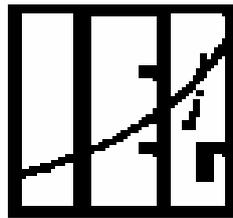


IT and ITES as an Engine of Growth: An Exploration into the Indian Experience

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IT and ITES as an Engine of Growth: An Exploration into the Indian Experience

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India emerged as one of the fastest growing economies of the world during the 1990s because of the spectacular dynamism shown by the services sector. India's services sector has been burgeoning fast and one of the major driver's of the growth of services sector is information technology (IT) and information technology enabled services (ITES). It is well documented in literature that IT impacts growth by different channels. In this study we try to empirically verify the question: Can IT and ITES be an engine of growth? Using micro-level data of 100 households of 20 IT and ITES firms along with secondary data we tried to estimate the extent of indirect employment generation at macro level and the share of IT and ITES in total employment and total value added. According to our study, one job for skilled professional employed in IT and ITES spins off jobs for 0.48 semi-skilled, low skills or unskilled workers. As per our estimates, the 16 lakh workers who are expected to be directly employed in IT sector in the FY 2008 would generate secondary employment for 7,68,000 people which would constitute 0.16 % of total employment. However, the share of consumption expenditure of 16 lakh professionals would be 20% of total value added. Assuming the consumption expenditure of the IT and ITES workers and total value added to be the same/constant when we tried to assess the contribution of consumption expenditure of 2.3 million workers (who are projected to be directly absorbed by IT sector by 2010, NASSCOM, 2005) to total value added it comes out to be 29% of total value added. The study says that the proportion of IT-ITES in total employment may be small but its contribution to total value added is still very high. Indeed IT and ITES can be an engine of growth in India's economy by way of generating demand impulses in the economy as has been hypothesized and shown through the present study. Keeping in view the contributions of this sector and its huge untapped potential as evident from the present study and various other studies, there is a need for introduction and implementation of policy initiatives to address the challenges faced by this sector and to sustain the growth driven by the services sector.

JEL Codes: L8. L80. L86.

Key words: fastest growing economies, spectacular dynamism, the services sector, burgeoning fast, major driver's of the growth, IT and ITES engine of growth, employment generation.

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I. Introduction

India emerged as one of the fastest growing economies of the world during the 1990s mainly because of the remarkable performance of the services sector. India's services sector has shown highly impressive growth being driven primarily by the Information Technology (IT) and IT enabled services (ITES). India became tenth largest exporter of services (Prasad, 2007) in the world in the year 2007. As per the Global Services Location Index 2007, India has emerged as a top destination for off shoring. "The country continues to be the 'nerve-centre' for global sourcing with over 2/3rd of the Fortune 500 and a majority of the Global 2000 firms leveraging global service delivery-now sourcing from India" (NASSCOM, 2008). Not only this, the WNS '2008 Global Outsourcing 100' survey reveals that twenty Indian companies are among the world's top hundred in outsourcing (*The Hindustan Times*, May 3, 08).

Though the impact of IT sometimes fails to be visible, "the country's IT industry reflects in every way possible the vibrancy of India shining." (Natrajan, 2004 p.14). Indian IT companies rode high on the growth wave as is reflected by the fact that four Indian companies joined the billion dollar club viz. TCS, (July 2003) and Infosys, Wipro and Bharati Televenture (telecom player) in April 2004. TCS was the first company to touch \$ 1 billion in yearly revenue, and subsequently it became the first to touch \$ 1 billion in one quarter in 2007 (De, 2007). That India has been on the global companies' radar for quite some time gets further reflected in the fact that more than fifteen CEOs of leading IT and Telecom companies visited India in less than five months in 2007(Prasad, 2007).

The IT industry is growing at a rapid pace. The direct impact of the IT industry on development is tremendous and its potential is huge. The share of IT and ITES in GDP increased from 1.2 % 1997-98 to 5.5% of GDP in the financial year (FY) 2008. Exports increased from \$4.8 billion in 1997-98 to \$ 64 billion in FY 2008. Not only this, this sector is expected to directly employ 1.6 million professionals in FY 2008. In addition to direct employment, this sector is expected to generate huge indirect employment also. As per NASSCOM (2005) estimates, 2.3 million direct and 6.5 million indirect jobs will be created by this sector by 2010. Given the rate at which this sector has been growing, the Indian IT industry is definitely gearing up to scale new heights.

The spectacular performance of IT and ITES segment of the services sector along with its huge untapped potential motivated us to empirically verify whether IT and ITES could be an engine of growth? To answer this question we begin by providing a brief overview of the literature on linkages between IT and economic development in Section II. Section III presents the performance of the services sector in India. Section IV provides the IT landscape in India. In Section V the research question is raised. Section VI discusses sources of data, methodology and the empirical results have been reported in Section VII. Section VIII gives conclusions and policy implications.

II. Information Technology (IT) and Economic Development

Identifying the drivers of economic growth ranks among the most important issues that economists have focused on. The role of technological progress in general in driving growth has been highlighted in a number of studies (Solow, 1956, Romer, 1986, Grossman and Helpman, 1994). The role of information and communication technology (ICT) in pushing up economic growth has become more perceptible from the mid-80s and 1990s onwards.

Jorgenson and Stiroh (1999) in their article focused on IT and growth. They say that “... The story of computer revolution is one of relatively swift price declines, huge investment in IT equipment, and rapid substitution of this equipment for other inputs.” Subsequently, Stiroh (2002), points towards the strong relationship between IT and improvement in economic performance. There is sufficient empirical evidence to suggest that there exists a linkage between ICT and output growth (Zhen-Wei Qiang, 2004) and that returns on IT systems, equipment and labour investments are substantial (Lichtenberg, 1995).

Several studies in Pohjola (2001) have found significant returns on ICT investments in developing as well as developed countries. The partial survey of literature carried out in Bedi (1999) shows that the benefits of ICT adoption are many ranging from employment to productivity gains, consumer surplus and improvement in product quality. Joseph (2002) points towards the potential of ICT to make governments efficient, more inclined to share information, more transparent and more accountable. Lal (2006) notes that ICTs cut across types of activities. They can be applied in a wide variety of fields such as agriculture, health, education and training, manufacturing, services, transport, business, and

environmental management. Lal (2007) collecting evidence from the five developing countries of Malaysia, India, Nigeria, Jamaica and Costa Rica suggests the crucial role ICTs can play in the era of globalization. Though there are studies (Mitra, 1999; and Mitra et al., 2002) which highlight the contribution of social, financial and physical infrastructure to total factor productivity(TFP) growth across countries yet there are certain other studies (Oyelaran-Oyeyinka and Lal, 2006; Lal, 2007) which emphasize recognition of the role of technological infrastructure comprising of telecommunications, computing and connectivity infrastructure to growth.

Roller and Waverman (2001) taking a sample of twenty one OECD countries over a twenty-year period examined the relationship between telecommunications infrastructure investments and economic performance. They found a causal relationship between telecommunication infrastructure and aggregate output after accounting for simultaneity and country-specific fixed effects.

There are micro economic studies by Brynjolfsson and Hitt (2000) which explored a large economic impact from IT use. Stiroh (2002) attributed productivity revival in the US in the late 1990s to the production and use of IT. The study reveals that the larger productivity gains after 1995 were registered by those industries that made the largest investments in computer hardware, software and telecommunication equipments in the 1980s and early 1990s. Singh (2003) by extending the Weitzman's Model (1998) of recombinant growth addresses the growth impacts of IT.

There are several channels through which IT can impact growth (Srinivasan, 2005). It could be through reduction of transaction cost through the use of information technology (Singh, 2004) and consequent efficient use of resources or it could be through productivity gains (Jorgenson and Stiroh, 1999; Stiroh, 2002) or speedy delivery of services. The efficiency of resource use would be seen both sectorally, but even more importantly, inter-sectorally, as gainful transactions (market and non-market) which were previously unavailable became available. For example, improvement in market price information leads to higher revenues generation in some parts of rural India. IT -based delivery of education at all levels is another area with positive level and growth (e.g., e -chopals and Tara haat as cited by Singh, 2002). An extensive and effective use of IT in public administration would make it really SMART (simple, monitored, accountable, responsive and transparent). ICT

seems to be improving accountability and transparency in the government and allowing greater access of services to the poor (D'Costa, 2003). An extensive and imaginative use of Information and Communication Technologies (ICTs) in the day-to-day management of urban local bodies in India with a view to increase their effectiveness and efficiency of their operations, e.g. Bhumi for land records in Karnataka, E-Seva or common service centres in Andhra Pradesh, STAR in Tamil Nadu and Sarita in Maharashtra for property registration is well known and well recognized today.

A UNDP study (2004), tries to explore the development effect of ICT through three channels namely,

- i) ICT as a sector of economic activity;
- ii) ICT as an enabler of input for enhancing human productivity; and
- iii) ICT directly influencing human development through access to information, knowledge, and enlarging choices.

