can be a counterargument that the financial markets will discipline the listed companies, but since the markets are still evolving in India it is a fair assumption to believe that companies may not be necessarily punished on the downside due to information asymmetry. Thus a rating mechanism would be useful across the board on listed and unlisted companies.

Quality: The ability of the company to deliver projects on time and with the required level of quality is an important parameter to be considered in the overall rating scheme. One of the biggest uncertainties that increases the cost of an arms length transaction is the perceived ability of the company to deliver projects at the desired level of quality.

Risk: The rating would consider the risk associated in dealing with the company. This parameter would be indicative of the past track record of the firm in delivering projects on time and at the desired level of quality.

A hypothetical rating scenario of SME's in IT services segment may play out as follows:

Let these ratings be r_1 for SME1 and r_2 for SME2 where $r_1 > r_2$. The two firms pay a certain fee to NASSCOM for providing them with this rating. This then becomes an effective signaling mechanism for larger companies to consider the capabilities of a SME to successfully participate in a collaborative effort. In addition to providing a rating and thus effectively creating a situation of close to information symmetry, the neutral broker also might provide services of being party to the actual transaction itself. This means that the broker actively commits itself to the project till such time that the contract is established. In an

extreme case it may also provide services for accelerated dispute resolution between the parties to ensure smooth transactions.

On successful completion of the project the ratings of both parties in the transaction will be updated by the broker. Thus through a tight feedback loop, the information asymmetry is minimized and eventually can be brought down to negligible levels. By working in this mechanism the firm SME1 now has the capability to scale up its competency since the Tier I company under the guarantee issued by the broker is incentivised to avoid an arms length transaction and actually embed the company into the detailed working of the project. This will lead to a more effective transfer of knowledge shortening the learning curve. The payoff to the larger firm is two fold. First it gets to create a backup for it on the lower end of the spectrum, in areas where it may not wish to operate and instead hand over the projects to SME1 or other companies. Secondly SME1 can move up the value chain and possibly operate in niche segments where it can augment the larger company in complex projects.

It is known that there is little qualitative transfer of information in an arms length transaction. There is an asymmetry of information due to the lack of trust. Such failures can be overcome if trust is established between the transacting parties and stable, reciprocal arrangements can be established. Building such trust requires relation specific investments by participating firms (Basant 2002, Maskell 1999; Maskell and Malmberg, 1999). This sets the basis for establishing social capital and the topic will be dealt in some detail in the later part of this paper.

Economies of Scale in Advertising and Marketing

The broker can leverage its position as a representative of a group of smaller companies and use the combined capability to advertise on their behalf with foreign clients who may not be aware of the capability of these companies. For example the broker might maintain an office in a city on behalf of a set of companies who might wish to be represented. This creates a collaborative setup that can be exploited by all the members and will function as a 'one stop shop' for clients who wish to interact. The office can also double up as information centers for the whole industry as a whole to ensure that it is easier for foreign companies to obtain information and carry out transactions. Grossman and Helpman

suggest that “The extent of international outsourcing depends *inter alia* on the thickness of the domestic and foreign market for input suppliers, the relative cost of searching in each market, the relative cost of customizing inputs and the nature of the contracting environment in each country.”

A CASE FOR CLUSTERING

There has been clear evidence of persistence and dynamism of competitiveness among industrial clusters, even with the increasing globalization. While the static advantages of clustering like lower transaction costs and inter firm interaction have been studied in great detail, the knowledge on the dynamic aspects are only being recently explored. The “knowledge focus” of clusters is of recent origin.¹⁸ The fundamental aspect of clustering that is of interest to this paper is the suggestion that the nature and quantum of knowledge flows in a cluster have a dependency on external linkages, external policy and economic environment.

Research emanating from industrial landscapes in Europe in the 1970’s and 1980’s suggest that interactions between SME’s yield efficiencies through reduced transaction costs, improved innovation through the enhanced collaboration on problem solving and an enhanced market access. The macro environment is just as critical to the evolution of efficiencies in SME’s, as suggested by the evidence that most of the European successes stated above were also a function of the active involvement of regional and local governments. (Schmitz and Musyck, 1995). The interest in studies on clusters was rekindled in 1990’s. It was observed that “the expected erosion and decline of clusters due to competitive pressures emerging from globalization and liberalization did not take place” which led to studies taking a keener interest in the impact of macro economic policies. In spite of the declining transportation costs and the emergence of the internet there has been an “increase in the importance of firm clustering, especially in high technology, information intensive sectors which, given the enormous recent developments in information technologies, one might have expected to be least sensitive to the need for geographical proximity” (Lawson, 1999: 151)

¹⁸ Source of the term “knowledge focus” is from the working paper “Knowledge Flows and Industrial Clusters: An analytical review of literature”, Rakesh Basant, Indian Institute of Management, Ahmedabad.

