

# CAPTURING THE GAINS



*economic and social upgrading  
in global production networks*

**How social upgrading drives economic  
upgrading by Indian IT majors:  
the case of telecom IT services**

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## **Abstract**

The paper deals with the dynamics of change in IT service provision in the telecom global production network (GPN). It deals with two main questions: why did the Indian IT majors not get the Managed Services contract to provide IT services for the major Indian telecom companies? And, how did the Indian IT majors respond to the shrinking margins in their traditional IT applications' development and programming tasks? In answering these questions, the paper looks into revenue per employee and remuneration of IT professionals in India, which are not only higher than for those with similar qualifications in other industries but also have risen substantially in the past decade. The paper argues that the social upgrading of IT professionals, which resulted in shrinking margins, forced the Indian IT majors to change their strategy and enter both end-to-end services and software products. The US IT service majors (IBM and Accenture) have adopted the Indian IT innovation of the Global Delivery Model (GDM), and moved to integrate low-end tasks in order to provide full Managed Services. As they move in opposite directions, the difference between the US and Indian IT majors is now narrowing.

**Keywords:** IT services, mobile software, managed services, trajectories of development

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## Abbreviations

|        |                                                                |
|--------|----------------------------------------------------------------|
| ARPU   | Average Revenue Per User                                       |
| CPRC   | Chronic Poverty Research Centre                                |
| DFID   | Department for International Development                       |
| EBITDA | Earnings Before Interest, Taxes, Depreciation and Amortization |
| ESRC   | Economic and Social Research Council                           |
| GDM    | Global Delivery Model                                          |
| GDS    | Global Delivery System                                         |
| GPN    | Global Production Network                                      |
| IAMAI  | Internet and Mobile Association of India                       |
| IT     | Information Technology                                         |
| NSSO   | National Sample Survey Organization                            |
| OS     | Operating System                                               |
| PIO    | Person of Indian Origin                                        |
| R&D    | Research and Development                                       |
| RDES   | Research, Development and Engineering Services                 |
| SCI    | Sustainable Consumption Institute                              |
| UK     | United Kingdom                                                 |
| US     | United States                                                  |
| VAS    | Value Added Services                                           |

## **Introduction**

The mobile phone or telecom global production network (GPN) is a complicated system. Finally, what is produced is a mobile telephone service. However, a number of segments go into this production. First is the mobile phone instrument or handset itself. This can be split up into at least two segments. One is the production of raw materials such as coltan, which is a critical component of capacitors for all electronic equipment, or lithium, which is used for batteries. The other is the manufacture of handsets, which is centred in China, with India now a growing centre for handset manufacture. The handset itself has software embedded in it, or added to it. With smartphones, the cost of software often accounts for more of the value of a mobile phone than the hardware.

Then there is the provision of the mobile phone service, which includes the infrastructure, the software for phone operation and so on. The Capturing the Gains study of mobile telecoms decided to take up all of the above GPN segments: (1) raw material production, focusing on coltan from the Congo in Africa; (2) handset manufacture in China; (3) mobile software and IT services in India; (4) mobile phone end uses and their impacts in Africa and India; and (5) the treatment of mobile waste in India.

This Working Paper deals with mobile software. The two main points we deal with are: why were Indian IT majors not able to secure the major Indian telecom companies' out-sourcing of their entire IT services' requirements? And what was the Indian IT majors' response to declining margins brought about by substantial increases in salaries?

## **Mobile software**

There are two types of software requirement in mobile phones: the software product, in this case mainly the Operating System (OS), but also including middleware to integrate various systems on the platform, and applications, or apps; and IT services, including customized software. Software is the major component of 'smartphones'.

Taking the OS first, these were, until recently, linked with particular handset manufacturers. Thus, Nokia has its Symbian system, Apple its iOS, Blackberry its own OS. This began to change with Microsoft developing its Windows OS, which could be licensed by any mobile phone developer or manufacturer. But the situation really changed with the Google Android. This not only can be licensed, but also is an 'open architecture' system. With this, it is very easy for any mobile phone manufacturer to become a smartphone manufacturer.

In a sense, Google has done to the smartphone what IBM did to the PC. IBM revealed the PC's architecture, making it possible for any PC manufacturer to clone the IBM PC. This had two effects. First, it drove down the price of the PC, and second, it enabled PC use to spread, because of the cheapness of the desktop. With the standardization of components in terms of 'Intel inside' and Windows software, competition in the PC segment is based on price and not on product differentiation.