Most of the studies discussed above are in the context of developed countries. But the spectacular success of the IT industry in India has stimulated interest among academicians on the potential role that IT can play in India's economic development (Adeya, 2002; Arora and Athreye, 2002; Bhatnagar and Schware, 2000; Chandrasekhar, 2003; Kapur, 2002; Kumar, 2001a; Richter and Parthasarathi, 2003; and Tessler et al., 2003; Thatchenkery and Stough, 2005; and Saith and Vijayabaskar, 2005). Some are of the opinion that the Indian case study could serve as a useful model for other developing countries (Tschang, 2001). Some other studies (Miller, 2001), using India as an example attempt to evaluate the potential benefits that the internet and more broadly, the IT industry promises to bring to developing countries.

Technological advancements are transforming services. Almost all the services, whether those provided by banking or the health system, telephone and telecommunication networks or distribution and retailing firms all these benefits from economies of scale. Besides, ICT is narrowing down the differences between services and other economic activities. In fact services have taken on the characteristics of commodities. Thus, for example, copies of movies and other performances can be recorded and mass produced for future consumption like manufactured goods. There has been a lot of debate on the desirability of a growth of services (Joshi, 2008). According to Adam Smith, services

because of their intangible and, therefore, non-durable nature were ‘barren and unproductive because they perish generally in the very instant of their performance and don’t fix or realize themselves in any vendible commodity’¹ Services are thought of as incapable of generating any growth of their own and are regarded as dependent on the growth of other sectors, particularly manufacturing (Browne, 1987). However, the whole scenario has changed now. Services have become a major driver of economic growth in many economies. “Rather than services following and supporting manufacturing, manufacturing is seen as flowing to those countries and areas where the services infrastructure is efficient and well developed”(OECD, 2000). There are country-specific studies (Banga and Goldar, 2007) which show that the contribution of service input to output and productivity growth in manufacturing (organized) has increased substantially in the 1990s in the case of India. Further, many non-tradable services have become tradable now due to ICT. Thus, ICT by enhancing the tradability of services is becoming a vehicle for growth.

Some opine that since the resource requirements in ICT are different from those needed by the traditional sectors, this will provide an opportunity to developing countries to skip certain stages of industrialization (popularly known as ‘leapfrogging’) and enable them to catch up with industrially-advanced nations (Perez and Soete, 1988). The less developed countries (LDCs) can directly enter in to the stage of development known as the ‘new economy’.

There are authors who suggest that “developing countries can leverage the global revolution in ICT in two distinct ways (Wong, 1998) namely, one as a producer or supplier of ICT goods and services to meet the rapidly growing world market demands for such goods and services; and two, as a user of ICT goods and services to improve the productivity and competitiveness of key sectors of their economy.

Wong (2001) explains how ICT production can contribute towards increasing the overall economic growth of a country: First, as the global demand for ICT goods has been expanding faster than for most other goods, a country may be able to expand ICT production faster than the average rate of growth of most other economic sectors, especially through production for export. Thus, ICT production can serve as an engine for growth by its direct contribution to GDP and job creation as well as through indirect multiplier impacts, for

¹ D.W. Cowell (1984). *The Marketing of Services*, London: Heinemann.

example, stimulating the development of upstream industries (R &D and product design, precision engineering, metal stamping, etc.) and downstream services (for example, logistics and transportation services). Second, there might be an increase in the level and growth of labour productivity in the country because of an expansion in the share of ICT manufacturing in the overall economic output.

Kaldor (1966, 1967, and 1968) regarded manufacturing as an engine of growth. However, technological changes have brought in their wake a wide array of unconventional services like IT and ITES, etc. which enabled the shift from an era of industrial society to a knowledge society. In more recent years, economists have started speculating whether services could be an engine of growth? (Dasgupta and Singh, 2005; Joshi, 2007; Goldar and Mitra, 2008).

ICT is the driving force of globalization in India. The Indian ITES-BPO industry is a high potential and high growth segment within the country's ICT industry accounting for around 60% of ICT revenues in 2004-05. As can be observed, business practices, theories and work timings have undergone drastic changes in industry due to ICT-driven globalization. The emergence of new technology is gradually resulting into a removal of geographical barriers, accessibility of data with the click of a key and the availability of information at low cost due to death of distance (mediated by internet services). The globe is becoming like a family and the work pattern and work culture are undergoing rapid change. These days the two buzz words for the firms are: business development and customer care. For business development, the ITES-BPO segment provides a major opportunity to firms. In addition to focusing on outsourcing, Indian businesses are focusing on deploying IT for scalability and growth in a fundamentally different way than has been done in the West for efficiency. IT is being applied in core business operations rather than as a support service and there has been an emergence of heavy verticals in IT. "Business transformation through IT was a phrase invented by large IT companies to impress Fortune 500 clients. But if there is business transformation that is truly happening through IT, then it is not the Fortune 500 but rather in selected areas of Indian industry that this is occurring with a realization that the entire business can be reinvented using IT". For example, in media, engineering, telecom, banking, retail, online businesses etc. IT is being deployed for changing the way business is done, for better customer experience and for increasing efficiency. A judicious mix of

outsourcing and in-house deployment will enable Indian IT to grow fast and grow well (Das, 2008).

Having explained the linkages between IT and growth and development, let us briefly examine the growth performance of the services sector vis-à-vis the primary and secondary sectors of Indian economy and the role played by the services sector in general and IT and ITES in particular in the post -1990 period in India's economy.

III. Spectacular Dynamism of the Services Sector

One of the commendable achievements of the Indian Economy post the economic crisis of the 1990s is the spectacular dynamism shown by its services sector which has emerged not only as a major contributor to GDP but also a promising source of tax and export revenue. Besides, its contribution to employment and foreign exchange too has increased. This section provides a brief overview of the growth implications of the service sector on different macro-economic parameters.

III. a Services: An Important Contributor to Growth

India emerged as one of the fastest growing economies of the world during the 1990s because of the remarkable performance of the services sector. An analysis of the structure of production and employment for the period 1950-2000 reveals that during the process of economic development, as it has been observed across various countries by Kuznets (1966), there has taken place a growing 'tertiarization' of the structure of production and employment in India. During the process of growth over the years 1950-51 to 1999-2000, the Indian economy has experienced a change in production structure with a shift away from agriculture towards industry and the tertiary sector. The share of the agricultural sector in real GDP at 1993-94 prices declined from 55.53% in the 1950s to 28.66 % in the 1990s. The share of industry and services increased from 16% to 27.12% and 28.09% to 44.22% respectively during the same period. During the 1950s it was the primary sector which was the dominant sector of the economy and accounted for the largest share in GDP. But the whole scenario changed subsequently, and especially in the 1980s. The service sector output increased at a rate of 6.63% per annum in the period 1980-81 to 1989-90 (i.e. pre-reform period) compared with 7.71% per annum in the period 1990-91 to 1999-2000 (i.e. post-

reform period). During the period 1999-2000 to 2004-05, the growth rate of output was 5.79% per annum .The tertiary sector emerged as the major sector of the economy both in terms of growth rate as well as in its share in GDP in 1990s. It is to be noted here that while the agriculture and manufacturing sectors have experienced phases of deceleration, stagnation and growth, the tertiary sector has shown a uniform growth trend during the period 1950-51 to 1999-2000 (Joshi, 2004). In fact the recent years' experience shows that "the growth of services sector has imparted resilience to the economy, particularly in times of adverse agricultural shocks as also during cyclical downturns in industry" (RBI, 2000-01, p. III-38).

With an 11.1% growth, the momentum has been maintained by this sector in 2006-07 during which period the share of this sector in GDP further increased to 55.1% .Further, it accounted for 68.6% of the overall average growth in GDP in the last five years between 2002-03 and 2006-07(Government of India, 2007). This sector is estimated to have the potential for creating 40 million jobs and generating \$ 200 billion annual income by 2020 as per *An Approach to 11th Five-Year Plan*. There are several reasons cited for the growth of tertiary sector in the decade of 1990s varying from for example: the operation of the Engel' law of consumption to growth of producer, consumer, government services to technological advancement, liberalization, demonstration effect to increasing urbanization to splintering of services (Joshi, 2006a). There are studies (Joshi, 2007a) which point out that the main sources of services growth in addition to increase in income increasing urbanization, growing middle class and increasing working age population (15-24 age group) are a wide array of unconventional services though the role of some of the conventional services can not be underestimated .

World Bank in its study (2004) attributed the rapid growth of this sector to enabling access to external markets and domestic reforms. High income elasticity of demand for services, cost-reducing and variety enhancing technological advances, changes in the method of organizing production favouring an increased outsourcing are the contributors to the dynamism of this sector (World Bank, 2004).

