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Productivity of India's Offshore Outsourcing Sector: Business-based Evidence

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Abstract: Following on an earlier paper discussing the sustainability of India's comparative advantage in IT offshore outsourcing, the authors pursue their enquiry whether rising labour costs are being compensated by rising productivity. A sample of six firms including the big three in Bangalore was selected for a field survey, and the total factor productivity (TFP) approach used to look at trends of output, capital employed and wage costs per unit labour, enriched by insightful discussions on site. While the trend towards decreasing age profile of the work force has succeeded in maintaining mean salary per capita constant, productivity performance in TFP terms is not so uniformly brilliant across the sample. Caveats and cautionary notes on using TFP as a reliable tool to gauge efficiency of labour especially in times of sharp changes in capital and labour resources and other exogenous factors including exchange rate movements have been expressed.

Keywords: Offshoring, outsourcing, total factor productivity, output, capital employed, wage costs, age profile, attrition rates, Bangalore, tier 2 cities.

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Introduction

The rise of India as the leading destination for IT offshore outsourcing has made it a rich field for discussion. Of late, there has been some speculation about the sustainability of India's competitive advantage because of rising costs of skilled labour and emergence of several other low cost competitors, with China the closest behind it. The authors too joined this discussion and presented a paper on the sustainability of India's comparative advantage in offshore outsourcing at the European Conference of Information Systems (ECIS) in Gothenburg (June 2006)[2]. That paper argued that the currently low wages of skilled IT staff in India may be eroding over time. The dramatic reversal of roles of some labour costs in the Indian economy, ranked amongst the lowest wage economies, to the most expensive one (in purchase price parity terms) for senior managers in "hot Indian spots" like Bangalore and Mumbai was demonstrated. Nevertheless it was argued that if Indian offshoring capabilities concentrate more on high value-added knowledge processing services leveraging on the well recognised skills of its senior managers in the IT and other service sectors, then it can retain its competitiveness. Comparisons of health care costs between the US, India and some other countries were used as an illustration.

This paper[3] continues with the question whether rising labour costs can be matched by rising productivity (total factor productivity at the firm level) in order to retain India's leading position. It summarises the insights and evidence garnered during a field survey profiling across time the movement of some key indicators in a sample of six Indian firms, e.g. total revenue in value added terms, wage costs, output per worker, and capital per worker. The data furnished by the firms was enriched by discussions with their senior managers.

1. IT Offshore Outsourcing in India

As an industry-leading supplier of IT offshore-outsourcing, India continues to attract the investments of multinational corporations (MNCs). Offshore outsourcing refers to a broad spectrum of services ranging from (1) traditional IT outsourcing services (ITO), to (2) business process outsourcing (BPO), (3) the outsourced development of packaged software and (4) outsourcing of R&D and engineering.[4] By definition business functions in these areas are contracted to external organisations in countries with a preferably lower wage level than the one in which the final product or service will be consumed. The term "offshoring", in contrast, refers to the outsourcing of services to foreign subsidiaries of the same firm and therefore does not involve external organisations.[5]

For FY2007 the Indian IT-BPO business was projected to grow by an estimated 28% reaching USD 47.8 billion in revenues, which is almost a 1.000% increase over the last nine years (FY1998: USD 4.7 billion). Given this, the growing sector represents app. 5.4% of India's national GDP. The industry is primarily dominated by services and software exports to the US

[2] Tawfik Jelassi & Suman Modwel, "The Sustainability of India's Comparative Advantage in IT Offshore Outsourcing", European Conference of Information Systems (ECIS), Gothenburg, 12-14 June 2006

[3] Project commissioned by the ENPC School of Management and the Groupe d'Economie Mondiale of the Sciences-Po.

[4] cf Strategic Review 2007, "The IT Industry in India", NASSCOM, p.30

[5] cf. Source Paradigm Limited (2007): "Risks, Rewards, Challenges and Opportunities in Offshore Outsourcing"; White Paper, February 2007.

and UK which represent the main markets. Software and Services export revenues alone are estimated to grow over 16-17% to reach USD 47 billion in 2009[6]. Banking, Financial Services and Insurance as well as Technology already account for the majority of revenues, while Manufacturing, Retail, Media, Utilities, Healthcare and transportation follow behind with rapid growth. India's comparative advantage is based on five factors according to NASSCOM[7]: (1) India's rapid growth in key business infrastructure (2) enabling business policy and regulatory environment, (3) abundant talent, (4) cost advantage and (5) an emphasis on quality and information security.[8]

2. Sample Size, Methodology and Scope of the Field Research

Having laid out the big picture, one has to remain very modest in the descent from the global level discussion, to micro (firm) level investigation because of the limited resources and time at our disposal. Hence the sample of companies was limited to six. Through the contacts of one of our authors we could arrange for interviews at CEO or top corporate level with the following companies:

- The "Big Three"[9], namely Infosys, Wipro Ltd and Tata Consultancy Services (TCS) at Bangalore

- AxisIT&T, a merger between an Indian and US company dealing in engineering services and interactive voice services (VOIP) at Noida and Gurgaon around in the Delhi national capital region (another "hot spot" like Bangalore), much smaller in size

- Alcatel Lucent Development, Chennai, an internal testing facility of Alcatel-Lucent. This was the sole sample of an offshoring (not outsourcing) facility of a big European group

- Metacube, Jaipur, a small sized software development company in a "second tier" city.