The Android could have a similar effect on the manufacture of smartphones. Just as with the PC, in the case of smartphones we may soon see a modularization of production with 'AMD inside' and 'Android' OS, or some such variants. The prices of these smartphones are already being driven down. While just a couple of years ago smartphones were an upper-end, niche product, now there are much cheaper phones (Samsung's Wave series, HTC, India's Maxx, China's ZTE and other

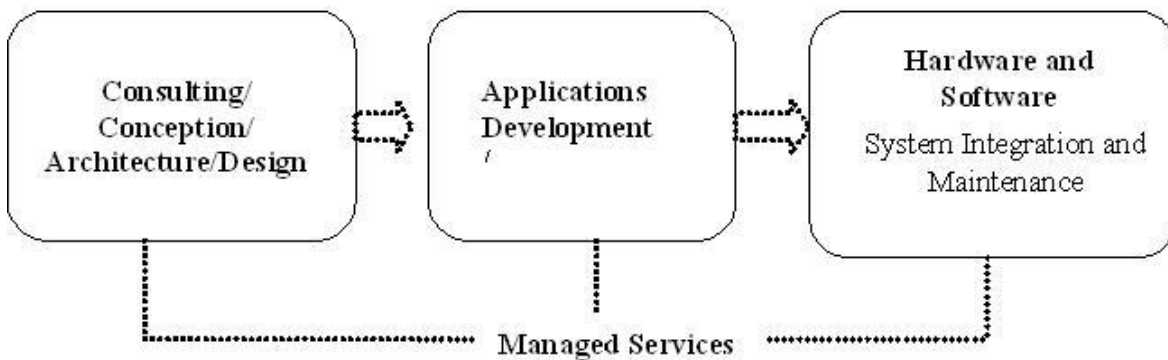
products), all of which are smartphones catering to the middle-to-lower end of the market. With more or less similar features, price and not product differentiation is beginning to drive the smartphone market at the middle to lower ends.

The second software requirement, rather a combination of software and hardware requirement, is for what are known as Managed Services. This is the management of applications onsite or remotely, managing networks, information systems and system infrastructure. These used to be largely managed in-house, with some parts, namely apps development, being out-sourced. But the picture has changed, post Airtel's out-sourcing its IT service requirement for IBM to provide as a Managed Service.

### IT services GPN

IT services production has its own production network, which does not vary with the type of client. Its production stages can be summarized as below:

**Figure 1: The software GPN**



The high-end of IT services production is that of consulting, conception and architecture and design. This is the beginning of the process. While the customer companies have a role in that they set the requirements, this first step in IT services is increasingly out-sourced. Once the IT service requirements have been set, there comes the task of programming and development of applications. This is where the Indian IT firms have excelled and captured a major portion of the world market. The hardware and software are then deployed and maintenance support is provided. In the Managed Services system, all of the IT service requirements are out-sourced to an IT company, which is expected to conceive, execute (including providing both hardware and software) and maintain the system, in order to provide the required IT services.

The above is a simple linear representation of the stages of IT service provision, and there are feedback loops from one segment to another. At each stage, for example programming or systems integration, problems may arise, which might require going back to the system's architecture. But there is an essential modularity to IT service provision, which is what makes it possible to out-source parts of IT service provision.

In the early period of out-sourcing, these IT services were managed by the customer companies themselves. But the in-house management of IT services, with only parts of it being out-sourced, has been changing in many industries, beginning with banking and insurance. The need to cut

costs during the current recession led Citibank and others to out-source the entire segment of IT requirements, in terms of Managed Services. In the telecom sector, Airtel pioneered the complete out-sourcing model, not only of all IT services it required, but even of other services, such as tower installation and network management.

When Airtel decided to out-source its entire IT services requirement, it gave the contract worth more than \$1 billion to IBM. Given the strong position of Indian IT majors in global out-sourced IT services, the question needs to be asked: why did one of the Indian majors not get this contract? To answer this question, it is necessary to look a little more into the role of Indian IT majors in different segments of the IT services production network.

### **Position of Indian IT majors and Airtel's out-sourcing**

The Indian IT majors (TCS, Infosys, Wipro, Cognizant,<sup>1</sup> HCL) are not in the IT products' segment. However, there are some small Indian companies in this segment, but mainly in the development of apps for what are known as Value Added Services (VAS).

Table 1 shows that Indian IT companies dominated in the Applications Development segment, and had a small presence in Managed Services in about 2007. They had captured almost 40 percent of the global market for Applications Development, but just 5 percent of the Managed Services segment. Lacking proven capability in the Managed Services segment, it is no surprise that the Indian IT majors did not get the end-to-end IT service contract from Airtel, or even later from Vodafone and IDEA, the three largest Indian telecom companies. All \$3 billion contracts went to IBM.

The Indian IT companies, in fact, were not even organized to take up Managed Services for an industry. They were not organized in 'industry verticals', but by different types of services (Programming, System Integration, Call Centres, etc.) irrespective of the industry concerned. Not being organized in verticals meant they neither consolidated the domain knowledge of specific industries nor would have been able to utilize hired domain specialists. Thus, given their lack of organization by industry verticals, they were not in a position to offer the 'end-to-end' service that was required.