III b. Service Tax: A Promising Source of Tax Revenue

The Services have become a promising source of revenue as a hundred services were under the tax net in 2007-08(Budget Estimates) as against three in 1994-95. The service tax revenue is estimated to have increased to Rs 50,200 crores in 2007-08 from Rs. 407 crores in 1994-95. The faster growth of services has thus been directly as well as indirectly contributing to the growth of the economy (Government of India, 2008, pp.38-39). Indeed “India is shining” because of the commendable performance of the services sector.

III c. Services: As Export Revenue Generator

It is important to mention here that the New Development Strategy (NDS) has offered unprecedented opportunities by ‘death of distance’ (internet services) which in turn has provided a fillip to services sector growth. Services have emerged as an important source of export revenue over the period 1990-2005. This can be judged from the fact that commercial services exports have registered an increase from \$ 4.6 billion in 1990, and \$17.67 billion in 2000 to \$ 56.1 billion in 2005; an increase of over 1119.6 % in the past 15 years. India’s share in total world services exports has increased overtime from 0.56% in 1990, and 1.23% in 2000 to 2.28% in 2005.

The structure of services exports reveals that the share of travel and transport exports in commercial services exports (CSE) has declined whereas that of insurance and financial services and computer, information, communications, and other commercial services registered an increase over the 1990-2005 period. It is this other services segment of CSE, comprising of insurance and financial services and computer, information, communications, and other commercial services, which accounts for 70% of India’s exports of services (Joshi, forthcoming).

III d. Services: As an Instrument of Employment Generation

The sectoral distribution of the workforce in India during the period 1983 to 2004-05 reveals that the structural changes in terms of employment have been slow in India as the primary sector continued to absorb 56.67% of the total workforce even in 2004-05, followed by the tertiary and industrial sectors (24.62% and 18.70%), respectively. There has been disproportionate growth of the tertiary sector, as its share in employment has been far less

when compared to its contribution to GDP. Within the services sector, the shares of trade hotels and restaurants in the total workforce increased from 9.4 % to 10.8%. Transport, storage, and communication rose from 3.7% to 4.02% while finance, insurance, real estate and business services increased from 1.27% to 1.68%. The rising shares of the three segments of services in employment may be due to a booming organised retail business in India , booming tourism services, growing dependency of manufacturing over producer services and the policy environment created by the government to boost the growth of the services sector (Joshi 2007a, 2007b). There is minor decline in the share of community, social and personal services from 8.34% to 8.13% during the above -referred period. It is important to point out that, within the services sector employment, the growth rate is highest in finance, insurance, and business services, followed by trade, hotels and restaurants and transport, etc. The community social and personal services occupy the last rank in growth rates of employment (Mitra, 2008).

Further, Table 1 shows a sharp drop in the labour absorptive capacity of growth in the economy (employment elasticity of growth) from 0.40 to 0.15 during the post -reform period (1993-94 to 1999-2000) initially, reflecting the phenomenon of jobless growth. However, during the 1999-2000 to 2004-05 period, the employment elasticity of growth registered an increase from 0.15 to 0.51. With the exception of one sub-sector of the tertiary sector i.e. transport, storage, communication all other sub-sectors exhibited an increasing trend in employment elasticities and thereby the overall elasticity of employment increased from 0.15 to 0.51. The employment elasticity was highest in the case of finance, insurance and real estate services and business services (1.34) followed by agriculture and allied activities (1.04), construction (0.99), trade, hotels, restaurants (0.76) and community, social and personal services (0.46).

Table 1
Rate of Growth of GDP and Employment, and Employment Elasticity

Activity	Rate of Growth of GDP			Rate of Growth of Employment			Employment Elasticity		
	1983 to 1993-94	1993-94 to 1999-2000	1999-2000 to 2004-05	1983 to 1993/94	1993/94 to 1999/2000	1999/2000 to 2004/05	1983 to 1993-94	1993-94 to 1999-2000	1999-2000 to 2004-05
Agriculture and Allied Activities	2.82	2.84	1.82	1.38	-0.15	1.892	0.49	-0.05	1.04
Mining and Quarrying	6.02	5.09	4.69	4.16	-2.85	2.857	0.69	-0.56	0.61
Manufacturing	5.79	7.08	6.24	2.14	2.05	3.157	0.37	0.29	0.51
Electricity, Gas etc.	8.07	6.71	3.43	4.5	-0.88	-0.544	0.56	-0.13	-0.16
Construction	4.76	6.16	7.88	5.32	7.09	7.836	1.12	1.15	0.99
Trade, hotel etc.	5.43	8.77	7.59	3.57	5.04	5.734	0.66	0.57	0.76
Transport etc.	5.91	8.97	11.89	3.24	6.04	4.629	0.55	0.67	0.39
Financial and Business Services	9.63	8.03	6.40	7.18	6.20	8.594	0.75	0.77	1.34
Community, Social and Personal Services	5.17	8.22	5.25	2.90	0.55	2.426	0.56	0.07	0.46
Total	5.05	6.42	5.79	2.04	0.98	2.964	0.40	0.15	0.51

Note: Sectoral and aggregate GDP are point-to-point estimates (exponential) at 1993-94 prices for the period from 1983 to 1993-94 and from 1993-94 to 1999-2000 and at 1999-2000 prices for the period from 1999-2000 to 2004-05. Employment elasticity is defined as the ratio of the rate of growth of employment to the rate of growth of GDP. The employment shares are reported below to gauge the relative importance of changes in employment elasticities over time.

Source: Reproduced from Mitra, Arup (2008), "Tertiary Sector Growth: Issues and Facts", *Artha Beekshan*, 16(4), March, p.56.

It is our hunch that in the current scenario, when agriculture and industrial sectors are not able to generate adequate employment opportunities, it is the tertiary sector which can prove to be instrumental in employment generation (Joshi, 2004).

Having examined the direct development impact of services on macro-economic parameters, we will focus now on the star performance of the services sector i. e. IT and ITES.

IV. IT landscape in India

In the present section, we have provided an overview of the contribution of the IT-sector in India's economy. Before we take up the composition of the IT market first as has been given by NASSCOM and will proceed to discuss the contribution of this segment of the service sector to economy.

IV.a Composition of IT Market in India

Coming now to the composition of the IT market in India, there are two components of the Indian IT market: domestic IT market and IT exports. As is evident from Fig.1, the IT-ITES industry has been divided into three segments, viz.IT services and software, ITES-BPO and hardware.

Globally, the non-IT outsourcing segment is referred to as BPO (Business Process Outsourcing). In India, this segment is referred to as ITES (NASSCOM, 2005b). ITES refers to those outsourcing services, which are processed and delivered with the use of information technology. BPOs comprise of diverse activities such as human resource, accounting, financial research, marketing, sales, legal work, logistics and so on.