Challenges faced in India as a developing economy:

“Several developing countries continue to liberalize their domestic and external policies adding to the competitive pressures faced by the local firms. At the same time, they search for policy initiatives to increase the competitiveness of their enterprises. The infrastructural constraints on the growth of the industrial sector in most of the countries are also significant and growing. Under these circumstances, identification of the sectors and location for infrastructural support is crucial if the limited resources are to be utilized efficiently and productively to raise competitiveness of domestic enterprises. The industrial clusters consisting of viable and dynamic enterprises provide a good infrastructural investment opportunity. Besides, there is some evidence to suggest that clusters located in small or intermediate towns have been more dynamic and successful in comparison to clusters in large towns. (Humphrey and Schmitz, 1995)”

Inter firm collaboration and clusters result when the knowledge domains and product domains of the different organizations are incongruent and collaboration increases the efficiency of knowledge utilization. Collaboration offers risk-spreading benefits when there is uncertainty over future knowledge needs (Source: A, Page 553).

Constituents of a cluster:

The typical constituents of a cluster are

- (a) Suppliers
- (b) Producers
- (c) Customers
- (d) Labor markets and
- (e) Educational and Training institutions

Some of the important features of industry clusters are external economies, generalized reciprocity and flexible specialization. More important than the static external economics like cost savings are dynamic external economics associated with knowledge transfer, innovation and specialization. The real purpose of industrial clusters is to achieve a position of global leadership vis-à-

vis competitors and make the constituent organizations globally competitive. TCE determines whether the knowledge cluster is the cost minimizing governance form. Embeddedness goes beyond the economic rationale and describes the nature of relations between industry constituents that lead to knowledge cluster creation. Knowledge transfer cements the relations between organizations (Source A, pg 554)

The main characteristics of dynamic industrial clusters are:

- (1) Geographical Proximity
- (2) Sectoral Specialization
- (3) Close inter-firm collaboration
- (4) Inter-firm competition
- (5) Social embeddedness
- (6) State support

Innovation and the relation of clustering as a solution:

One of the solutions to the issue of SME' survival and growth has been suggested as innovation. The small and medium enterprises are encouraged to explore various options of enhancing their ability to innovate and thus locate themselves at a niche and consequently profitable location on the technology value chain. From the point of view of facilitating this, clustering could play a critical role.

Innovative activities require (a) a high amount of transaction and (b) they are highly uncertain. Clustering helps to reduce aspects like distance among the interacting firms which consequently brings down the cost of transaction and enhances the transaction intensity. (DeBreeson, et. al. 1996). There are three primary kinds of uncertainties related to innovation (1) Technical (2) Market and (3) Conduct of rivals. It is argued that being a part of a cluster reduces these uncertainties (Baptista, 1998, De Breeson, et. al. 1996)

We must also consider the benefits of technology spillover as the proximity of companies permits the up-gradation of clusters to a higher technical base. ¹⁸ However one must consider the effect of appropriability and this is never complete. The extent of appropriability depends on various factors like tacit-

ness, complexity of the technology, market structure and access to complementary assets etc. What is not appropriated is 'spill over' and this can facilitate the upgradation of clusters.

The Schumpetrian view is that large oligopolistic firms will induce and facilitate technological advance. This is so because these firms are better able to internalize the benefits of their innovation and are more certain of their environment. These firms are also better able to internalize the benefits of innovation and exploit the benefits of new technology largely due to access to finance and complementary assets like scale capacity and marketing infrastructure. *(Page 16)*

Many clusters are hierarchical while the others are flat. A large number of clusters access complementary assets internally and might encompass the entire technology supply chain. Proximity and intense interaction might make appropriability levels low and potential of knowledge spillovers high. Clusters may be located at different stages of the 'global supply chain' and market structure on the 'input' and 'output' side may impinge on the nature and quantum of knowledge flows.

Knowledge Spillover: Knowledge embodied in the 3P's can be acquired through the so called spillover effects. Knowledge spillover can occur in many ways including imitation and knowledge transfer through employee turnover. Knowledge flows to incumbents have been distinguished from knowledge flows facilitating new entry. Entry of new firms in a cluster is seen as an important source of exploiting the spillover potential of the knowledge available in the cluster. It has been argued that often the tacit component of the knowledge embedded in a cluster is utilized when new enterprises are created by employees or other individuals who have been part of the cluster and who have internalized this tacit knowledge.

Relational Assets, Untraded interdependencies, Social Capital:

Untraded interdependencies cannot be captured through input-output transactions but involve technology spillovers, conventions, rules, languages for

developing, communicating and interpreting knowledge. These interdependencies generate observed input output linkages but are more enduring. Silicon Valley continues to be a dynamic agglomeration because 'geographically-constrained un-traded interdependencies outlive geographically-constrained input output linkages'.