IBM, on the other hand, as with Accenture, had been strong in providing both high-end consulting (conception, design and architecture of software services) and end-to-end Managed Services. In these Managed Services, it would often out-source parts or all of programming. But, probably because of the need to assure the quality of these Managed Services and also to stave off the threat from Indian majors developing capabilities to take up Managed Service provision, IBM and Accenture moved to lower-end activities from their strong positions in high-end consulting; they too adopted the Indian companies' Global Delivery Model (GDM). Business models, whether the Japanese just-in-time manufacturing system or the Indian GDM, cannot be patented and thus can easily be copied. As the business models are copied, the competitive advantage of the first-movers is wiped out.

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<sup>1</sup>Cognizant is a company quite in keeping with current globalization. It originated in and is registered in the US, with branches in India. The owner/promoter and CEO is a person of Indian origin (PIO, as now called in India). Most of its staff are in India. Like the other Indian majors, or for that matter, the US majors too, the largest share of its global staff are in India.

IBM developed in-house and also contracted lower-end capabilities, and that too in India. As a result, IBM was able to offer the end-to-end service Airtel required. This was something the Indian IT majors, not being organized in verticals or having the requisite domain knowledge, could not provide.

**Table 1: Global software and research and development (R&D) services spending by categories of work (2007) and India's market share**

|                                                                     | Global software services spending (\$ bn) | India's global market share, 2003 (%) | India's global market share, 2007 (%) | US wage rate (\$/hour) |
|---------------------------------------------------------------------|-------------------------------------------|---------------------------------------|---------------------------------------|------------------------|
| <i>Software applications</i>                                        |                                           |                                       |                                       |                        |
| 1. Consulting                                                       | 59.6                                      | <0.1                                  | 1.4                                   | 80-120                 |
| 2. Applications development                                         | 25.2                                      | 16.4                                  | 39.3                                  | 25                     |
| 3. System integration: hardware and software deployment and support | 119.3                                     | <0.1                                  | 1.3                                   | 18-25                  |
| 4. System integration: application, tools and OS                    | 84.9                                      | < 0.1                                 | 0.8                                   | 40                     |
| <i>IT education and training</i>                                    | 23.3                                      | 0                                     | 1.3                                   | 40                     |
| <i>Managed Services</i>                                             | 182.7                                     | 1.6                                   | 5.1                                   | 60-120                 |
| <i>RDES</i>                                                         | 802                                       | <0.1                                  | 0.8                                   | 40-120                 |
| Total                                                               | 1 297                                     |                                       |                                       |                        |

Source: Dossani (2010: 185)

1. Consulting – this is the highest level, and includes system conceptualization, architecture and design;
2. Applications development – generally applications programming. Indian companies do a great deal in this area;
3. Systems integration – hardware and software integration;
4. Systems integration – integration of products and custom software;
5. Managed Services – managing applications, networks, etc;
6. RDES (Research, Development and Engineering Services) – chip design, embedded software development, e.g. Wipro, Infosys.

But then the Indian majors too reorganized in industry verticals, Wipro before the others, subsequently securing telecom Managed Services contracts from the relatively smaller telecom companies, Airtel and Telenor. The other Indian majors, TCS and Infosys, have now also reorganized by industry verticals in order to be able to provide this Managed Service. TCS, a Tata company, provides Managed Services to Tata Docomo. But, as yet, it is difficult for the Indian companies to match IBM's combination of conceptualization and design capabilities, along with hardware, software, services and research.

**Table 2: Subscriber base of major Indian telecom operators, 31 December 2011**

|          | Subscriber base (millions) | Share (%) |
|----------|----------------------------|-----------|
| Airtel   | 178.97                     | 19.32     |
| Reliance | 151.34                     | 16.33     |
| Vodafone | 147.75                     | 15.95     |
| BSNL     | 119.72                     | 12.93     |
| IDEA     | 106.38                     | 11.48     |
| Tata     | 84.89                      | 9.16      |
| Airtel   | 61.64                      | 6.65      |
| Telenor  | 36.31                      | 3.92      |

Source: TRAI (2012: Table 1.4)

In addition to providing the Managed Service to the three largest telecom operators, Airtel, Vodafone and IDEA in India, IBM also provides this service to Airtel for its international operations, including in Africa. Wipro provides this service to the next two companies, Aircel and Telenor; TCS has made a beginning with Tata-Docomo.

Overall, the Indian mobile software market grew from \$5 billion in 2008/09 to \$5.2 billion in 2009/10 (Mishra 2010). This includes work done in India for mobile telecom companies in other parts of the world. Tech Mahindra has the largest share among Indian companies, with 20.1 percent, but it does not provide the full Managed Services package. TCS and Wipro have about 18 percent each. But the biggest share is that of IBM, with close to 40 percent. The relatively high shares of the Indian companies owe to their provision of customer solutions for telecom companies in developed countries.