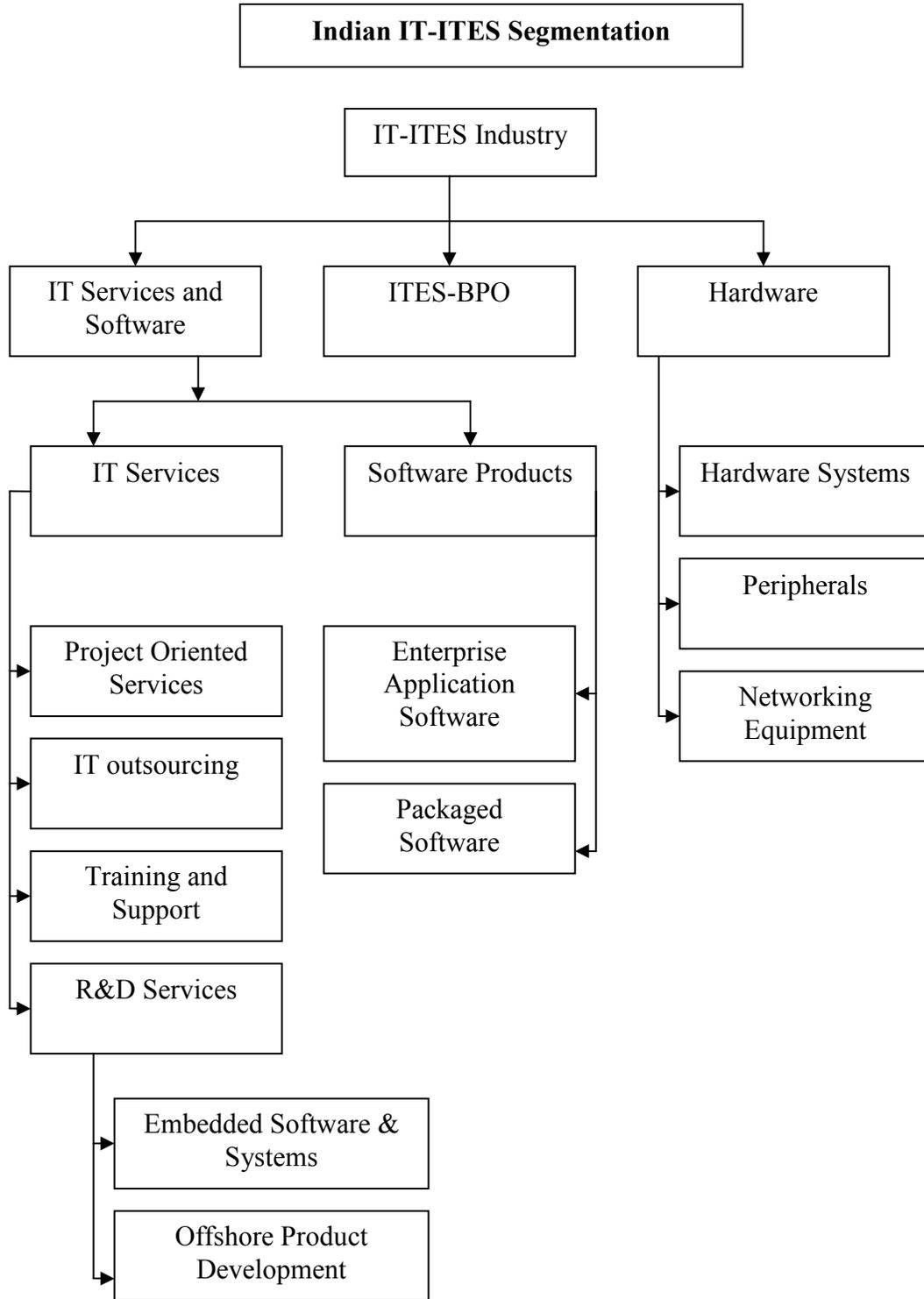


Figure 1: Indian IT-ITES Segmentation.

Source: NASSCOM (2005b), *Strategic Review*.

IV b Contribution of IT in Rapid Growth of Indian Economy

IT industry is an outstanding performer of the Indian economy. According to Karnik “India’s sustained leadership over other competing offshore destination is driven by strong fundamentals comprising a large and growing pool of qualified , English speaking manpower; keen focus on defining and adhering to global quality standards, the demonstrated emphasis on information security practices, the improving quality of telecommunication infrastructure with its cost approaching globally competitive levels and strong government support-focus on improving basic infrastructure and developing policies and an effective regulatory regime that favour the growth of industry” (2005) are factors in its success. Strong demand over the past few years has placed India amongst the fastest growing IT markets in the Asia-Pacific region. The Indian software and IT industry has registered a CAGR of 28% during the last five years (Eleventh –Five Plan).

The following sub-section shows the contribution of IT industry to GDP, to revenue generation, the generation of foreign exchange and that of employment.

IV .b (i) IT and GDP:

During the decade of 1990s, the rise of IT industry in India was a remarkable achievement of the Indian Economy.

Table 2 shows the growth of the Indian IT industry from FY 1997-98 to 2008. As is evident from the table, the IT industry in India accounted for a marginal share of India’s GDP in the FY1997-98, but it has been rising very fast. The share of IT industry was just 1.2 per cent of GDP in 1997-98. It is expected to increase to 5.5% of GDP in the FY 2008. The NASSCOM –Mckinsey Report (1999) projected that by 2008, this sector would contribute a 7.7% share to GDP. NASSCOM (2005a, p.80) says “The IT and BPO industries can become major growth engines for India, as oil is for Saudi Arabia and electronics and engineering are for Taiwan. Saudi Arabia’s oil exports accounted for 46% of GDP in 2004; Taiwan’s electronics and engineering exports accounted for 17% of GDP in the same year. India’s IT and BPO industries could account for 10-12% of India’s GDP by 2015”.

Table 2

Growth of Indian IT Industry# and Its Share in National GDP (FY 1997-2006E)

Year	Growth of Indian IT Industry (in US \$ billion)	Share in National GDP (per cent)
1997-98	4.8	1.2
1998-99	6.0	1.5
1999-00	8.2	1.9
2000-01	12.1	2.7
2001-02	13.4	2.9
2002-03	16.1	3.2
2003-04	21.6	3.5
2004-05	28.4	4.1
2005-06E	36.3	4.8
FY 2007E*	47.8	5.4
FY 2008E**	64	5.5

Notes: # IT industry includes hardware, software and services and related business Services

* see NASSCOM, *Strategic Review*, 2007.

** see NASSCOM, *Strategic Review*, 2008.

Source: NASSCOM, *Strategic Review* 2006, 2007, 2008.

The studies (Kumar, 2005, p. 106), opine that the rate at which the software industry is growing, it is bound to emerge as an important sector of the economy. A commendable feature of the Indian software industry is that a large number of companies are participating in the development activity. This gets reflected in the fact that NASSCOM has grown from 38 members in 1988, 850 members in 2001 to more than 1100 members in 2007. There are large as well as medium companies (with 20 employees or more) which are members of NASSCOM.

IV.b (ii) Revenue Generation from IT Industry

There are a number of studies which examine the different aspects of India's IT (software and services) exports (Heeks, 1996; Joseph and Harilal 2001; Kumar, 2001; Kumar and Joseph, 2005; Parthasarthy and Joseph, 2002; Schware, 1992; Sen, 1995).

It is important to point out here that the revenue generation from the total software and services segment (exports as well as domestic) is expected to be \$39.7 billion in the FY

2007 of which exports are expected to be in the range of \$ 31.3 billion (see Table 3). We are likely to touch \$ 60-billion mark (by 2010) as per NASSCOM estimates.

Table 3
Sector wise Break –up of IT Industry Export Earnings

(in \$ billion)

Revenues (US \$ billion)	FY 2004	FY 2005	FY 2006	FY 2007
IT Services	10.4	13.5	17.8	23.7
-Exports	7.3	10.0	13.3	18.1
-Domestic	3.1	3.5	4.5	5.6
ITES-BPO	3.4	5.2	7.2	9.5
-Exports	3.1	4.6	6.3	8.3
-Domestic	0.3	0.6	0.9	1.2
Engineering Services and R&D, Software Products	2.9	3.9	5.3	6.5
-Exports	2.5	3.1	4.0	4.9
-Domestic	0.4	0.8	1.3	1.6
TOTAL Software and Services Revenues	16.7	22.6	30.3	39.7
of which, exports	12.9	17.7	23.6	31.3
Hardware	5.0	5.9	7.0	8.2
Total IT industry (including Hardware)	21.6	28.4	37.4	47.8

Source: NASSCOM, *Strategic Review*, 2007.

IV.b (iii) IT and ITES: An Important Source of Foreign Exchange (FOREX)

Indian IT and ITES have played an instrumental role in the building up of foreign exchange reserves for India and the trend in the build up clearly reflects the growth of IT and ITES exports from India (NASSCOM, *Strategic Review*, 2006). IT and ITES has emerged as a key contributor to the FOREX earnings of India. Its share in total receipts from trade in invisibles nearly doubled over the last five years, as per the *Strategic Review*, 2006. The IT

and ITES exports increased from \$6.2 billion to \$23.9 billion while FOREX earnings went up from \$42.3 billion to the projected \$139 billion in the financial Year (FY) 2006. IT and ITES exports further increased to \$ 31.3 billion in the FY and the FOREX reserves increased to US\$ 272.3 billion (*Monthly Monitor*, 2007).

Table 4

Growth of Indian IT-ITES#
FY 2001-06 (US \$billion)

FY	IT-ITES Exports (\$ bl)	FOREX Reserves (\$ bl)
2001	6.2	42.3
2002	7.6	54.1
2003	9.9	75.4
2004	13.3	111.7
2005	18.2	131.2
2006E	23.9	139.0*
FY 2007**	31.3	272.3

Notes: # includes hardware, software and services and related business services exports

* Forex Reserves as on January 06, 2006.

** For IT and ITES exports see NASSCOM, *Strategic Review*, 2007 and for FOREX reserves *Monthly Monitor*, November 2007

Source: NASSCOM, *Strategic Review*, 2006

Coming now to the Indian economy, ICTs spearheads globalization process. It is being seen as the new engine of growth. The recent surge in services during the last two decades has been attributed mainly to high productivity services such as IT services and ITES (like BPOs, KPOs, MBPO, LPOs, RPOs, ESO, HRO², etc.). At present, India exports software and services to nearly 95% countries around the world. North America (US and Canada) accounts for 61% of our software exports. It is heartening to note that in 1999-2000, more than a third of Fortune 500 companies outsourced their software requirements to India.

IV.b(iv) IT and Employment

² BPOs stands for Business Process Outsourcing, KPOs for Knowledge Process Outsourcing, MBPOs for Medical Business Process Outsourcing, LPOs for Legal Process Outsourcing, RPOs for Research Process Outsourcing, ESOs for Engineering Process Outsourcing, and HROs for Human Resource Outsourcing.

Studies show (Sarkar and Mehta, 2008; Thomas, 2005) that the contribution of ICT employment to the total is still very minimal. As per estimates of Sarkar and Mehta (2008), the ICT sector accounts for just 0.3 per cent of total employment. The ICT sector employed 700,000 (0.700 million) persons which is a miniscule of the total employment in the economy which was 324.7 million workers in India by Usual Principal Status in 1999-2000. But there are studies which show that there is a huge potential for employment generation in this sector (Report of HLSG, 2003; NASSCOM, 2005a ; CRISIL, 2007).