The agenda for discussion was developed (see Annex 1) that the discussion was sought to be focussed on wage trends (their effect on changes in products and services offered, attrition rates, etc.); productivity related issues (upgradation and improvements in technology and processes; HRD policies to enhance skills and motivation levels of employees; positive and negative externalities impacting on productivity); competitiveness issues (reflections on how to stay on top of it); and strategic options and future perspectives (A free ranging discussion was suggested - strategies that may enter in the conversation may include looking at alternative lower cost

[6] NASSCOM Strategic Review 2009
[7] cf. Strategic Review 2007, "The IT Industry in India", NASSCOM, pp.9 - 13

[8] The year 2008 witnessed the effects of the global financial crisis. Despite the unprecedented economic downturn NASSCOM (NASSCOM Strategic review 2009) predicts that the IT industry will still witness sustainable growth estimated to reach USD 71.7 billion accounting for 5.8% of India's GDP; software and services revenues aggregated to about USD 60 billion.

[9] The reference is to the three Indian companies in Bangalore – some multinationals like IBM India and Accenture that have offshoring operations in India are bigger.

locations (the so called second/third tier cities); performing only high value sophisticated jobs for select "star" clients to whom quality and security concerns override cost; looking outside and acquiring outsourcing facilities in other low cost economies or in those locations "nearer" to clients (geographically, linguistically, culturally); reverse offshore outsourcing to US and Europe; capital deepening (making the service less labour intensive through more capital inputs (technology, automatic processes).

The second instrument (TFP estimation sheet) did require some effort and goodwill on everyone's part to understand and appreciate its purpose. The idea was to trace out across time (we suggested a 2003-2007 span) the changes in value added (Y), i.e. operating income less expenses on bought out materials and services (excluding wages and salaries), numbers of employees (L), expenses on wages and salaries (W); capital employed (K) which includes all the technology that comes with it; and capital employed per unit labour (K/L). In simple conceptual terms, without getting into complexities (and controversies) of growth accounting[10], and staying close to the businessperson's vocabulary of performance metrics, the approach was not only to look at the well accepted proxy of productivity, value added per unit labour (Y/L), but go a little deeper and look at what was responsible for its increase (or decrease). What for example was the role of capital deepening i.e. increasing K/L? How did, to take an hypothetical example, overall productivity (Y/L) increase despite resources of labour (L) and capital (K) remaining constant? The intuitive answer of course lies in the quality and efficiency of labour, their skills, motivation, learning culture of the company, supportive business environment, etc. – all these combined to make them work "faster and better" despite resources remaining the same. These are all the notorious "grey box" areas, difficult to extract and measure accurately both at the macro and micro level[11]. Nevertheless, the TFP approach, with all its caveats and limitations does go some way in at least pointing at some trends in a relative sense whether countries, or firms, are extracting more (or less) out of given quantities of capital and labour resources over time.[12]

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[10] Attributed first to Solow and Swan (1956). Total Factor productivity (TFP) or Multi-factor productivity (MFP) is "measured residually as that change in output that cannot be accounted for by the change in combined inputs of labour and capital (OECD Glosary of statistical terms)"

[11] It is important to emphasise here that, as the title of the paper suggests, the paper maintains a business perspective and has no pretensions of participating in any scholarly discussion on the usefulness of TFP at the firm level from an economic perspective. Hopefully however some theoretical economists, if at all they read this, may indulgently look at TFP from a business persons angle.

[12] The ratios Y/L, K/L, W/L were readily understood by all. However, the TFP assumptions required some explanation. The basic equation that we used to measure TFP is:

$TFP = Y / [L^{0.7} \times K^{0.3}]$,

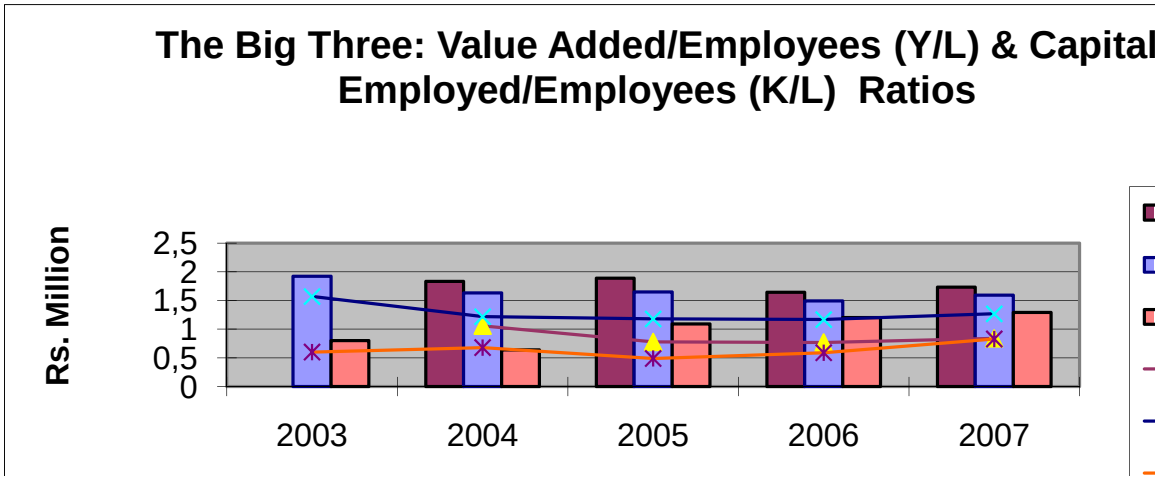
where L is the number of employees and K is the value of the firm's capital. The exponents represent the fraction of the firm's value added contributed by labour (0.7 or 70%) and by capital (0.3 or 30%) -- taken as the general average for the services sector which is considered more labour intensive. We used the sector averages or the economy-wide average, since the data needed to compute this parameter for each firm is normally not publicly available. Unfortunately the sector averages for India are also not available so we have taken the averages from other economies where figures are available. A little mathematical manipulation (taking logs and differentiating across time) yields the equation used in the estimation sheet:

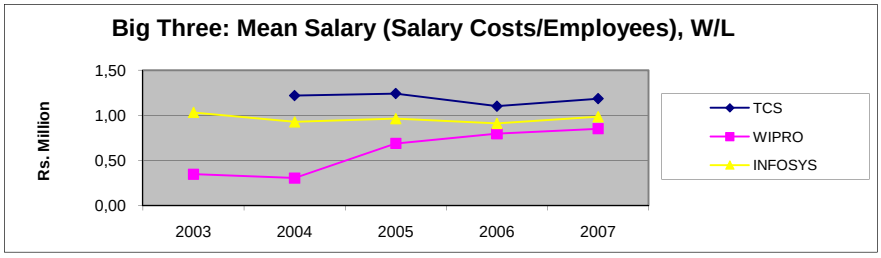
% change in TFP = %change in productivity per worker – 0.3* %change in contribution of capital per worker

We elaborated a short note on TFP explaining all this for the benefit of the sample companies in the more detailed working paper (available on request: please email modwel@enpcmbaparis.com). In this we noted that "Economic

3. Cross Comparison Between The Big Three[13]

We now present in this section the cross comparison of trends revealed from the TFP estimation sheets (attached in Annex 3) of the Big Three" Bangalore companies. The remaining three – Alcatel Lucent, AxixATT, and Metacube – have non-comparable specificities, and are discussed in he next section which summarises key observations and insights gathered during our visit to the companies in the sample. The two charts in the following page help us in making some comparisons and contrasts in the performance metrics indicated in the respective estimation sheets of TCS, Infosys and Wipro.





Value- added per unit labour (Y/L): This is the broad measure of productivity. Wipro (1.29, 2007) appear to be closing in on Infosys (1.59, 2007) as the years go by, although both are still behind TCS (1.73, 2007), which is the clear leader. In absolute income values WIPRO has almost caught up with Infosys, but the gap between the two is still perceptible in value added per unit labour terms. TCS' value added per capita ranges between 1,89 and 1,64, while Infosys'

Value Added (EVA) has become a widely used measure of firm performance, known to the business world. It is however criticised by some on the grounds that it measures the productivity of capital alone, measuring its return against a benchmark, cost of equity, to see if value has been created. The advantage of the TFP measure is that it takes into account both labour and capital in measuring productivity. This could be more meaningful for firms operating in economic sectors (like IT related services) where human resources play a key role in driving performance".

[13] All values in the ratios are Rs.Million

numbers range from 1,49 to 1,92 and Wipro's between 0,64-1,29. Despite certain volatility, Infosys is seen to be moving moves towards TCS.

A certain volatility in the company's performance growth covered during the years 2003 to 2007 can be seen. In general TCS shows steady growth of figures and maintains its high level (Y/L: -5,29% 2007/2004). Infosys' value added decreased by -17,13% between 2003 and 2007, which is mainly due to relatively high drops in 2004 and 2006. Wipro managed to steadily grow, increasing Y/L by 60,94% between /2003 and 2007.

TFP and Capital Employed per Unit Labour (K/L): This is a measure of the capital intensity of the firm, and in the TFP context, indicates the contribution of capital to total productivity per capita (Y/L). In absolute terms, Infosys has the highest amount of capital employed representing almost twice the amount that Wipro employs in 2007. The K/L ratio reflects this contrast between the two companies. Both Infosys and Wipro have the same level of workforce (around 70000), but the K/L ratio by 2007 for Infosys is much higher, making it perceptibly more capital intensive in its operations. Some may argue that for this reason Infosys appears to have the highest growth potential and could therefore deemed to be more sustaining in the long run, others may look at the consequent negative TFP growth rate and hold that that is responsible for the decreasing trend in its value added per unit labour, which is the overall productivity measure. In contrast, Wipro emerges as the clear winner in terms of positive TFP growth (49.48%) over the period 2003-2007. As for TCS, its capital employed in 2007 (Rs. 72 billion) is between the two, and its K/L on par with that of Wipro. Its TFP growth remains constant over the period 2004-07.

Wage trends and Mean Salary (W/L): TCS has the largest workforce over the covered period of time (85.500, 2007), whereas Infosys and Wipro have the same level (around 70000, 2007). Wipro has the lowest mean salary level, Rs. 0.85 million (2007) although a rising trend can be seen. It can also be seen that Infosys and Wipro have managed to remarkably contain mean salary ratio over the period 2005-07 despite the sharp hikes in wages and salaries during this period. This validates the discussion in previous sections on the work force becoming younger and younger, thus dampening the effect of sharp wage hikes at senior levels.

4. Key Observations and Insights

We give below a summary of key insights and observations from our visits to the dample companies[14]. The sample companies are located in different "tiers" of Indian cities. Bangalore, Mumbai and Delhi (Gurgaon and Noida) are the so-called first tier (tier 1) regions in India. Their attractiveness is determined by a high development of the value-adding characteristics, with higher (burgeoning) costs on the flip side. Hyderabad and Chennai, for instance, are cities which pick up on these characteristics and are therefore called tier 1-1. Cities such as Kolkata belong to tier 2, less of both valued added sophistications and costs, but still have reasonably good value propositions. Jaipur could also be classified as tier 2. Tier 3 cities aim (with strong encouragement and support from the local authorities) become attractive locations for the IT industry, relatively lacking in availability of skilled labour and other externalities that exist in tier 1 clusters, but with even lower wage and infrastructure costs.

[14] Extracted from the more detailed account in our working paper (see footnote 12)

Infosys[15]

Infosys started in 1981, went public in 1992, and has been registering hundred percent growth year on year, and has a large number of Fortune 500 as its clients, and 90% of their billings are repeat business, with a workforce of 80000. As Vinay Rao, Assistant of the Co-Chairman, put it, "We try to understand the business of the customer, not only the technology he uses", and they do not hesitate to enter into transaction based and revenue sharing pricing arrangements with their clients (this policy of "differentiation", playing on loyalty, quality and reliability succeeds in loading increased costs on increased billing rates). Infosys emphasizes the importance of training at the "bottom of the pyramid". It has a huge facility in Mysore with more than 5.000 classrooms where intensive training for 4 months is imparted, including short duration domain specific modules for which certification is also provided. The performance appraisal system is unrelenting.