*Voice and Data* magazine has recently calculated the size of the telecom software industry in India. The market size of telecom software is estimated to be Rs. 22, 242 crores (\$5 billion) in 2009/10 and it grew to Rs. 23, 537 crores (\$5.2 billion) in 2010/11. The largest Indian players in 2010/11 were Tech Mahindra (with 20.1 percent), TCS (18.9 percent) and Wipro (18.4 percent). These three companies grew largely by obtaining contracts from developed countries to provide customers core solutions for communication service providers.

Tech Mahindra, for instance, worked on Mobile Wallet and other telecom systems for BT, AT&T, MTN, Zain and Vodafone (Annual Report 2011/12). BT accounted for 40 percent of Tech Mahindra's telecom IT service work. Cognizant provided IT engineering services to various telecom equipment vendors and operators. TCS worked on developing the next-generation WiMax solutions for an unnamed US company. For a European major, TCS provided a platform for integrating 45 applications. For the Norwegian Telenor, it upgraded its IT system (Annual Report 2010/11).

The above data reinforce the point made above – that the Indian IT majors did various parts of IT work for telecom, and not the end-to-end Managed Service for the industry vertical. The challenge posed by IBM securing the major Indian telecom Managed Services contracts forced the Indian majors to develop Managed Services capacity.

Riding on serving the Indian Telecommunication companies, IBM has the highest IT service revenue in the Indian IT service space. Its portfolio of clients includes mobile operators like Bharti Airtel, Idea and Vodafone and insurance company Max of New York. It started with out-sourcing contract worth \$1 billion from Bharti Airtel in 2004, followed by an out-sourcing contract of \$800 million with Idea Cellular and a \$600 million contract with Vodafone in 2007.

The only other company that secured a larg- sized deal in Indian telecom space in past three years is Wipro, which got the \$600 million deals each with Aircel and Unitech Wireless (Mishra 2010). However, the combination of technology, services, hardware, software and research that IBM brings is difficult for the Indian IT service companies to match (HT Media, 14 May 2009). This can be seen from the new contract of \$1.5 billion that IBM has signed with Bharti Airtel for managing its IT requirement in 16 countries of Africa (Economic Times, 13 July 2011).

Telecom software work done in India has also extended to R&D. It is estimated that, of the global telecom R&D market of \$38 billion in 2009, one-fourth was out-sourced, of which one-third was in



India, making the Indian market for telecom R&D about \$3.1 billion in 2009 (Silicon India News, 13 May 2010; Knowledge Faber, May 2010).

Much of the R&D is done not by Indian firms but by captive units of leading international telecom firms. Alcatel-Lucent, Motorola, Nokia-Siemens, CISCO, Docomo, Samsung and Huawei all have important research centres in India. The Samsung India Software Operations worked on building both Galaxy and Wave smartphones and the BADA OS, which is being developed as Samsung's own OS.

Their Indian research would in one way or the other have fed into the lead firms' global research. But a lot of it was also not just bits and pieces, but whole areas that resulted in patents. Some 396 telecom-related patents are reported to have been developed out of India (Naresh Wadhwa of CISCO India, reported in Daily News and Analysis, 24 January 2012).

To sum up: the Indian IT majors were not able to capitalize on the rapidly growing Indian telecom service and the out-sourcing of Managed Services since they did not have the end-to-end capabilities. Rather, it was IBM that was able to utilize the advantage of its end-to-end capability. The Indian IT majors are now trying to catch up and have restructured their organizations on the basis of industry verticals.

### **Out-sourcing: beyond wage**

The usual analysis of out-sourcing is that it allows the lead firm to utilize the segmentation of the labour market and pay wages according to the market price for the task concerned. This segment can have an international dimension, in which case there would be a GPN.

But in the case of mobile software, another reason for out-sourcing can be identified in the case of the gains from specialization. This is Adam Smith's gain from the division of labour in an inter-firm sense. In the first place, the out-sourcing to IBM is unlikely to have involved wage arbitrage. Salaries of IT professionals would not be different whether they worked for Airtel or for IBM. These professionals are highly mobile, not only across companies but even across countries. Airtel must obviously have paid less to IBM than it would have cost for its setting up and maintaining its own IT service. So, where does the cost saving come from?

For Airtel to provide itself the service it would have had to procure the entire hardware and software required. There would have to be some capacity redundancy to take care of peak requirements and emergencies. But it is unlikely that the equipment would have been fully utilized, 24x7, and to full capacity. But if IBM invested in the hardware and software, it would be able to use it not just for one customer but over many customers. IBM provides the service not only to Airtel but also to Vodafone and IDEA, and possibly other international customers too. This would definitely result in a higher utilization rate of equipment and possibly staff too. Fixed costs are spread over a larger volume of business. This is the first element of more efficient use of resources leading to lower cost, an economy of scale.

There is yet another factor at work. IBM working on telecom would be able to develop an expertise in the area and in problem solving. In working for many customers, the expertise developed is likely to be more than of Airtel engineers working only for Airtel. Thus, there is also a benefit of specialization and the greater resulting knowledge.