Report of the Study Team on Human Resource Development says that, “India has been developing as a major hub in knowledge creation in IT and Electronics in the global arena. The growth of this sector (IT and ITES) primarily depends upon the knowledge centric professional. The number of professionals employed in this sector has grown to 1.28 million by 2005-06. The indirect employment generated by this sector is approximately three (3) times the direct employment”. But there is a need to address the human resource requirement of the industry on a continuous basis to retain our position as a major player in the IT arena.

Table 5
Growth of IT –ITES Professionals in India

Indian IT Sector : Knowledge Professionals Employed* (in millions)							
(Nos.)	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05E	2005-06E
IT, Engineering and R&D Software Product Exports	0.110	0.162	0.170	0.205	0.296	0.390	0.513
IT-enabled Services Exports	0.420	0.700	0.106	0.180	0.216	.316	0.409
Domestic Sector	0.132	0.198	0.246	0.285	0.318	0.352	0.365
Total	0.284	0.430	0.522	0.670	0.830	1.058	1.287

Note: * Does not include employee numbers related to the hardware sector

Source: Planning Commission, *Eleventh –Five Year Plan, 2007-2012*, Government of India.

Table 5 indicates that in the IT and ITES sector, the number of knowledge professionals employed has grown from 0.284 millions in the financial year 1999-2000 to 1.287 millions by end of 2005-06.

The study entitled ‘India’s New Opportunities 2020’ undertaken by the High Level Strategic Group (2003) states: “By 2020, India Inc. can hope to generate \$139-365 billion of additional revenue from these opportunities (in the form of professional services and

customers serviced in India), pushing the GDP growth rate by an additional 0.6 -1.5% between 2002-20. The resultant employment generation (direct and indirect) can be in the range of 20-72 million by 2020.”

The report further projects that ‘The contribution of remote service alone, which is the focus of this report, will be \$ 133-315 billion of additional revenues flowing into the country, and an addition of 10-24 million jobs every year (direct and indirect) by 2020 ... Additionally importing customers into India (medical tourism, educational services, leisure) may add \$ 6-50 billion and create 10-48 million jobs by 2020.’

As per NASSCOM-Mckinsey Report (2005a) India’s offshore IT and BPO industries hold the potential to create over 9 million jobs by 2010, 2.3 million direct jobs and 6.5 million indirect / induced jobs

In a study conducted with NASSCOM by researcher CRISIL (released on Tuesday, February 20,2007), for one job created in IT and ITES, four jobs are spun off in the rest of the economy in supportive activities like transport, catering and security, which generates employment for semi –skilled and even unskilled workers. In 2005-06, the sector provided direct employment to 1.3 million people and indirect employment to 5.2 million people as per the NASSCOM President. Further, “Consumption spending by IT professionals alone has created 2.49 million jobs while the companies created 2.1 million jobs through other operational expenses incurred. Capital expenditure has led to the creation of another 0.63 million jobs in the sector so far’, said CRISIL Chief Economist and Executive Director Subir Gokarn (*The Hindustan Times*, February 20, 2007, p. 26).

A Taskforce on ‘Human Resource Development in Information Technology was being set up by the Government of India to suggest a long-term strategy for increasing the number of IT professionals in line with economic projections. The Taskforce recommendations have come in the form of two reports namely, (i) ‘strengthening the human resource foundation of the Indian IT enabled services/IT industry’ and (ii) ‘Taskforce

on meeting the Human Resource Challenge for IT and IT enabled Services’ (Report and Recommendations) during December, 2003 (DIT, 2007).

The Taskforce has indicated that the global IT/ITES market is expected to grow from \$ 1184 billion in 2002 to \$3391 billion by 2012 (see Table 6). Obviously, there would be a huge demand for knowledge professionals from India to cater to the requirement of the global market.

Table 6
Global ITES/IT Market (US \$ billion)

IT /ITES Market	2002	2003	2006	2009	2012
IT*	392	441	625	864	1,193
ITES#	792	1,838	1,213	1,633	2,198
Total	1,184	1,322	1,838	2,497	3,391

Note: * IT services include systems integration and information systems consulting, application development and support as well as IT training services.

IT-enables services include support for human resources, payment processing, finance, customer care, administration and content development (including high –end design and development work).

Source: Planning Commission, *Eleventh –Five Year Plan, 2007-2012*, Government of India.

It is expected that India will achieve total revenue of \$62 billion by 2008-09 and US \$148 billion by 2012 in IT and ITES at a CAGR of 35% over 2003-2012. This translates into a direct employed manpower requirement of around 0.97 million for IT export services and 2.72 million for ITES by 2012 (see Table 7).

India has emerged as a top destination for off shoring as per the Global Services Location Index 2007. India’s share in global offshore IT services (i.e., outsourced software services) is 65% and global BPO (business process off shoring) industry is 46%. This was made possible by unparalleled export performance with a CAGR of 28% over a decade. There is a lot of scope for future expansion as only 10 % of the potentially addressable global IT/ ITES market has been realized. The remaining 90% (worth \$300 billion) remains to be tapped as per *An Approach to the 11th Five Year Plan*.

Table 7
Manpower Requirements for ITES/IT in India (millions)

	2002	2003	2006	2009	2012
IT Export Services					
Consulting, Integration, Installation	0.01	0.02	0.03	0.09	0.27
IT Development	0.07	0.08	0.08	0.08	0.11
Outsourced IT Support	0.09	0.11	0.17	0.28	0.53
Training and Education	0.00	0.00	0.00	0.02	0.06
Total	0.17	0.21	0.29	0.48	0.97
IT-Enabled Services					
Customer care	0.03	0.05	0.15	-0.42	1.03
Finance	0.02	0.03	0.05	0.09	0.21
Human Resource	0.00	0.00	0.02	0.15	0.69
Payment Services	0.00	0.1	0.05	0.14	0.45
Administration	0.2	0.3	0.5	0.15	0.15
Content Development	0.03	0.04	0.07	0.09	0.20
Total	0.11	0.16	0.38	1.0	2.72

Source: Reproduced from *Report of the Study Team on Human Resource Development*, Electronics Information and Planning, 34(5-6), February-March, 2007, p.127.

V. Research Question

Having discussed the performance of the service sector in general and IT and ITES in particular, now we present a research question of the study. The present study is an attempt to empirically verify a question: Can IT and ITES be an engine of growth?

A careful review of literature revealed that this question was also raised by Neil M Swan (1985) in his article, "The Service Sector: Engine of Growth?" However at the outset

of his paper he said “In this paper I want to ask an apparently foolish question: Can service sector be an engine of growth? Apparently foolish because most people, including many professionals economists, consider it obvious that the service sector service; that it services the good sector, mainly natural resources in the west; that without the resources there would be no services ; that service are derivative, parasitic; that they can no more be an engine of growth than a man can pull himself up by his own bootstraps; that expecting services to be an engine of growth is like expecting the caboose to push the train.”

However, with the recent wave of globalization spurred by technological progress and ICT revolution, the above-referred question can no longer be termed as foolish; rather it appears to be more relevant. It is pertinent to mention here that with technological progress, splintering of services, transformation of services and convergence of services with manufacturing has been taking place and in fact services have become increasingly dynamic. The dynamism of services can be attributed to the growth of the dynamic components within services which include ICTs and tend to be an engine of growth (Lal, 2007). Therefore, services can no longer be viewed as sterile, barren or parasitic as was opined by the physiocratic school and Smith (see Joshi, 2006a, 2008a).

The motivation for this research is that the services sector and IT and ITES sector in India are booming, but can IT and ITES be an engine of growth? We argue in this paper that services especially IT and ITES can be an engine of growth in the case of India by generating employment opportunities and contributing to the overall GDP growth.

The growth of IT and ITES can impact the overall growth of the economy thorough inter-sectoral linkages by generating demand impulses in the economy. There would be consumption demand as well as production demand on the one hand (which will boost the growth of the rest of the economy) and direct employment generation for the skilled workers on the other. The consumption demand, production demand and demand for skilled workers will result into generation of secondary/indirect employment in the service sector. As IT and ITES grow, there would be increased spending by employees of this segment on food items as well as non-food items. It is this spending by IT-BPO employees on food, apparel, clothing, durable goods, travel, health and medical care and real estate services which would boost production demand and consequently lead to higher GDP growth on the one hand and employment generation on the other. It is direct and indirect employment generation by

putting purchasing power in the hands of people can contribute to change in economic conditions and rise in per capita living standards. Figure 2 depicts how IT-ITES growth can impact the rest of the economy through inter-sectoral linkages.