Relational Assets have a variety of dimensions. They include 'reciprocity, trust and the nature of ties within and between firms; the conventions and routines that bind agents and corporate culture, past and present; and the rationalities of behavior and action, and the cognitive base for collective learning and adaptation'. (Amin and Wilkinson, 1999:125). If these properties are geographically circumscribed they facilitate learning and contribute to the competitiveness of the cluster firms.

Social Capital "refers to the values and beliefs that citizen's share in their everyday dealings and which give meaning and provide design for all sorts of rules. The use of the word 'capital' means we are dealing with an asset. The word social tells us that it is an asset attained through membership of a community. Social capital is attained within the community through processes of interaction and learning. But social capital is not a commodity for which trade is possible or even meaningful." (Maskell, 1999:2)

Further arguments propounded by Maskell suggest that clusters constrain unethical behavior even by new entrants as a consequence of their large 'stock' of social capital. Silicon Valley being a prime example of this phenomenon.

INTERNATIONALISATION vs. DOMESTIC MARKETS

The IT domestic market is now booming as well. This brings about new opportunities for SME's to target at the domestic market to expand their markets. There are challenges associated with internationalization of SME's that are not faced when dealing in domestic markets.

Hypothesis: *Ethnic Social capital can produce benefits for small firm internationalization*

The concept of social capital is extended further to encompass the three aspects structural, relational and cognitive (Nahapiet and Ghoshal, 1998). From the perspective of building an ecosystem, this paper shall focus on the relational aspects of social capital.

In Asian network relationships there is a substantially larger element of personal trust as opposed to systemic trust. This can be understood to be the consequence of greater collectivistic cultural orientation. (Chen, Chen and Meindl, 1998). Several studies present evidence that Asians are particularly skilled at extracting ethnic social capital and that this ability helps them overcome issues in obtaining mainstream resources (Redding, 1995; Filion, Ramangalahy, Brenner and Menzies, 2001, Jones, 2002) Benefits arising from social capital are information, influence and solidarity (Alder and Kwon, 2002) Of these, information is seen as especially vital in the business context (Gulati, 1999). Information benefits may accrue in terms of access, timing and referrals (Burt, 1992); also, these can be considered in terms of the volume, diversity and richness of information (Koka and Prescott, 2002).

Thus studies indicate that there is lot of gain from leveraging the goodwill that Indian nationals already established in lucrative markets can provide. There is a general perception that the Indian Diaspora in overseas markets, especially the USA¹⁹ and the role of MNC's in instilling best practices within the Indian context²⁰ has been important factors.²¹ This resource should be actively leveraged and can be an important factor to be considered by the intermediary in the combined marketing effort for SME's. The effect of social capital is

¹⁹ Dossani, R. (2002), 'Chinese and Indian Engineers and their Networks in Silicon Valley', *Asia/Pacific Research Centre Working Paper, Stanford University. (SIBU working paper)*

²⁰ Patibandla, M. and Petersen, B. (2002), 'Role of Transnational Corporations in the Evolution of a High-Tech Industry: The Case of India's Software Industry', *World Development, 30 (9), pp 1561-1577. (SIBU Working paper)*

²¹ The previous lines have been referenced from SIBU Working paper: 'Ethnic Social Capital and Small Firm Internationalization: The Case of the Indian Software Industry', Shameen Prashantham, Pg 17

especially pertinent in the entry mode into new geographies and is relevant to the notion of ‘micromultinationals’²².

VI. EMERGING RESEARCH AGENDA

This report has been based on secondary data and the opinion of persons who have been associated with the industry through its evolution. Time constraints made it unfeasible to carry out primary research to validate the hypotheses that have been propounded. There is work to be done in understanding the presence of clustering in SEZ’s and their effectiveness outside the advantages offered in terms of favorable policies. There is also a need to evolve an accurate rating system based on the correlation between various parameters discussed in the above sections.