Infosys focuses on hiring smart people, regardless of their background. They do not need to be engineers, they can be medical doctors with MBBS degrees and even about 70% have no prior experience. The average age of the work force is about 26 years. While high attrition rates and body-snatching amongst the IT companies are problems Infosys' salaries are not any higher than the general norm, and they are comfortable losing 5-6% annually to competition.[16] Infosys is evidently not relying on the wage factor for employee retention, rather playing its brand card, its well known quest to capture the "mind" of the employee. As Narayana Murthy, first CEO, and an icon of the IT world puts it: *"Our assets walk out of the door each evening. We have to make sure that they come back the next morning."* One could see what he meant as we toured through their huge campus with all the facilities and landscaped parks and greenery for leisure, sport, special events including family gatherings, restaurants, and bicycling employees. These amenities rather resembled a five star luxury resort sitting rather bizarrely alongside huge amphitheatres and conference rooms fitted with multiple screens where state of the art communication and control systems operate at the service of their clients world-wide in real time.

As brought out in the preceding discussion based on TFP estimation sheet statistics that shows high K/L ratios, Infosys seems to intensely leverage technology and automation rather than the cost-effectiveness of Indian IT skilled manpower. This is counter-intuitive for an IT player in India, but as Vinay Rao puts it, *"Our defining process is through increased automation and labour arbitrage is only 25% in the product/service offer."*

Wipro Technologies[17]

Wipro is owned largely by Aziz Premji. Like Infosys, Wipro's hiring policy does not target engineers only, despite an engineering bias of 90% in the IT sector[13]. In Wipro too the hunt is on in full cry for what Vinay Rao of Infosys termed "smart people", whatever their background may

[15] Interview with Vinay Rao, Office of the Co-Chairman, 17/09/07.
[16] "I can get 2 to 3 times higher pay outside Infosys", say these quitters.
[17] Interview with Pratik Kumar, Senior VP, HRD on 18/09/07. As we entered their premises we could not help comparing them with Infosys. The layout of their buildings where their different units are lodged were elegant and pleasing in their design but less impressive in their grandeur, with modest landscaping surrounding them. We were not invited to take a tour. This was in contrast to the "bells and whistles" show window approach of Infosys. The human resource perspective, with their almost 90000 strong work force, naturally dominated our discussion and much useful information and insights emerged which we weave into the numbers in the TFP estimation sheet furnished by them.

be, which it hires and trains in its own centres much as Infosys does. The company does not restrict itself only to the top Indian Institutes of Technology (IIT) and Management (IIM). Employees with good potential are also picked from the less perceived technical institutions and universities (about 1600) who often feel that they are as good as those graduating from prestigious schools such as IIT and IIM and are "hungry to prove themselves". Wipro gives them an opportunity to do so. Wipro provided a detailed breakdown of different age groups for the years 2003-2007. The major change between 2003 and 2007 is the proportional rise of the senior and the decrease of the younger category, which has had an effect in dampening the total salary bill. Wipro has, and always had since 2003, the lowest mean salary of the big threeBangalore companies .The TFP approach attempts to explain where most of the productivity increase came from.

We can observe from the WIPRO estimation sheet that year on year, there was a hefty increase in TFP growth (78%) in 2005, followed by a negative rate (-5%) in 2007 for which a disproportionately large build up of capital employed (77% increase) appears to be responsible. Overall, however the 4 year trend rate of positive TFP growth of 50% registered by Wipro could certainly be a cause for celebration.

Tata Consulting Services[18]

Tata Consultancy Services Limited (TCS Limited company), a part of the gigantic empire of the Tata group, is Asia's largest and has the largest number of employees among the Indian IT companies with strength which has crossed 100,000 by the end of 2007, with IT consultants in 47 countries (source: Wikipedia).

Dr. Desai who received us in one of TCS' several offices (they have no "campus") observed that TCS "is a strong tech company trying to get to the business side", with its products and consultancy business growing but the services segment dominating. The challenge of managing such a large workforce and growing every year by 30000 or so, was underscored. There was a wide gap between the skilled and semi-skilled, younger, work force. He hinted that this was influencing the shift to more "automatic processes", quite apart from the latter being an imperative per se.. TCS too provides intensive training for 3 months on entry at their about 8 training sites. Their facility in Souzhou, China, was mentioned in this context: "To go out from China may be easier than from India".

Interestingly some of these observations sit well with the trend analysis we make of the data in the TFP estimation sheet[19]* discussed in the preceding section. The year 2007 could be signaling a turnaround as both K/L and TFP turned positive, giving a positive growth of 5.3% over 2006 of Y/L so one could even tentatively conclude that recent integrative and appraisal measures on the management and HR side and automotive and other processes on the technology side are

[18] Interview with Dr. Pradeep Desai, technology Head, TCS Financial Services on 17/09/07.
[19] See Annex for further reference on TFP calculations.
* Regrettably however we should point out that Dr. Desai declined to furnish these figures, which was puzzling as they are all extractable from several different sources like annual reports and quarterly "results" all in the public domain in their website (www.tcs.com), which we in fact did ourselves. These are therefore not verified by the company. Moreover, as we could not easily locate the numbers for 2003, we left that year out, considering only the span 2004-2007.