As has been perceived by Joshi (2004), that "...when the IT sector, the telecom sector, the retail trade sector, the automobile sector, etc. grow and expand, these directly create demand for skilled labour. But the latter would employ more and more of drivers, car cleaners, domestic help, security personnel, and a host of other low skill workers. Such employment generation, which would help in poverty alleviation, will follow the growth of sectors employing high skill workers in the first place." We hypothesized in this study (2004) that growth of the above-mentioned sector will generate direct/primary employment for skilled workers first and they in turn will create demand for semi-skilled/unskilled workers (i.e. indirect /secondary employment generation)

In the present study we have made an attempt to explore and estimate an unexamined relationship/ inter-sectoral linkages between growth of IT and ITES and overall growth of the economy by collecting and analyzing the primary survey data and combining that with secondary data.

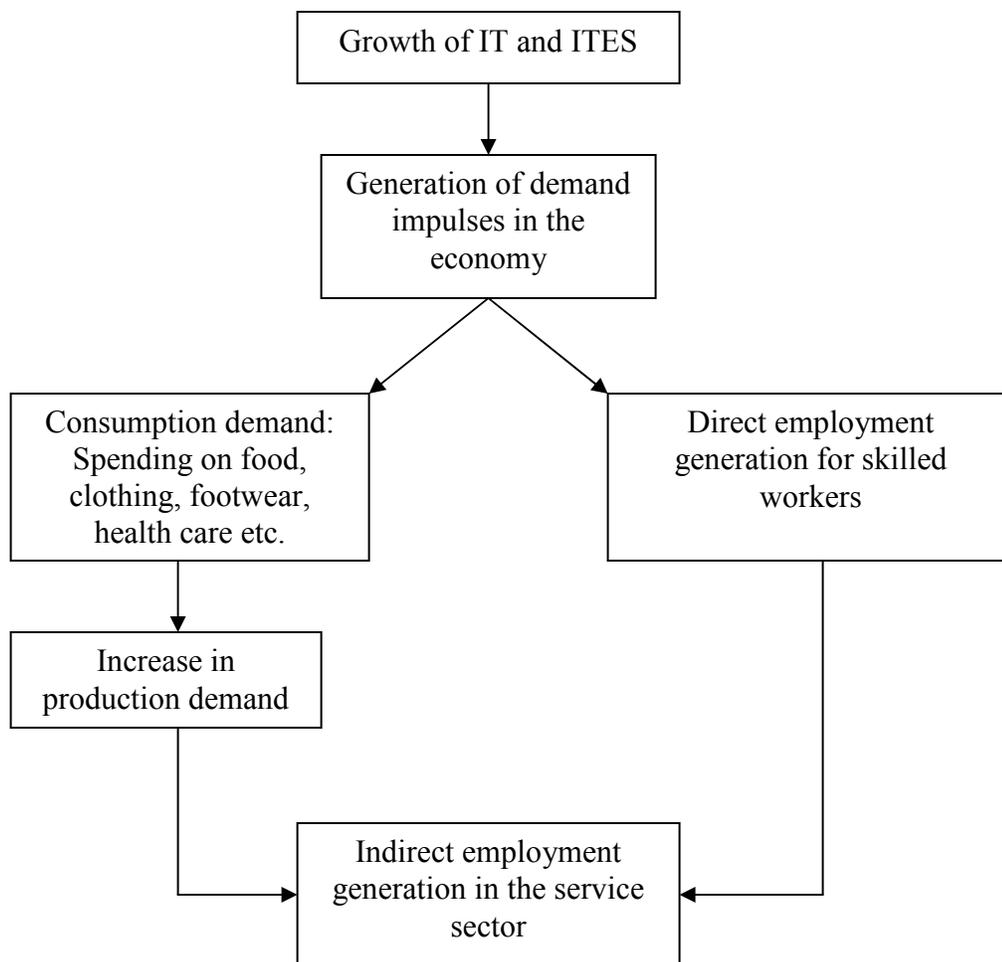


Figure 2: IT, ITES and Rest of the Economy: Inter –Sectoral Linkages

VI. Sources of Data and Methodology

At the outset it is pertinent to mention that, at present Central Statistical Organization does not give us a separate contribution made by IT and ITES sectors in its National Accounts Statistics (NAS). It is NASSCOM data reports which give us the figures for the IT and ITES sector. We have relied on NASSCOM data while carrying out this study. The main secondary sources of data for IT and ITES were the various reports of NASSCOM. We have also made use of data from GOI, *The Economic Survey*, *World Development Indicators*, and journals like *Dataquest* etc.

This study is based on primary data collected from 100 respondents of twenty IT and ITES firms located in Gurgaon. Gurgaon is a satellite city around Delhi and is a hub for

many MNCs and Indian firms especially in the area of call centers and back-end processing. It is interesting to note that the government of Haryana has set up an Electronic city in Gurgaon spread over an area of 40 acres for hi-tech and export-oriented electronics /IT industry. A Software Technology Park is being developed over an area of 14000 square feet within the Electronic city (NASSCOM-KPMG, 2004, p.164). Questionnaires were personally administered to 100 respondents drawn from 20 firms and filled up by a trained interviewer. As a first step, the addresses of firms were taken from the directory of registered software and service companies from NASSCOM's web site. NASSCOM is India's National Association of Software and Service Companies, the premier trade body and 'voice' of the IT software and service industry in India. It was found that there were 1234 companies registered with NASSCOM on November 11, 2007. Out of which 103 were in Gurgaon. The directory gave us useful information about 103 IT and ITES firms located in Gurgaon region along with up-to-date contact details. However, a visit to Gurgaon city and the collection of information through interaction with employees of various IT firms and call centers brought home the fact that in addition to 103 registered firms there are many other unregistered IT firms and call centers present in Gurgaon. Therefore, we tried to list the registered and unregistered companies also (see Fig. 3).

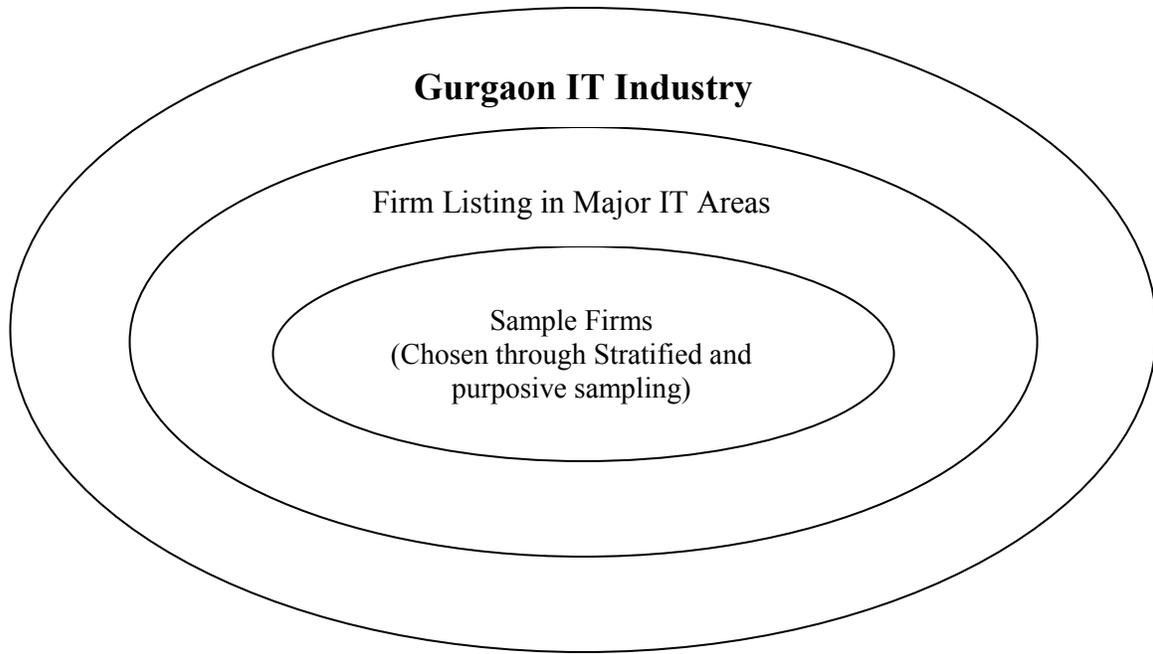


Figure 3: Selection of IT –ITES Firms

Our sample size, therefore, increased to 134 companies which were arranged following three criteria namely, type of organization, registration and location. Out of the 134 listed firms, 4 were taken out purposively as 3 of them were KPOs (2 LPOs and 1EPO firm) and 1 was HRO firm. The idea was to give representation to all types of ITES firms. The major difference between BPOs and KPOs lies in the work force employed and the type of processes being outsourced. In BPOs, low level skills are required whereas in KPOs knowledge or specialized domain expertise is the key point. BPOs mainly provide low end services like medical transcription, document processing, data entry and processing,etc. Whereas KPOs are involved in off shoring of high-end, knowledge-intensive business processes like research & analysis, business & market research,investment analysis, legal research, product & brand management, finance and accounting advisory services, educational services and medical services,etc. These days firms are outsourcing their HR activities like pay roll management, training, staffing, travel and expense management, retirement benefits planning,etc. to third party providers who are termed as HROs so that they can concentrate on their core competencies.