²² *Micromultinationals – small firms that are not pure exporters but engage in higher commitment modes especially in their lead market(s)*

TABLES AND IMAGES

Global IT industry	Table 1					
	Worldwide IT services spend (\$ billion)			Growth rate (%)		Share of service lines
	2002	2005E	2009E	2002 - 2005E	2005E-2009E	2005E
Project oriented services	124.4	139.9	168.9	4.0%	4.8%	33.1%
Custom application development	18.8	21.0	24.1	3.8%	3.5%	5.0%
IT consulting	20.8	22.8	27.0	2.8%	4.5%	5.3%
Systems integration	64.5	71.1	84.8	3.3%	4.5%	16.8%
Network consulting & integration	20.3	25.2	33.0	7.5%	7.0%	6.0%
IT outsourcing	116.7	156.4	197.4	10.3%	6.0%	37.0%
Application management	12.2	17.5	24.7	12.8%	9.0%	4.1%
IS outsourcing	104.5	138.9	172.7	10.0%	5.8%	32.8%
Support & training	108.9	126.3	159.5	5.1%	6.0%	29.9%
Total	350.0	422.6	525.7	6.5%	5.6%	100.0%

E: Estimate

Source: IDC, CRIS INFAC estimates

Figure 1 Growth of the global IT industry (Source: Annual review, Software, CRIS INFAC)

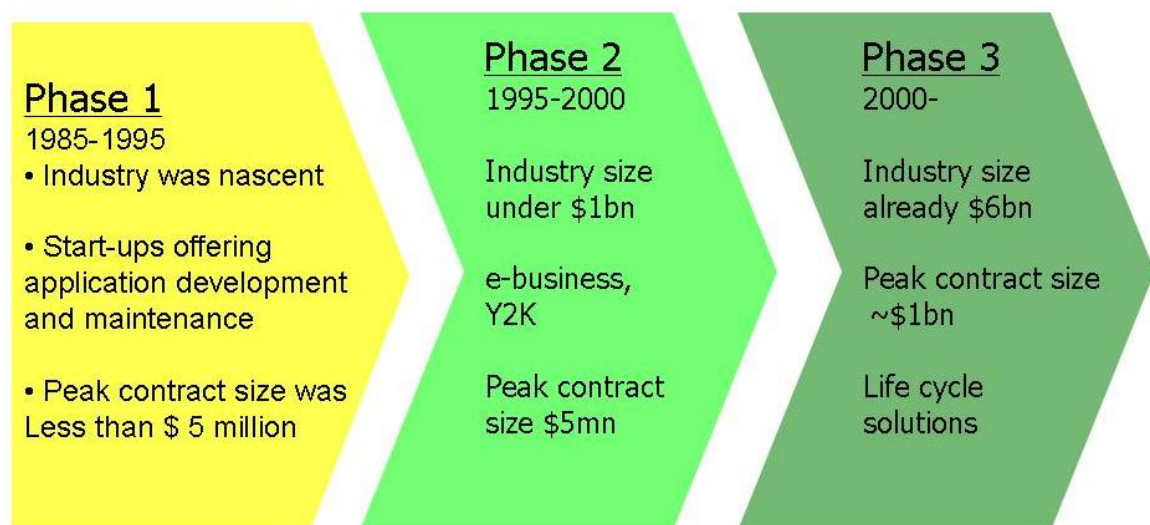


Figure 2: Evolution of the Indian IT industry (Information Source: CRIS INFAC Industry Report)

India's share in the global market	Table 2		
	2002-03	2005-06E	2009-10E
Project oriented services	3.1%	5.3%	10.3%
Custom application development	18.6%	31.4%	61.7%
IT consulting	0.6%	1.5%	4.1%
Systems integration	0.2%	0.4%	1.0%
Network consulting & integration	0.2%	0.8%	1.7%
IT outsourcing	1.9%	2.8%	6.5%
Application management	15.3%	20.3%	41.2%
IS outsourcing	0.3%	0.6%	1.5%
Support & training	0.5%	1.1%	2.2%
Total	1.9%	3.1%	6.4%

E: Estimate

Source: IDC, CRIS INFAC estimates

Figure 3 Growth of the Indian IT industry (Source: Annual review, Software, CRIS INFAC)

Key Highlights of the IT-ITES sector performance

IT Industry-Sector-wise break-up

USD billion	FY 2004	FY 2005	FY 2006E
IT Services	10.4	13.5	17.5
-Exports	7.3	10.0	13.2
-Domestic	3.1	3.5	4.3
ITES-BPO	3.4	5.2	7.2
-Exports	3.1	4.6	6.3
-Domestic	0.3	0.6	0.9
Engineering Services and R&D, Software Products	2.9	3.9	4.8
-Exports	2.5	3.1	3.9
-Domestic	0.4	0.7	0.9
Total Software and Services Revenues	16.7	22.6	29.5
Of which, exports are	12.9	17.7	23.4
Hardware	5.0	5.9	6.9
Total IT Industry (including Hardware)	21.6	28.4	36.3

Total may not match due to rounding off

Figure 4: IT industry sector wise break up of revenue (Source: Indian IT industry fact sheet, 2006, NASSCOM)