The greater efficiency of resource use through higher capacity utilization and the greater knowledge of staff owing to specialization and working for multiple customers are then also factors in out-sourcing. Both economies of scale and specialization come into play.

## **Indian IT majors move to upgrade**

There has been an increase in salaries and earnings of employees within the IT sector, which of course affects also those in telecom services within the IT service companies. Average salaries in the IT sector rose by more than 80 percent over the decade 1999 to 2009 (Mehta, 2013). Along with this in the lower end of programming or applications development, the barriers to entry are quite low. Many mid-size firms, employing a few hundred workers, have sprung up. Their competition could itself reduce margins. But, given that the Indian IT majors have a brand value, which mid-size companies do not, the erosion of margins may owe not so much to competition from new entrants but to the rising salary costs.<sup>2</sup>

This erosion of margins in IT services can be summarized as follows: since 2003, when revenue per employee peaked, EBITDA<sup>3</sup> per employee declined by 8.3 percent for the Indian IT majors by 2011, for a -1.1 percent compound annual growth rate, while revenues per employee declined in the same period by 10.5 percent for a -1.4 percent compound annual growth rate (Morgan Stanley 2011). This decline in margins is a clear sign that some change was needed to improve the nature of growth. Continued horizontal growth would mean adding employee numbers but would not halt the fall in EBITDA or revenue per employee. Continuing in what were somewhat commoditized IT programming services could not change this trend.

Of course, cost reductions could reduce the effect of deterioration in revenues per employee. The Indian IT majors did carry out cost reductions, TCS more successfully than others. But that, as the Morgan Stanley report points out, would not improve the quality of growth. In terms of economic upgrading and downgrading, the strategy of cost cutting would be a strategy of downgrading, while that of moving to higher-paying segments of IT services would be a strategy of upgrading.

Reducing costs could always be copied and spread through the industry, recreating the problem after a while. Movements into higher-value services and products, where entry barriers are high (in the sense of requiring specialized, high-level knowledge, and the ability to conceptualize, both of which are rare capabilities) as in end-to-end consulting, or products that get IP protection, could both result in higher returns.

As pointed out earlier, the Indian IT majors were not organized in industry but by horizontal service segments. Over the past few years, they have all reorganized on an industry vertical basis. This would enable them to provide the end-to-end Managed Services that customers, such as the telecom companies, were demanding. Both Wipro and TCS have entered the market for providing Managed Services for telecom companies, Aircel and Telenor by the former and Tata Telecom by the latter.

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<sup>2</sup> The decline of margins in IT services has been frequently reported and commented on in the Indian press. The Economic Times, 19 February 2013, headlined, 'IT margins headed inexorably downwards, may fall below 20%' (Nandakumar and Prasad 2013). Analysts pointed out that wage inflation is likely to be the most important pressure point for Indian IT services companies.

<sup>3</sup> EBITDA is earnings before interest, taxes, depreciation and amortization. This measure is used to compare companies in countries with different tax and depreciation rates or amortization histories. Morgan Stanley (2011) uses it in analysis that compares the Indian IT majors with Accenture. It is not clear why IBM was not included in the comparison.

Infosys, on the other hand, has taken what might be the more difficult, but potentially highly lucrative, route of developing software products. It developed Flypp as a mobile platform and m-Connect as a mobile middleware. More recently it has come out with m-Wallet, which is now being used by Airtel in its mobile money transfer system. The well-established banking software, Finnacle, has been modified for mobile banking.

While the Indian majors were, in a sense, moving upstream to higher value-capturing segments, the US majors, IBM and Accenture, were moving downstream in order to set up the off-shore programming and call centre facilities in India. IBM had taken this step earlier than Accenture and, when the Indian telecom majors wanted end-to-end services, IBM was able to provide the full package. Accenture started on this shift a little later than IBM, but in the mid-2000s it too adopted the Global Delivery System (GDS).

The GDS was a process innovation of the Indian IT majors in which they combined on-shore with off-shore staff, and that too in more than one location, in order to reduce both the lead time and the cost of providing services. They could 'follow the sun' in working and thus reduce lead time. Off-shore facilities in India or other developing country locations used the international segmentation of the work force in the form of comparatively lower salaries for off-shore compared with on-shore staff.

The Indian IT GDS was a process innovation that definitely disrupted the market for software services. It not only allowed the Indian companies to grab a 40 percent share of the global applications development market (Dossani 2010: Table 1), but also forced the established international majors, such as IBM and Accenture, to adopt the same model.

Large customers, such as the major banks and insurance companies, were increasingly asking for Managed Services, not just high-end consulting, from IT service providers. In order not to have to out-source the middle- and lower-end services to Indian companies, the US majors had to develop their own middle- and lower-end capabilities.