After taking out four firms from the total sample (i.e. excluding KPOs and HRO) and choosing a random number a further stratification of 130 firms was done (see Fig. 4). A

survey limited to 20 firms and 100 employees was conducted between November 12, 2007 to December 11, 2007. We could not cover more firms due to financial constraints.

Table 8
Type of Firms in Major IT Locations of Gurgaon

Types	IT Firms	Call Centers	Others	Total
NASSCOM (Registered)	23	21	18	62
Unregistered	19	31	18	68
Total	42	52	36	130

Note: Others comprise of those firms which were providing integrated services and were not exclusively BPOs.

It is important to mention here that the sample firms were chosen in such a manner that IT firms and ITES firms could get a representation. It can be observed from Table 8 that out of 134 listed firms, 42 were IT firms, 52 were call centers, 36 firms belonged to other category. Three KPOs and one HRO were also included in the firm listing. Finally, a sample of 20 firms was taken in which two (one-one each) were purposively selected under the KPO/HRO category, six were IT firms, seven were call centers and five belonged to other firm's category.

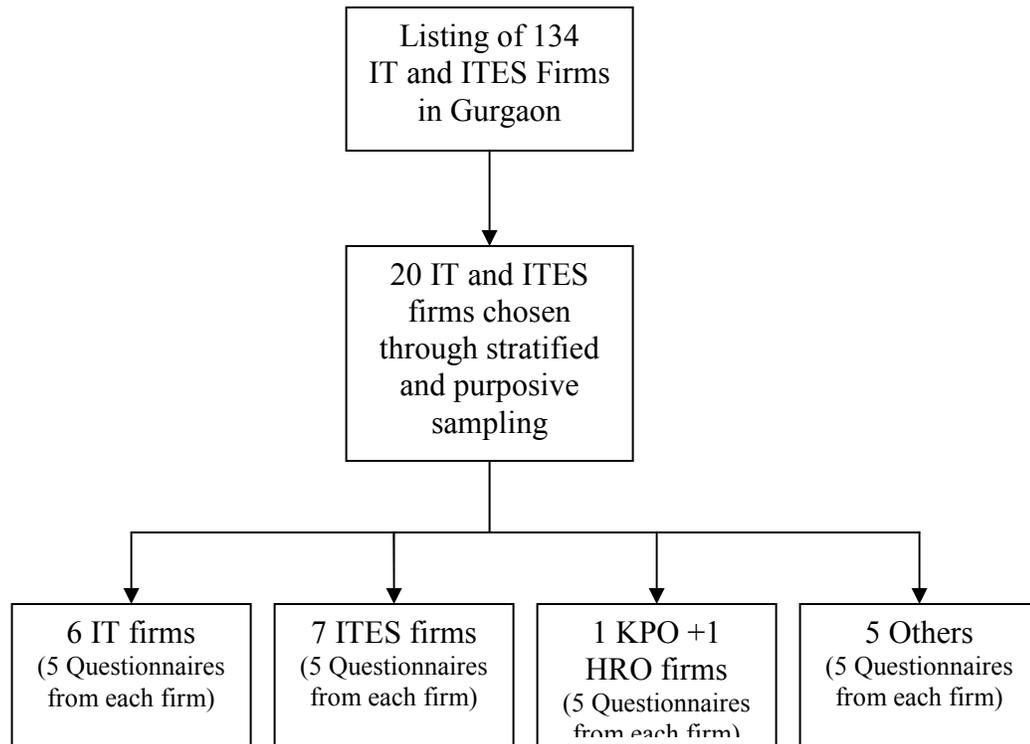
Table 9
Sample Selection

Types	IT Firms	Call Centers	Others	Total
NASSCOM (Registered)	3	3	2	8
Unregistered	3	4	3	10
Total	6	7	5	18

As can be observed from Fig. 4, we have taken a sample of 100 respondents –five each from each organization. We have taken one respondent each from the higher level, two each from middle and lower level work management because studies reveal that many firms around the world are organized into pyramidal like structures. The designation has been defined in terms of salary earned. If the salary earned by a respondent is more than 6 lakh per annum, he belongs to higher level of work management, if salary is in the range of 1.5 lakh - 6 lakh

per annum, then he/she is in middle level of work management and if salary is less than 1.5 lakh, he/she is in lower level of work management³

Figure 4: Selection of Households



³ We are referring here to different level of work management.

VII. Empirical Results

Having discussed the data sources and methodology, in the present section the empirical results have been reported.

Table 10
Type of Organization and Sex of Respondents

Type of organization	Sex		
	Male	Female	Persons
IT firm	30 (100)	0	30
Call centre	29 (83)	6 (17)	35
KPO/HRO	8 (80)	2 (20)	10
Others	19 (76)	6 (24)	25
Total	86	14	100

Note: The figures in parentheses are percentages.

Source: Compiled from the field survey data.

As is evident from Table 10, employees were mostly males (86 %). Only 14% of employees were females. Therefore, our study shows that IT jobs are not women centric as has been emphasized in certain studies (Singh and Pandey, 2005). This might be due to atypical work timings that act as constraint for the married women to take up such jobs due to the dual responsibilities of home and work and also due to their reproductive role. Besides the question of safety of women working in call centers and shift duties might act as deterrent for them to join this segment. It can be noted from the above table that in the case of IT firms all respondents are males. Kumar (2001b) says that the under representation of women⁴ in the software industry is more due to a lack of international mobility because of family commitments, regulations against night work preventing companies from hiring them for round-the-clock contracts, and some international clients' reluctance to hire women consultants.

⁴ We would like to submit here that when we approached various call centers in Gurgaon for collection of data, we found that these firms follow stringent security norms and direct interaction with their employees is not permitted. So we had to follow an informal method of data collection. We gathered information from the places like tea stalls, restaurants and food joints, etc. frequently visited by the employees of the IT and ITES firms and collected relevant information from those who visited the above-cited places. The under-representation of women might be accounted for by this limitation of the method followed for data collection.

Table 11
Distribution of Firms by Age of Respondents (in %)

Type of Organization	Age				
	<20	21-25	26-30	30-35	>35
IT firm	3.2	48.4	45.2	0	3.2
Call centre	8.5	55.9	32.2	3.4	0
KPO/HRO	0	40	40	20	0
Others	0	0	60	20	20
Total	6	50	38	4	2

Source: Compiled from the field survey data.

It can be noticed from Table 11 that 50% of the employees working with IT and ITES firms are in the age group of 21-25 years while 38% are in the age group of 26-30 years. In all, 88 per cent of the respondents were in the age group of 21-31. So definitely, IT employment is youthful. This finding is also supported by the previous studies (Joshi, 2006c, p.331) which say that call center jobs are the most sought after places for young, fresh graduates and undergraduates as these provide them with attractive perks (despite low skills and low level of qualification), transport facility, meals and refreshment and good environment. This sector definitely ensures job opportunities for the young educated youth as has been hypothesized in various studies (Joshi, 2004).

Table 12
Distribution of Firms by Length of Service with the Same Firm (in %)

Type of Organization	Length of Service with the Same Firm			
	1yr	2yrs	3yrs	4yrs
IT firms	35.48	54.8	9.4	0
Call centre	55.9	33.9	8.5	1.7
KPO/HRO	40	60	0	0
Others	100	0	0	0
Total	51	40	8	1

Source: Compiled from the field survey data.

Table 12 presents the distribution of firms by length of service with the same firm. Fifty one percent of the respondents reported to having worked with the same firm for one year, 40% for two years. 91% of respondents worked for one to two years period with the same firm.

Our results have been supported by Kumar (2001b) who also observed that the software industry is creating job opportunities for young graduates with a relatively short experience.

Tables 11 and 12 implicitly point towards the huge direct employment generation potential of IT and ITES in India. This observation has been made on the basis of our survey results which show that more than 80% respondents are in the age group of 21-31 years (see Table 11) and 66% of the respondents reported these jobs to be their first jobs (Table 13). Table 12 may be seen from the perspective of pointing towards the high attrition rates prevalent in the IT and ITES segment as the length of service varied between one to four years, which is one of the major challenges faced by Indian IT and ITES firms.

Table 13
Direct Employment Generation Potential of IT and ITES (in %)

Type of Organization	Is this your first job? Responses	
	Yes	No
IT firm	71	29
Call centre	66.1	33.9
KPO/HRO	80	20
Others	20	80
Total	66	34

Source: Compiled from the field survey data.

As is clear from Table 11 as well as Table 13, firms have been organized into four categories. Sixty six percent of the respondents reported that this was their first job. It is important to point out here that the average age of those employed in such jobs was 24.5 years and they were earning on an average Rs. 16448.36 per month. This table clearly shows the huge employment generation potential of IT and ITES.