beginning to give their fruit. However, negative exogenous changes in Y i.e. revenues in value added terms, also affect productivity negatively - the 12% appreciation of the rupee against the dollar during 2007 has undoubtedly caused unexpected pain. Decreasing L, the work force to maintain the ratio, becomes an inevitable policy option, as reports in the media of layoffs by TCs and other IT companies would confirm[20]:

Metacube[21]

Meta cube is an IT solutions and services company developing enterprise software applications specialising in global trading operations. It develops and sells these applications to software companies (mostly global logistics companies) which in turn offer their final software services to their clients. It is situated in Jaipur, one of the "tier two" cities about 350km from New Delhi that are coming up as alternative options to the "hot" centres like Bangalore, Mumbai, Gurgaon, NOIDA where salaries, especially of skilled IT engineers are exploding and the infrastructure deficit is challenging. M.Sharma, CEO, confirmed that the private sector is opening more and more regional engineering colleges (about 5 in Rajasthan alone) to restore the supply demand equilibrium (and hopefully deliver better quality and skills in its graduates), despite the fact that state authorities do not yet recognize their degrees.

Highlights of estimation sheet calculations: Income from operations and value added (Y) has leapt by more than 1000% by 2007 (no doubt from a small base). Work force grew by 62% (133 as the present head count). The even higher growth of wages and salaries (1189%) was neutralised by corresponding increase in business volume and hikes in billing as income also showed high growth (940%). Overall there is a clear and impressive increase in value added per employee (185%) and TFP (142%)[22] indicating that growth of value added per employee was not just owing to more capital (technology, improved software and processes) but also because of "better and faster" performance of its work force. In this context, the CEO places great emphasis on mentoring by senior staff as a critically important HR policy in their company. Their staff has an average of 3 years experience, salaries ranging from Rs. 600000-800000 p.a. Those with 6/7 years earn around Rs 1-2 million p.a., some even Rs. 2 million.

Axis IT&T[23]

Axis, considers itself to be a design and business process outsourcing (BPO) services provider. A particular challenge that they faced was illustrated by recalling the three stages involved from original conception (styling) to assembly/manufacturing, with engineering design in between. AXIS IT&T is in between. They are thus caught in the middle of the chain between, as one example, styling and assembly/manufacturing of superbikes. Zero defect and zero delay

[20] At the time of submission of this paper (Sept 2009) the Rupee is back to its weak level hovering around Rs. 49 to the US$. The arguments can thus be run in reverse. Implications of the weakening Rupee could have many implications, Indian offers becoming less uncompetitive, being only one oft them. These would have to be set against many challenges other challenges such as demand becoming more price inelastic and slackening more because of re-awakening resistance to outsourcing in the wake of this slowdown in the US and other developed economies.

[21] Discussion with M. Keshav Sharma, CEO on 24/09/07.

[22] See Annex for further notes on TFP calculations.

[23] Meeting with Rohit Chand, Chairman and his colleagues (20 Sept 07) as well as website information: http://www.axisitt.com

performance become even more crucial because of this. The attrition rate was estimated at 35-40% per annum. Small companies without the same "brand pull" as the big Indian and foreign players understandably face greater threats of attrition.

TFP estimation sheet highlights: significant increase in salaried staff starting from a small base in 2004 after the merger, while the capital employed (rather large!) remained basically unchanged[24]. Value added increased hugely (268%), compared to workforce increase (195%) whereas capital per worker decreased by 64% giving better overall productivity. The TFP score of 44% validates this interpretation. It is interesting to note that the mean salary of the big three at Bangalore is of the order of Rs. 1 million, three times more than that in small companies like Axis IT&T and Metacube.

Alcatel Lucent Development, Chennai[25]

Alcatel mainly focuses on product testing, broadband wireless access solutions like WiMAX, and product development. In this regard Alcatel filed 39 patents in 2007 as compared to 11 in 2006. Alcatel's software development centres are located at Gurgaon, Noida, Chennai, Bangalore and Hyderabad. Today, Alcatel-Lucent technologies make up 50% of India's fixed and CDMA wireless lines.[26] The company entered the South Asian market in 1982. In cooperation with ITI Ltd., Alcatel-Lucent became the first company to manufacture digital switching equipment in India significantly fostering the development of the Indian telecom market.

Estimation sheet highlights: work force growth very high (356%), but value added per employee (Y/L) also impressive (78%), thus TFP growth impressive too at (57.8%). Alcatel's key objective is to adhere to the delivery date of tested products within a set of rigid parameters of early defect removal. The work force is progressively getting younger and is being paid proportionately less, thus dampening here too the wage hike effect. On a query raised by their team, we explained that the TFP concept is equally applicable to their centre as it analyses where the increase (or decrease) of output per unit labour comes from, no matter whether the output is related to external sales in the market or internal payments by the parent for services rendered.

5. Concluding Remarks

The paper addresses the major research issue: Are rising labour costs being compensated by rising productivity and other measures to keep average costs in control? A sample of six firms including the big three in Bangalore was selected for a field survey, and the total factor productivity (TFP) approach used to look at trends of output, capital employed and wage costs per unit labour, enriched by insightful discussions on site with all the six firms. The discussion does not get into complexities of growth accounting but stays close to the businessperson's vocabulary of performance metrics in simple conceptual terms. We have discussed for each of the six sample firms what, for example, was the role of capital deepening i.e. increasing K/L in increasing overall productivity(Y/L). Did overall productivity increase despite resources of

[24] Figures for 2003, before merger, are really not comparable with later years, as income and salaried staff sharply decreased.
[25] Chennai center visited on 19/09/07. Interview with the MD, BVS Krishnamurthy and his colleagues.
[26] Cf. website : http://www.alcatel.co.in

labour (L) and capital (K) remaining relatively constant, which is what TFP tries to bring out? TFP estimation sheets were developed. Key insights that emerged from these discussions was that:

1. The policy to hire younger and younger people ("smart" graduates from all disciplines, not necessarily engineers and IT specialists only) succeeded in maintaining mean salary per capita more or less constant across the period 2003-07 covered in the survey.
2. While the Big Three in Bangalore dominate the IT sector in terms of revenues and value-added, smaller players such as Metacube in Jaipur, Axis IT&T in NOIDA, and Alcatel Lucent in Chennai impress too with their growth performance and productivity measures.