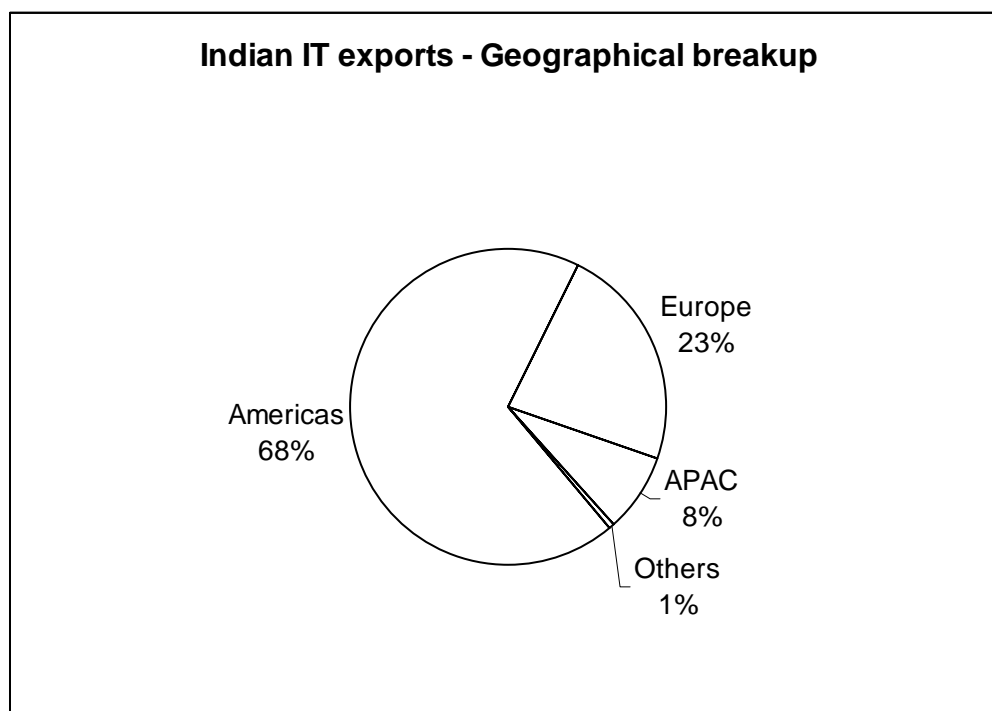


Figure 5: Indian IT exports, Geographical Breakup
(Source: Industry Fact sheet, 2006, NASSCOM)

Summary of trends in global IT contracts	Table 6		
	2003	2004	2005
Number of contracts signed	258	289	293
Increase in offshore-centric contracts			
Share of contracts with an 'offshore' component*		40%	52%
Reduction in contract size			
Share of small to medium-sized contracts (\$50-\$200 mil)	81%	85%	70%
Increased competition: Multi-vendor sourcing			
Number of service providers in top 100 deals	20	29	34
Share of 'big 8' in top 100 deals	73%	57%	53%
Share of 'big 8' in contracts valued over \$50 mil	70%	49%	43%
Indians gaining market share			
Share of Indian companies in deals >\$50m			
Based on number of deals		2%	6%
Based on total contract value		1%	3%

* Based on TPI advised deals

Source: TPI

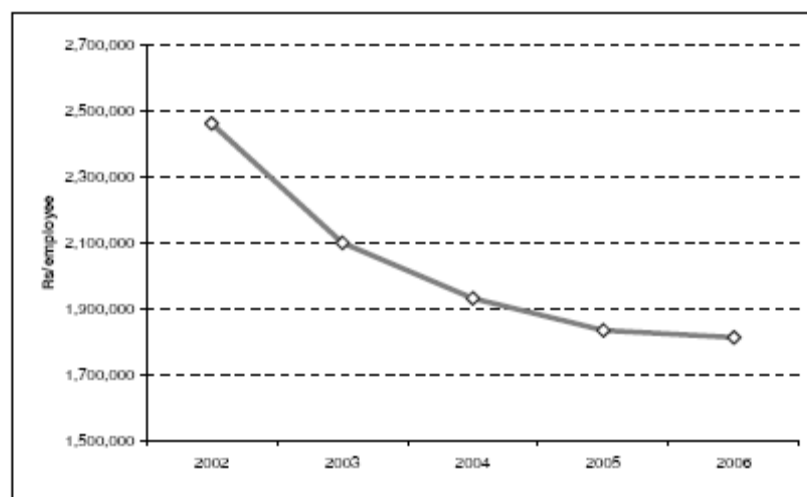
Figure 6: Summary of growth trends in global IT contracts