In the same period that the Indian IT majors were restructuring on an industry vertical basis to be able to provide Managed Services, Accenture was increasing its off-shore presence. It increased its staff in India from 27,000 in 2005 to 124,000 in 2011 (Morgan Stanley 2011: 26). With India-based staff providing the lower-end services, Accenture also moved from high-end consulting to providing end-to-end services.

Thus, the Indian and US IT software service majors moved in opposite trajectories to converge and become more like each other. The result is that the gap between Accenture's EBITDA and that of the Indian majors has narrowed. This is most pronounced in the case of Infosys, where the gap with Accenture's EBITDA narrowed from a peak of 22 percent in 2006 to just 6 percent in 2011 (Morgan Stanley 2011).

One question arises: why could the US majors not remain content with carrying out high-end services and out-sourcing middle- to lower-end services to the Indian and other developing country firms? Why did they have to develop their own, captive middle- to lower-end, offshore units? IBM's Daksh, for instance, is the largest business process out-sourcing employer in India. Why were such captive off-shore units necessary?

In software service supply, as in other GPNs, there is an initial division of labour by tasks across countries and firms. The Indian IT companies inserted themselves into the lower end of the GPN. They started out by carrying out the apps development and programming after the system conceptualization, architecture and design had been carried out either by the clients themselves or by high-end consultants.

Although the Indian IT firms started at the lower end, they did not remain confined there. Working with customers and learning their requirements they also moved into Managed Services, although on a smaller scale. Some of the learning in providing Managed Services was through Indian contracts, for instance TCS for the National Stock Exchange. By 2007, Indian IT firms had built a meaningful, though small, 5 percent share of the global Managed Services market (Dossani 2010).

This developing Indian IT majors' capacity for Managed Services was surely perceived as a threat by the US majors. Since the major clients, and the Indian telecom operators too, demanded Managed Services, the US majors too moved to combine their former value-capturing strategy at the high end to providing an end-to-end service.

The Indian IT majors, on their side, faced a double problem. On the one hand, margins were shrinking with salaries rising. On the other hand, clients demanded not just programming but also Managed Services. So, they had to develop the requisite conception, architecture and design capabilities in order to stay in the market for large contracts. Infosys, in addition, has taken up the challenge of developing software products, which would, over time, deliver even more revenue than software services. The other Indian IT majors are also developing products, though probably their strategy is not as clear-cut in this matter as that of Infosys.

Indian companies made efforts to enter into the higher segment of consultancy and provide end-to-end service by (1) hiring entire teams of enterprise solution consultants on-shore, who had much better understanding of the realities in developed countries; and (2) acquiring independent consultancy firms (Char 2010). So, even when they started providing end-to-end products, they had lesser capabilities in the higher value-added services. On the other hand, leading multinationals, even though they moved to low-end services in that category, were not as efficient as their Indian counterparts.

A major difference between Indian companies and leading multinationals still remains. Indian companies even now undertake the whole spectrum of lower-level tasks in-house. As a result, they have increased their headcount manifold and they are reaching unmanageable positions of manpower management. In this regard, they could follow the example of leading multinationals of out-sourcing at least some part of the low-level activities.

### **Impact of out-sourcing on different segments of workers**

A key feature of the Indian market (as with other developing economy markets) is that a large proportion of the population has a low income. This leads to a potentially high-volume but low-price market. Competition and a benign government policy of giving bandwidth at a low price, probably supplemented by payments to some members of the government and officials, have allowed for a low price of calls. This low price, the lowest in the world, has been a big part of the reason for the rapid spread of mobile telephony, with a 2011 volume of 880 million mobile phones.

The low price and associated low 'average revenue per user' (ARPU)<sup>4</sup> drove Airtel, in almost big apparel and sportswear style, to out-source everything except marketing and sale of the service itself. A driver of the Airtel business model is the high-volume but low-margin market in India. Airtel did not begin operations with this business model, rather the business model was developed as the market grew but revenues did not grow anywhere near proportionately.

Out-sourcing of service provision, however, can have very different effects on the service suppliers, depending on the kind of service supplied. In a knowledge-intensive service, such as IT service, where there was already a tight market for trained professionals, workers in the out-sourced service had better salary conditions than comparable telecom workers. But where construction, a relatively lower-end task, is out-sourced, then the workers in the out-sourced segment would only get wages similar to other construction workers. The fact of working for an Airtel contractor would not make any difference to their wages. These construction workers would have no claim over any rents that Airtel might earn.

Airtel out-sourced the construction and maintenance of the telecom towers to Indus, which is jointly owned by Airtel, Vodafone, etc., and provides services to all of them. Indus, in turn, out-sources the task to contractors, at prices lower than what the telecom companies originally paid, e.g. Rs. 2,500 for the construction of a staircase as against Rs. 5,000 earlier.<sup>5</sup>

The workers who construct the towers are then employees of neither Airtel nor Indus, for that matter. They are employees of the contractor. They get paid an average of Rs. 3,000-4,000 per month (about \$60-80) with a few allowances for overtime. Minimal safety equipment is provided. The trained diploma engineers who are the supervisors get about Rs. 5,000-7,000 (\$100-140) per month. What this means is that these workers employed in constructing mobile phone towers are just like construction workers anywhere else.