Wipro emerges as the clear winner in terms of positive TFP growth (49.48%) over the period 2003-2007. As for TCS, its capital employed in 2007 (Rs. 72 billion) is between the two, and its K/L on par with that of Wipro. Its TFP growth remains constant over the period 2004-07. Both Infosys and Wipro have the same level of workforce (around 70000), but the K/L ratio by 2007 for Infosys is much higher, making it perceptibly more capital intensive in its operations, and as a consequence its TFP is in negative territory. It obviously therefore ranks high by the Economic Value Added (EVA) measure. We took this opportunity to express that neither EVA nor TFP are complete tools by themselves, both need to be used (instead of EVA only, which is more popular in the corporate world) and the limitations of both needs to be stated with plenty of “footnotes” to explain deviations in particular years that neither of these tools can properly interpret. In the event, we did notice such unusual deviations from the normal trend in our analyses of the estimation sheets of some companies and have properly explained them. TFP by itself holds up a mirror, perhaps sometimes distorted, that is neither a messenger of good news, nor of bad news, but an invitation to go through further analysis of the data to explain and understand departures from real trends and their implications. Service-wise, as an offshoring company servicing its parent, Alcatel Lucent stands apart from the other two, but it too measures up very positively in registering high TFP growth[27].

Annex 1

Agenda for Discussion during Company Visits

To facilitate an efficient interaction during our visit to your company the following anchor questions/points are listed around which discussions could focus. These are by no means exhaustive – discussions would undoubtedly bring out more insights. Having supporting data

[27] At the time of submission of this paper (Dec 2009) the Rupee hovering around Rs. 50 to the US$. During our field visits (end 2007) the Rupee had appreciated to levels of Rs.40, so the arguments related to loss of competitiveness used by NASSCOM and others in India's export sector can thus be run in reverse now. Implications of the weakening Rupee could have many implications, Indian offers becoming less uncompetitive being only one of them. These would have to be offset against other challenges such as overseas demand becoming more price inelastic, slackening more because of rejuvenated resistance to outsourcing in the US and other developed economies in the wake of global economic slowdown, not therefore so tempted by more price competitive Indian offers. These developments are perhaps worthy of scrutiny more deeply, but outside the scope of this paper. All these exogenous changes do underscore again however the need to use the TFP measure with caution as discussed earlier.

ready at hand (apart from the TFP related data solicited in the second excel sheet document) would be helpful.

Wage Trends

What has been the impact of the rise in salaries and wages of skilled and semi-skilled workforce in the last five years?

On changes in your target market (client profile). Less clients, more preference for projects requiring higher skills? Upward changes in prices?

On changes in the products and services offered (or tasks entrusted to your offshore location by your parent company headquarter)

On attrition rates

On HRD policies (hiring, training, employee retention measures to combat competitive body snatching etc. in the light of the acute supply-demand mismatch.)

On provoking specific "economy drive" measures (not related to productivity enhancement, which are mentioned in next section), e.g. restrictions on travel, changing mix of permanent and casual staff, etc.

Productivity Related Issues

At a crude level, one can state that wage cost escalations need to be matched with productivity (output per unit input) improvements to retain cost competitiveness. Productivity improvement could come through superior and more cost effective technology, or more efficient use of existing technology, or both:

What upgradations in technology and improvements in processes have been implemented recently? Faster communication links, application of next level of software, process and cycle time improvements, six sigma etc.(Improving "capital productivity")

What measures to enhance the skills and motivation levels of the workforce have been initiated in the recent past? ("Better and faster with the same tools"). Supply side issues such as increasing labour scarcity (supply-demand mismatch) and inadequate quality of graduating engineers from regional colleges, high cost of IIT graduates etc. could be discussed here.

What positive and negative externalities do you perceive that impact on company performance (role of government and its policies, business climate and culture, infrastructure issues)

Competitiveness Issues

How do you assess the threat of foreign competition, especially in a dynamic, evolutive, sense? What would be your strengths (tied relationships with loyal client base, English speaking staff, all that is positively perceived about India) and weaknesses (escalating wage costs, appreciating Rupee, all that is negatively perceived about India) in facing it?

Strategic Options and Future Prospective:
A free ranging discussion would be appropriate. Strategies that may enter in the conversation may include looking at alternative lower cost locations (the so called second/third tier cities); performing only high value sophisticated jobs for select "star" clients to whom quality and security concerns override cost; looking outside and acquiring outsourcing facilities in other low cost economies or in those locations "nearer" to clients (geographically, linguistically, culturally); reverse offshore outsourcing to US and Europe; capital deepening (making the service less labour intensive through more capital inputs (technology, automatic processes).