India: Graduate labour pool**Table 1**

(All values in nos million)	India	Philippines	China	Russia	USA
Graduate labour pool - 2005	18.75	1.66	15.49	3.77	
Suitable graduate labour pool - 2003	1.77	0.51	0.73	0.65	
Suitable graduate labour pool - 2005	2.56	0.80	1.20	0.90	
Engineering graduate labour pool - 2005	2.04	0.34	2.74	0.58	
Annual turn-out of graduates - 2005	2.50	0.35	3.10	0.80	1.30
Annual turn-out of engineers - 2005	0.44	0.03	0.60	0.04	0.07
IT employee base - 2005	1.28				
Addition to IT employee base 2003-05	0.46				
Additional IT employees required (2005-2010)	2.12				
Increase in suitable graduate labour pool (2005-2010)	2.76				

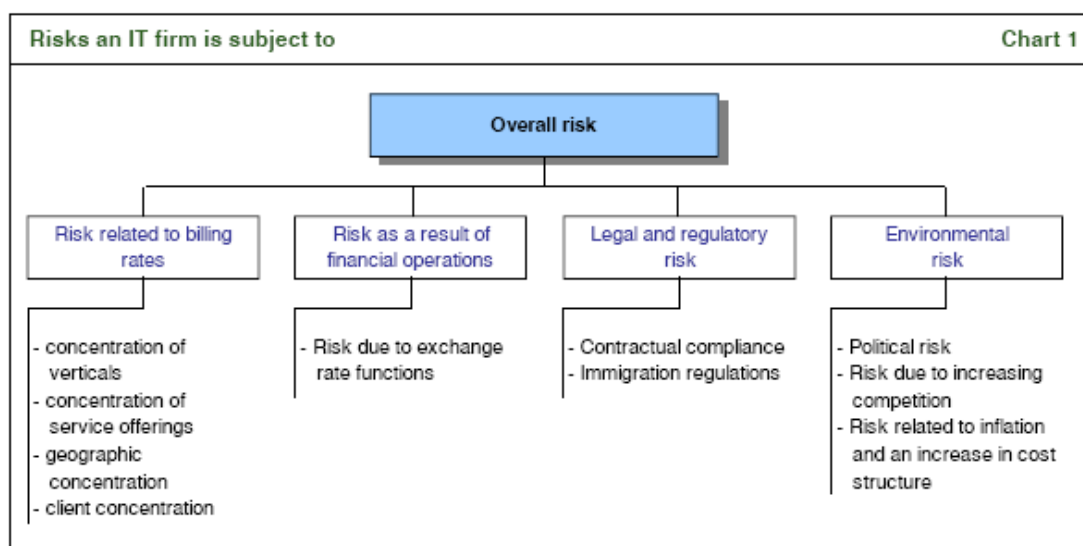
Source: Mckinsey Global Institute, CRIS INFAC

Figure 7: Trends in the graduate labour pool in India
(SOURCE: McKinsey Global Insitute, CRIS INFAC)

Indian IT industry: Revenue per employee**Figure 2**

Source: Company releases, CRIS INFAC

Figure 8: Productivity trends in the Indian IT industry



Source: CRIS INFAC

Figure 9: Diagrammatic representation of the risks faced by an IT company
(Source CRIS INFAC Industry report)

	2Q FY05	3Q FY05	4Q FY05	1Q FY06	2Q FY06	3Q FY06	4Q FY06	1Q FY07
Change in offshore pricing								
Infosys	0.7%	0.0%	0.9%	-0.4%	0.3%	0.2%	0.3%	0.2%
Wipro Global IT Services	-0.4%	1.0%	-0.9%	2.2%	-2.1%	-0.1%	0.2%	0.5%
Satyam	0.0%	0.0%	0.1%	0.2%	0.2%	0.0%	0.1%	0.2%
Change in onsite pricing								
Infosys	1.6%	-0.5%	1.3%	-1.6%	1.0%	-0.1%	0.6%	1.1%
Wipro Global IT Services	2.9%	1.0%	-2.1%	1.4%	-0.8%	-3.6%	3.0%	0.8%
Satyam	0.1%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.3%

Figure 10: Changes in pricing over the last eight quarters (Source: Indian IT services – Answering 10 burning questions, Citigroup research)

IT Service: Wage inflation

Table 2

	Manpower pyramid*	Wages (INR'000)			Wage inflation			
		2003	2004	2005	2003*	2004	2005	2002-2005
Software engineer	50%	287	290	322	11%	9%	11%	10%
Senior software engineer	25%	424	439	491	21%	4%	12%	12%
Team leader	12%	583	655	750	21%	12%	15%	16%
Project leader	7%	850	935	1004	13%	10%	7%	10%
Project manager	3%	1178	1362	1446	12%	16%	6%	11%
Program manager / Senior program manager	2%	1801	1884	2164	13%	5%	15%	11%
Head	1%	2670	2790	2912	21%	4%	4%	10%
Total	100%				15%	8%	11%	11%