This, of course, is the logic of out-sourcing – a task is paid for on the basis of its market price. Only where the supplier has a valuable and not easily available resource, such as IT companies and their knowledge workers, then some rent may be earned by these suppliers, and part of this rent may be passed on to the employees.

The mobile telecom sector finally produces one product, that is, a mobile phone service. In an integrated mobile telecom company, the various services or segments would be part of one firm. The IT professionals would carry out the IT tasks, call centre operators would provide customer service and so on. But the out-sourcing model separates various tasks and segments by firms. IT companies, such as IBM, Wipro or TCS, provide the required IT services, Ericsson-Siemens manages the towers, construction of which is carried out through contractors (*The Economist* 2009). There are independent retail shops, through which recharging of mobile phones can be carried on.

The sum of these workers, in a sense, is telecom workers. But these can be broken up into two key segments, those in IT and those in the rest of telecom work. We leave aside manufacturing of the handsets, which is covered under manufacturing. But even in providing the mobile phone and related services, there are two clear categories of workers, IT workers and the rest.

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<sup>4</sup>To the low price per call must be added the very smart Indian subscriber tactic of the 'missed call' as resulting in a low ARPU.

<sup>5</sup>The data in this section are based mainly on Damodaran (2013), which is a more detailed analysis of the Airtel out-sourcing model, which has now been adopted in India by all telecom companies.

In the Indian labour force surveys, carried out by the National Sample Survey Organization (NSSO), these two categories of workers can be distinguished, those in the IT and those in the telecom sector. It is instructive to look at the differences between workers and working conditions in these two sections to see how benefits of a single service are differentially distributed among workers who contribute to the production of one output.<sup>6</sup> All data refer to 2009/10.

In both IT and telecom, the proportion of regular workers is high (87 percent and 79 percent, respectively), with the rest being largely self-employed (12 percent and 19 percent). But it should be noted that in the Indian NSSO definition, regular does not mean permanent, or even with a contract. The proportion of permanent regular workers was 66 percent in IT and 63 percent in telecom. This also means that at least one-third of regular workers in IT are on a project basis, and not permanent employees. About 60 percent of workers in both these sectors do get social security benefits, varying from provident fund to health care, maternity benefits and gratuity.

The major difference between the IT and telecom work situation is in salaries. The average daily earnings (2004/05 prices) in IT increased by 60 percent between 1999/00 and 2009/10, while the increase was just 7 percent for telecom workers. While the average IT earning was almost double of that of all workers, in the case of telecom it was just about one-third higher. These average figures do not quite tell the story of ICT. In both IT and telecom, the distribution of workers is much more at the higher income levels than at lower income levels (Mehta 2013).

A survey of software employees in the telecom segment was commissioned by the Internet and Mobile Association of India (IAMAI) and conducted by MA FOI in 2009. It should be remembered that there would not be much difference between salaries of software staff in telecom and other IT sectors. There is some variation by industry verticals, but not much.

**Table 3: Annual compensation (starting salaries) to mobile software workers (in 2009)**

| Sl. No. | Functions              | Workers                                                         | Compensation (in Rs. '000) |                   |                    |        |
|---------|------------------------|-----------------------------------------------------------------|----------------------------|-------------------|--------------------|--------|
|         |                        |                                                                 | P10                        | Median            | P90                | P90/P1 |
| 1       | Design and development | Software engineers/<br>programmers/senior<br>software engineers | 215                        | 350               | 480                | 2.23   |
|         |                        |                                                                 | <i>\$4,300.00</i>          | <i>\$7,000.00</i> | <i>\$9,600.00</i>  |        |
| 2       | Design and development | Software developers/<br>engineers/programmers                   | 240                        | 339               | 920                | 3.83   |
|         |                        |                                                                 | <i>\$4,800.00</i>          | <i>\$6,780.00</i> | <i>\$18,400.00</i> |        |
| 3       | Technology             | Software developers/<br>engineers/programmers                   | 198                        | 300               | 572                | 2.89   |
|         |                        |                                                                 | <i>\$3,960.00</i>          | <i>\$6,000.00</i> | <i>\$11,440.00</i> |        |
| 4       | Network/security       | Network administrators/<br>system administrators                | 200                        | 400               | 605                | 3.03   |
|         |                        |                                                                 | <i>\$4,000.00</i>          | <i>\$8,000.00</i> | <i>\$12,100.00</i> |        |

Note: Figures in italics are in US dollar with \$1 = Rs. 50.