Annex 2: Company Specific Estimation Sheets

INFOSYS

		ESTIMATING TOTAL FACTOR PRODUCTIVITY					Fig in Rs. Million			
Company[3]:Infosys / Yr.ending March 31,	**2003**	**2004**	**%chg**	**2005**	**%chg**	**2006**	**%chg**	**2007**	**%chg**	**%chg 2007/2003**
Income (from operations) - A	36.540,00	47.860,00	30,98%	72.540,00	51,57%	95.210,00	31,25%	138.930,00	45,92%	280,21%
Less: All operating expenses except wages and salaries - B	6.040,00	6.020,00	-0,33%	12.010,00	99,50%	16.700,00	39,05%	23.920,00	43,23%	296,03%
Value Added (A - B) = Y	30.500,00	41.840,00	37,18%	60.530,00	44,67%	78.510,00	29,70%	115.010,00	46,49%	277,08%
Work Force (no. of employees)1- L	15.876,00	25.634,00	61,46%	36.750,00	43,36%	52.715,00	43,44%	72.241,00	37,04%	355,03%
Wages and Salaries[2] (W)	16.400,00	23.770,00	44,94%	35.390,00	48,89%	48.010,00	35,66%	71.120,00	48,14%	333,66%
Mean Salary (W/L)	1,03	0,93	-10,23%	0,96	3,85%	0,91	-5,43%	0,98	8,10%	-4,70%
Value Added per employee - Y/L	1,92	1,63	-15,04%	1,65	0,91%	1,49	-9,58%	1,59	6,90%	-17,13%
Capital Employed (net assets, book value) - K	24.930,00	31.250,00	25,35%	43.310,00	38,59%	61.770,00	42,62%	91.470,00	48,08%	266,91%
Capital per Worker - K/L	1,57	1,22	-22,37%	1,18	-3,33%	1,17	-0,57%	1,27	8,06%	-19,37%
Total Factor Productivity (TFP) [%changeTFP= %change Y/L - %change K/L*0,3]			-8,33%		1,91%		-9,41%		4,48%	-11,32%
Notes: 1. Apart from permanent employees, part time resources may also be counted with suitable co-efficient										
2. From employer's perspective, i.e. include social benefits, pension contributions, bonuses etc.										
3. May be left blank if anonymity preferred										

Source: Data extracted from annual reports and website information. Figures not verified by company.

Tata Consulting Services

		ESTIMATING TOTAL FACTOR PRODUCTIVITY					Fig in Rs. Million			
Company[3]:TCS Yr.ending March 31,	2003	2004	%chg	2005	%chg	2006	%chg	2007	%chg	%chg 2007/2004
Income (from operations) - A	55.178,60	71.227,30	29,09%	97.272,00	36,57%	132.454,00	36,17%	186.332,00	40,68%	161,60%
Less: All operating expenses except wages and salaries - B		16.240,00		19.929,00	22,72%	29.320,00	47,12%	38.372,00	30,87%	136,28%
Value Added (A - B) = Y		54.987,00		77.343,00	40,66%	103.134,00	33,35%	147.965,00	43,47%	169,09%
Work Force (no. of employees)1- L		30.121,00		40.992,00	36,09%	62.832,00	53,28%	85.582,00	36,21%	184,13%
Wages and Salaries[2] (W)		36.738,00		50.939,00	38,65%	69.239,00	35,93%	101.515,00	46,62%	176,32%
Mean Salary (W/L)		1,22		1,24	1,88%	1,10	-11,32%	1,19	7,64%	-2,75%
Value Added per employee - Y/L		1,83		1,89	3,35%	1,64	-13,00%	1,73	5,33%	-5,29%
Capital Employed (net assets, book value) - K		31.910,00		32.090,00	0,56%	48.650,00	51,60%	72.220,00	48,45%	126,32%
Capital per Worker - K/L		1,06		0,78	-26,11%	0,77	-1,09%	0,84	8,99%	-20,34%
Total Factor Productivity (TFP) [%changeTFP= %change Y/L - %change K/L*0,3]			0,00%		11,19%		-12,68%		2,64%	0,81%
Notes: 1. Apart from permanent employees, part time resources may also be counted with suitable co-efficient										
2. From employer's perspective, i.e. include social benefits, pension contributions, bonuses etc.										
3. May be left blank if anonymity preferred										
Special Note: Figures extracted buy authors from public documents (annual reports, "results" for various quarters) in the TCS website www.tcs.com) as company declined to furnish data										

Source: Data extracted from annual reports and website information. Figures not verified by company.

Wipro

		ESTIMATING TOTAL FACTOR PRODUCTIVITY					Fig in Rs Million			
Company[3]: WIPRO / Yr.ending March 31,	2003	2004	%chg	2005	%chg	2006	%chg	2007	%chg	%chg 2007/2003
Income (from operations) - A	39.848,17	51.326,81	28,81%	72.331,61	40,92%	102.271,17	41,39%	136.839,00	33,80%	243,40%
Less: All operating expenses except wages and salaries - B	24.972,37	33.094,48	32,52%	26.855,70	-18,85%	37.569,38	39,89%	49.450,55	31,62%	98,02%
Value Added (A - B) = Y	14.875,80	18.232,32	22,56%	45.475,91	149,42%	64.701,79	42,28%	87.388,45	35,06%	487,45%
Work Force (no. of employees)[1]- L	18.580,00	28.502,00	53,40%	41.857,00	46,86%	53.742,00	28,39%	67.818,00	26,19%	265,01%
Wages and Salaries[2] (W)	6.424,70	8.644,41	34,55%	28.785,34	232,99%	42.790,25	48,65%	57.681,93	34,80%	797,82%
Mean Salary (W/L)	0,35	0,30	-12,29%	0,69	126,75%	0,80	15,78%	0,85	6,82%	145,97%
Value Added per employee - Y/L	0,80	0,64	-20,10%	1,09	69,84%	1,20	10,81%	1,29	7,03%	60,94%
Capital Employed (net assets, book value) - K	11.206,92	19.290,66	72,13%	20.643,73	7,01%	31.953,00	54,78%	56.535,00	76,93%	404,47%
Capital per Worker - K/L	0,60	0,68	12,21%	0,49	-27,13%	0,59	20,55%	0,83	40,21%	38,21%
Total Factor Productivity (TFP) [%changeTFP= %change Y/L - %change K/L*0,3]			-23,77%		77,98%		4,65%		-5,03%	49,48%
Notes: 1. Apart from permanent employees, part time resources may also be counted with suitable co-efficient										
2. From employer's perspective, i.e. include social benefits, pension contributions, bonuses etc.										
3. May be left blank if anonymity preferred										

Source: Data provide by company.