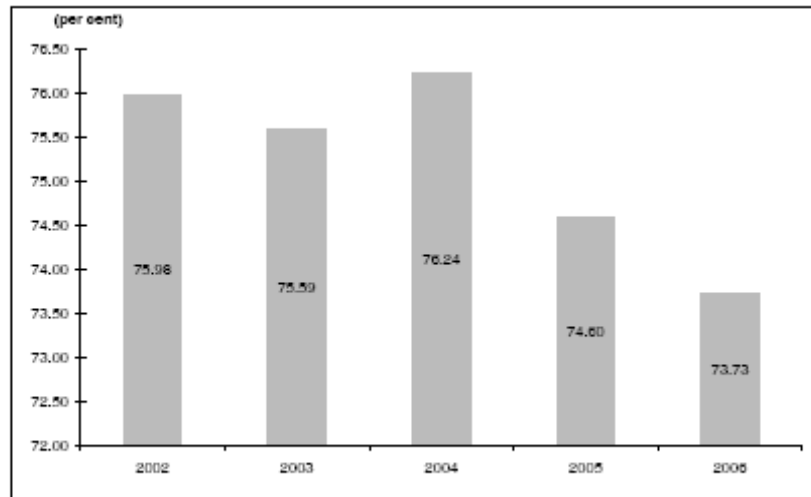
* CRIS INFAC estimates

Source: NASSCOM Hewitt Total Rewards study

Figure 11: Wage inflation trends in the Indian IT sector (CRIS INFAC)

Indian IT industry: Employee utilisation

Figure 4

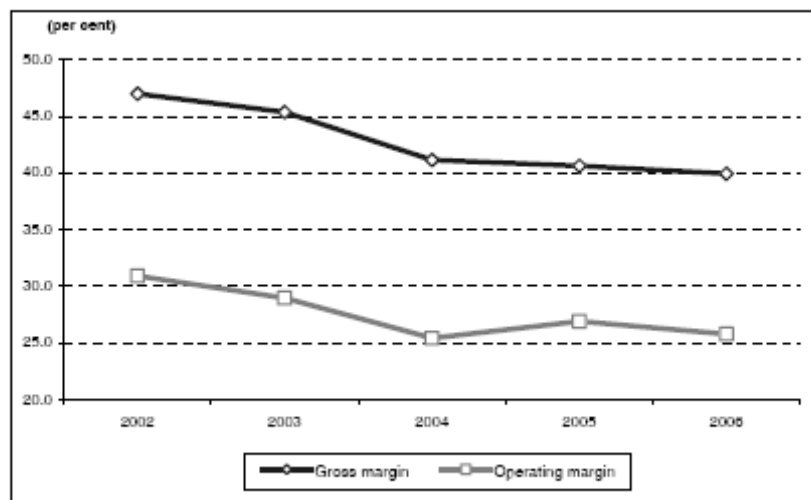


Source: Company releases, CRIS INFAC

Figure 12: Employee utilization trends in the Indian IT industry
(Source: CRIS INFAC)

Indian IT industry: Operating and gross margins

Figure 5



Source: Company releases, CRIS INFAC

Figure 13: Trends in operating and gross margins in the Indian IT industry

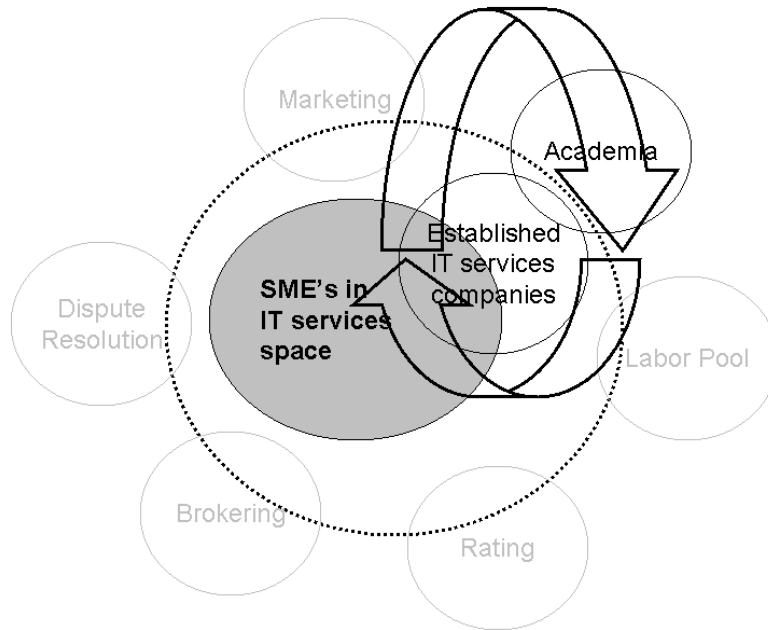


Figure 14: Interactions of SME' and Established companies with academia through the intermediary