Source: IAMAI (2009)

2009 was a recession year, and many organizations experienced unprecedented staffing and compensation reductions. Workers' compensation constitutes a major portion of firms' costs, and they undertook various steps to reduce manpower cost in the form of salary/wage freeze, mandatory reductions in manpower and freeze on hiring.

In the IT industry, shortage of competent IT professionals has increased the cost of delivery of services. In this industry, to remain competitive, people are of paramount importance. The turnover rate of technology workers is high, and there is a constant threat of losing high-quality human

<sup>6</sup>This is dealt with in more detail in Mehta (2013).

resources. On the other hand, for a large section of competitive workers, the monetary compensation has become the single most important requirement.

In Table 3, we present the average earnings and earning distribution of various categories of software technology workers in the telecom segment. This survey throws up inequality in earnings across different types of technology workers. The median annual starting salary of design and development and design and integration is around Rs. 350,000 (\$7,000). The salary of a software developer/engineer is the lowest at \$6,780 and that of the network/system division is highest at \$8,000. However, the ratio of P90/P10 salary of design and development is lowest at 2.23. For other divisions, it is far higher and it ranges from 2.89 to 3.83.

In other parameters of working conditions, there is no substantial variation. All firms report working eight to nine hours per day, with Sunday and alternative Saturdays as off-days. Except for a small section of workers, the rest work in single shifts. Around 45 percent of firms report annual leave of 20-24 days and an equal proportion of firms report annual leave of 18 days or fewer. The entitlement of sick leave varies between six and fifteen days and that of casual leave between six and twelve days. Most of the organizations surveyed provide 10-12 days of holidays. Non-managerial staff report only hospitalization insurance, with no benefit of company-provided housing, transport and telephone bills. Median retirement age is 59 years and three-fourths of the firms provide provident fund and gratuity benefits.

Most of the firms follow a probation period of three to six months and over two-thirds report an annual salary review. The most important factor determining the quantum of salary increase is the volume of business undertaken.

The survey shows that software firms pay comparatively well by Indian standards, but job security is weak. The number of days of paid holidays is also comparatively low.

In the context of social upgrading of software workers, it can be concluded that:

1. The telecom software sector, as with other software sectors, for the most part provides well-paid jobs compared with other jobs available in India. This sector being knowledge intensive, the average starting annual salary of software professionals is around \$7,000. In the past decade, nominal salaries have experienced double-digit annual growth. However, in 2009 the sector faced extensive job cuts and a virtual freeze in nominal salary.
2. In terms of other parameters like job security, working with constant deadlines, annual leave with pay, freedom of association etc., the sector fares badly against comparable jobs in other sectors.

The main point is that there is a clear difference between earnings of telecom IT workers and direct telecom employees. The former do not work only in telecom IT services, but there may be little difference between earnings in different industry verticals in IT companies. In addition, they also earn more than those with comparative qualifications employed in other sectors (Sarkar and Mehta 2010).<sup>7</sup> Thus, we can put forward the hypothesis that IT workers obtain not just an efficiency wage (which would pay for itself through productivity increases) but also a share of rents earned by their

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<sup>7</sup> Although in terms of other parameters of decent work such as job security, working under pressure and with constant deadlines, paid annual leave and freedom of association they fare badly with comparable employees in other sectors (Sarkar and Mehta 2010).

firms. For example, Infosys gives its employees stock options, which would mean a share of dividends. No other IT firm provides this. But since it has to retain staff, it would also have to pay something similar, possibly as performance- or profit-related bonuses. This issue is worth further exploration. Studies of the US have shown that firms that earn rents or excess profits (compared with the industry norm) do share a portion of it with workers, with the ratio of shared profits given to workers ranging from 0.1 to as much as 0.7 (Borjas 2010 and references therein). How much of their rents do Apple, Facebook and Google share with their employees? A study in various locations would help identify firms that are earning profits in excess of the industry norm.

### **Conclusion: reversing the link between economic and social upgrading**

Social upgrading in the form of increases in employee remuneration has introduced a new dynamic into the telecom and other IT services market. With salaries going up, margins have come down. In addition to this, there has been increased competition among suppliers, with many new entrants at the low end. Consequently, wage cost as a share of total revenue has gone up, and margins have gone down. Revenue per employee has also fallen, showing a deterioration in the quality of growth.

This social upgrading is now pushing Indian IT firms to move up the value chain, that is, to attempt economic upgrading to maintain or increase their margins and increase revenue per employee. They now have to undertake economic upgrading, to compete with the likes of IBM and Accenture, in high-end consulting and provision of fully Managed Services for telecom service providers, in order to maintain their margins or retain market share.

In Capturing the Gains case studies, for instance of garments in Bangladesh, we observe first an economic upgrading by firms, followed, with a lag, by social upgrading of workers' condition. In the IT services sector, however, we see a reversal of this dynamic. Social upgrading of workers owing to increased demand and reduced margins have forced IT service firms to move from their middle-to low-end service to higher-end provision, including end-to-end or Managed Services and software products.



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