Metacube

		ESTIMATING TOTAL FACTOR PRODUCTIVITY					Fig in Rs Million			
Company[4]: Metacube / Yr.ending March 31,	2003	2004	%chg	2005	%chg	2006	%chg	2007	%chg	%chg 2007/2005
Income (from operations) - A				8,06		29,53	266,50%	83,83	183,85%	940,30%
Less: All operating expenses except wages and salaries - B				1,98		7,50	277,77%	14,14	88,53%	612,22%
Value Added (A - B) = Y				6,07		22,04	262,81%	69,70	216,29%	1047,52%
Work Force (no. of employees)[1]- L				33,00		82,00	148,48%	133,00	62,20%	303,03%
Wages and Salaries[2] (W)				2,88		12,33	328,79%	38,67	213,59%	1244,63%
Mean Salary (W/L)				0,09		0,15	72,56%	0,29	93,34%	233,63%
Value Added per employee - Y/L				0,18		0,27	46,01%	0,52	95,00%	184,72%
Capital Employed (net assets, book value) - K				5,27		17,55	233,08%	51,65	194,27%	880,15%
Capital per Worker - K/L				0,16		0,21	34,04%	0,39	81,43%	143,19%
Total Factor Productivity (TFP) [%changeTFP= %change Y/L - %change K/L*0,3]				-1,452		-5,077	35,80%	-15,127	70,58%	141,76%
Notes: 1. Apart from permanent employees, part time resources may also be counted with suitable co-efficient										
2. From employer's perspective, i.e. include social benefits, pension contributions, bonuses etc.										
3. May be left blank if anonymity preferred										

Source: Data provided by company.

Alcatel-Lucent

		ESTIMATING TOTAL FACTOR PRODUCTIVITY					Fig in Rs Million			
Company[4]: Alcatel India / Yr.ending March 31,	2002	2003	%chg	2004	%chg	2005	%chg	2006	%chg	%chg 2006/2002
Income (from operations) - A	279,80	380,00	35,81%	754,00	98,42%	1.510,00	100,27%	2.323,00	53,84%	730,24%
Less: All operating expenses except wages and salaries - B	133,00	156,00	17,29%	402,00	157,69%	784,00	95,02%	1.129,00	44,01%	748,87%
Value Added (A - B) = Y	146,80	224,00	52,59%	352,00	57,14%	726,00	106,25%	1.194,00	64,46%	713,35%
Work Force (no. of employees)[1]- L	257,00	358,00	39,30%	758,00	111,73%	779,00	2,77%	1.173,00	50,58%	356,42%
Wages and Salaries[2] (W)	96,40	94,00	-2,49%	264,00	180,85%	554,00	109,85%	894,00	61,37%	827,39%
Mean Salary (W/L)	0,38	0,26	-30,00%	0,35	32,64%	0,71	104,19%	0,76	7,17%	103,19%
Value Added per employee - Y/L	0,57	0,63	9,54%	0,46	-25,78%	0,93	100,69%	1,02	9,22%	78,20%
Capital Employed (net assets, book value) - K	227,90	395,00	73,32%	846,00	114,18%	1.215,00	43,62%	1.746,00	43,70%	666,13%
Capital per Worker - K/L	0,89	1,10	24,42%	1,12	1,15%	1,56	39,75%	1,49	-4,57%	67,86%
Total Factor Productivity (TFP) [%changeTFP= %change Y/L - %change K/L*0,3]			2,21%		-26,13%		88,77%		10,59%	57,85%

Source: Data provide by company

AXIS IT&T

		ESTIMATING TOTAL FACTOR PRODUCTIVITY					Fig in Rs Million			
Company[3]: AXIS ITT Yr.ending March 31,	2003	2004	%chg	2005	%chg	2006	%chg	2007	%chg	%chg 2007/2005
Income (from operations) - A	94,85	28,93	-69,50%	16,18	-44,06%	40,51	150,36%	55,36	36,64%	242,10%
Less: All operating expenses except wages and salaries - B	55,37	12,57	-77,29%	4,67	-62,83%	5,65	20,99%	13,00	129,85%	178,11%
Value Added (A - B) = Y	39,48	16,36	-58,57%	11,51	-29,63%	34,86	202,88%	42,36	21,52%	268,08%
Work Force (no. of employees)[1]- L	354,00	29,00	-91,81%	45,00	55,17%	83,00	84,44%	133,00	60,24%	195,56%
Wages and Salaries[2] (W)	62,79	15,71	-74,98%	13,89	-11,57%	27,24	96,08%	40,88	50,07%	194,25%
Mean Salary (W/L)	0,18	0,54	205,42%	0,31	-43,01%	0,33	6,31%	0,31	-6,35%	-0,44%
Value Added per employee - Y/L	0,11	0,56	405,73%	0,26	-54,65%	0,42	64,21%	0,32	-24,16%	24,54%
Capital Employed (net assets, book value) - K	259,63	189,12	-27,16%	187,49	-0,86%	208,13	11,01%	200,45	-3,69%	6,91%
Capital per Worker - K/L	0,73	6,52	789,17%	4,17	-36,11%	2,51	-39,82%	1,51	-39,90%	-63,83%
Total Factor Productivity (TFP) [%changeTFP= %change Y/L - %change K/L*0,3]			168,98%		-43,82%		76,16%		-12,19%	43,69%
Notes: 1. Apart from permanent employees, part time resources may also be counted with suitable co-efficient										
2. From employer's perspective, i.e. include social benefits, pension contributions, bonuses etc.										
3. May be left blank if anonymity preferred										

Source: Data provide by company