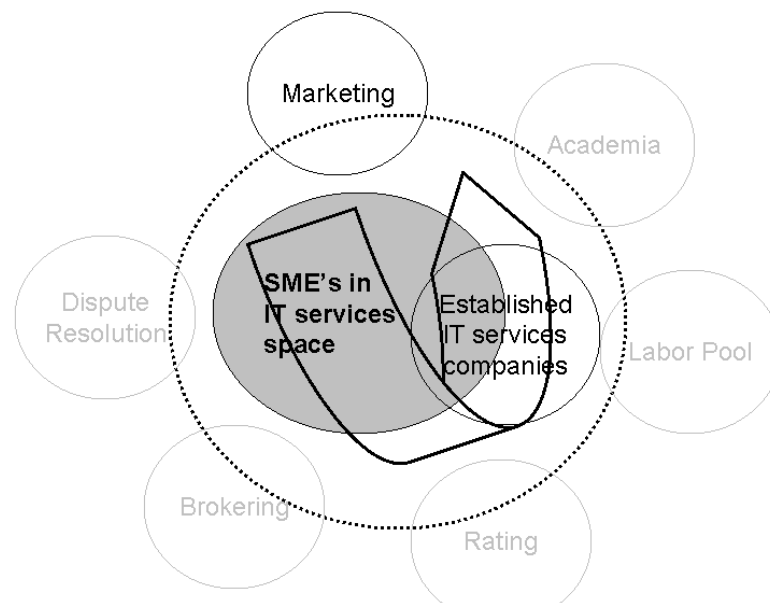


Figure 15: Joint marketing for SME using intermediary to enhance the signaling capability of the industry

LIST OF SOURCES:

- (1) Embeddedness, knowledge transfer, industry clusters and global competitiveness: a case study of the Indian software industry. N Dayasindhu, IIMB
- (2) In the footsteps of Silicon Valley? Indian and Irish software in the International Division of Labour, Ashish Arora, Alfonso Gambardella, Salvatore Torrasi, Standfor Institute for Economic Policy Research, SIEPR Discussion paper No. 00 – 41, June 2001
- (3) Information Internalization and Hurdle Rates in Small and Medium Enterprise Internationalization, Peter W. Liesch; Gary A. Knight, Journal of International Business Studies, Vol. 30, No. 2. (2nd Qtr., 1999), pp. 383-394.
- (4) IT Outsourcing Evolution, Past, Present and Future, Jae-Nam Lee, Minh Q. Huynh, Ron Chi-Wai Kwok, Shih-Ming Pi. Communication of the ACM, May 2003,/Vol 46. No.5
- (5) Knowledge Flows and Industrial Clusters: An analytical Review of Literature, Rakesh Basant, East-West Center, Economics Series, No 40, February 2002
- (6) Reputation Effects and the Limits of Contracting: A study of the Indian Software Industry, Abhijit V. Banerjee, Esther Duflo, The Quarterly Journal of Economics, August 2000
- (7) Networks, Milieux and Individual Firm Strategies: Emperical Evidence of an Innovative SME environment, Reinhold Grotz, Boris Braun, Geografiska Annaler. Series B, Human Geography, Vol. 75, No. 3. (1993), pp. 149-162.
- (8) Small and Medium Enterprise in India Today – Overcoming Policy Constraints to Achieving Rapid Growth in a Globalizing Economy, Sebastian Morris and Rakesh Basant, Indian Institute of Management, Ahmedabad, India, WP No. 2006-07-03, July 2006.
- (9) Competing for the Future, Gary Hamel, C.K. Prahalad, Harvard Business School Press.
- (10) NASSCOM Strategic Review 2006
- (11) State of the Industry, CRIS INFAC Software Annual Review, January 2005/May 2006
- (12) Industry Statistics, CRIS INFAC, August 2006

- (13) Building an ecosystem for IT innovation in India, NASSCOM

The following working papers have been referred to; permission for use as reference has not been sought for yet. In case it is not possible to do so by the time of final publication the references shall be withdrawn.

- (14) The Internet and Internationalization of Small Knowledge-Intensive Firms: Promises, Problems and Prospects, Shameen Prashantham, Stephen Young, University of Strathclyde, Srathclyde International Business Unit, Working Paper 2004/05

- (15) Ethnic Social Capital and Small Firm Internationalization: The Case of the Indian Software Industry, Shameen Prashantham, University of Strathclyde, Srathclyde International Business Unit, Working Paper 2004/05

Websites/Online material

Factsheets, Industry statistics from NASSCOM: www.nasscom.org.