Table 14

Distribution of Firms According to Educational Attainments (in %)

Type of Organization	Completed Years of Education					
	Literate	Secondary	Graduation	Technical	Masters Degree	Other
IT firm	0	6.5	38.7	16.1	38.7	0
Call Centers	1.7	8.5	61	1.7	22.03	5.1
KPO/HRO	0	0	60	0	40	0
Others	0	40	0	0	60	0
Total	1	9	51	6	30	3

Source: Compiled from the field survey data.

Table 14 shows the distribution of firms as per educational attainment. Of the respondents working with IT firms 38.7% were graduates and 38.7% were with a master's degree. While 61% of the respondents with the call centers were graduates and 22.03% had a master's degree. Of the employees working with HROs, 60% and 40% had graduation and post graduation degrees respectively. One thing is quite obvious from the table that in the case of other firms providing integrated services, the percentage number of respondents with a master's degree was the highest (60%) whereas in the case of call centers, graduates were dominating. This is mainly because of the nature of the job. Generally speaking, BPO professionals are college graduates who become experts in processes as the work is quite repetitive. Whereas KPOs /HROs employees are professional experts. They are the people with professional degrees/experience in their respective fields.

As is evident from Table 15, 66% of employees working with these IT and ITES firms earned incomes in the range of Rs 6001-25000. While 28% of the employees obtained an income in the range of Rs.25001 to 100000.

Table 15
Distribution of Firms by Monthly Income (in %)

Type of Organization	Monthly Income (in Rs)					
	<6000	6001-12500	12501-25000	25001-50000	50001-100000	>100001
IT firm	6.5	32.3	22.6	19.4	19.4	0
Call centre	5.1	37.3	37.3	1.7	18.6	0
KPO/HRO	0	40	40	0	20	0
Others	20	20	0	40	0	20
Total	6	35	31	9	18	1

Source: Compiled from the field survey data.

In terms of educational background, 51 % of the employees were graduates. The percentage of employees with a masters / equivalent degree was 30% while 6% had technical diplomas/certificates. Nine per cent were educated up to the secondary or senior secondary level (Table 16).

Table 16
Respondents Income and Education (in %)

Income	Literate	Secondary	Graduation	Technical	Master Degree	Other
<6000	0	50	16.7	0	16.7	16.7
6001-12500	2.9	17.1	74.3	2.9	0	2.9
12501-25000	0	0	74.2	6.5	19.4	0
25001-50000	0	0	11.1	33.3	55.6	0
50001-100000	0	0	0	0	94.4	5.6
>100001	0	0	0	0	100	0
Total	1	9	51	6	30	3

Source: Compiled from the field survey data.

An interesting observation can be made from Table 16. The table shows that the higher the level of educational attainments/skills, the higher is the salary. For example, in the income range of 25001-50000, 55.6% of the respondents had a master's degree while 33.3% respondents had technical diplomas/certificates whereas in the income range of 6001-12500, 74.3% of the respondents are graduates.

Table 17
Respondents Income and Age (in %)

Income	Age				
	<20	21-25	26-30	30-35	>35
<6000	33.3	50	16.7	0	0
6001-12500	8.6	74.3	17.1	0	0
12501-25000	3.2	60.3	32.3	3.2	0
25001-50000	0	22.2	66.7	11.1	0
50001-100000	0	0	83.3	11.1	5.6
>100001	0	0	0	0	1
Total	6	50	38	4	2

Source: Compiled from the field survey data.

Table 17 shows that in the income ranges of Rs.6001-12500 and Rs.12501-25000, more than 70% and 60% (respectively) of the respondents are in the age group of 21-25 years. In the income range of 25001-50000, 66.7% and in the next higher income range of 50001-100000, 83.3% are in the age group of 26-30 years. The table clearly shows that IT and ITES jobs are quite well-paid keeping in view the age of the respondents.

Table 18 shows that 78% of the respondents incurred no expenses on health. This might be due to the reason as 74.3% of the respondents were in the age group of 21-25 years (i.e. young) and 66 out of 100 respondents reported that this was their first job (see Table 13). The life-style diseases which are becoming quite common among people working in the IT and ITES or in the private sector become perceptible over a period of time. The answer for no health expenses by 78% of the respondents seems to lie in the fact that the majority of the respondents reported in this study belong to the younger age group and for 66% of them this is their first job experience.

Table 18
Organization- wise Monthly Health Expenditure (in %)

Type of Organization	Monthly health Expenditure					
	No Expenses	<100	101-200	201-500	501-1000	>1001
IT firm	74.2	3.2	3.2	16.1	0	3.2
Call centre	84.7	0	6.8	6.8	0	1.7
KPO/HRO	100	0	0	0	0	0
Others	0	40	40	0	20	0
Total	78	3	7	9	1	2

Source: Compiled from the field survey data.

Table 19
Monthly Expenditure: Previous Vs Current Job (in %)

Monthly Expenditure in Previous Job	Monthly Expenditure in Current Job				
	1001-5000	5001-10000	10001-20000	20001-50000	More than 50000
No Expenses	6.1	47	33.3	9.1	4.5
1001-5000	50	0	50	0	0
5001-10000	0	40	40	20	0
10001-20000	0	0	66.7	33.3	0
20001-50000	0	0	0	58.3	41.7
More than 50001	0	0	0	0	100
Total	5	35	31	17	12

Source: Compiled from the field survey data.

Table 19 clearly shows a significant increase in monthly expenditures of respondents after they joined the current job. For example, it can be observed from Table 19 that among those who were incurring no expenses in the previous job, 53% of them incurred expenditure in the range of 1001-10000 and the remaining in the range of 10,0001-more than 50,000. The highlighted figures in the above table show the percentage of respondents who were incurring more monthly expenditure (as compared to the monthly expenses incurred in the previous job) after joining the current job.

Table 20
Food Expenses: Previous vs. Current Job (in %)

Food Expenditure in the Previous Job	Food Expenditure in the Current Job						Total
	< 1500	1501-2000	2001-3000	3001-4000	4001-8000	>8000	
<1500	85.7	0	0	0	0	0	7
1501-2000	0	20	60	20	0	0	5
2001-3000	0	0	28.6	57.1	14.3	0	7
3001-4000	0	0	0	0	100	0	2
4000-8000	0	0	0	0	72.7	27.3	11
>8000	0	0	0	0	0	100	2
No	30.3	28.8	24.2	7.6	9.1	0	66
Total	26	20	22	10	17	5	100

Source: Compiled from the field survey data

Table 20 shows the food expenses incurred by the respondents in the previous and current jobs. It can be observed from Table 20 that after joining the current job, the food expenses of the respondents registered an increase. The highlighted percentage number of respondents incurred more food expenses after shifting to the current job.

Table 21
Non-Food Expenses -- Previous vs. Current Job (in %)

Non-Food Expenditure in the Previous Job	Non-Food Expenditure in the Current Job					Total
	< 1500	1501-3000	3001-5000	5001-10000	>10001	
No Expenses	1.5	30.3	36.4	28.8	3.0	100
<1500	50	50	0	0	0	100
1501-3000		75	25	0	0	100
3001-5000	0	0	50	33.3	16.6	100
5001-10000	0	0	0	42.1	57.9	100
>10000	0	0	0	0	100	100
Total	2	24	28	29	17	100

Note: Non-food items include apparel, tailoring, footwear, personal care items, etc.

Source: Compiled from the field survey data.

It can be noticed from above table that there has been an increase in the non-food expenses of the respondents in the current job. Again the highlighted figures point towards the increasing non-food expenses of the respondents in the current job.

It can be observed from Table 22 (see the highlighted figures) that the expenses of the respondents on various kinds of services viz. education, health, leisure, tourism, communication services ,etc. increased after joining the current job.

Table 22
Expenditure on Services -- Previous vs. Current Job

Expenditure on Services in the Previous Job	Expenditure on Services in the Current Job						Total
	< 1000	1001-2000	2001-4000	4001-8000	8001-20000	>20000	
No	25.00	38.24	19.12	5.88	7.35	4.41	100
<1000	83.33	16.67	0.00	0.00	0.00	0.00	100
1001-2000	0.00	71.43	0.00	28.57	0.00	0.00	100
2001-4000	0.00	0.00	50.00	25.00	0.00	25.00	100
4001-8000	25.00	0.00	0.00	50.00	0.00	25.00	100
8001-20000	0.00	0.00	0.00	0.00	33.33	66.67	100
>20001	0.00	0.00	0.00	0.00	0.00	100.00	100
Total	23.00	32.00	17.00	10.00	6.00	12.00	100

Note: Services include education, health, leisure, tourism, communication services, etc.

Source: Compiled from the field survey data.

Table 23
Relative Change in Average Household (HH) Income, Savings, Investments

Variables (on average terms and in Rs)	Previous Job	Current Job	Relative Change
HH Monthly Income	10,311	24,571.5	+14,260
Savings	19,485	49,025	+29,540
Investment	8355	32,934	+24,579

Source: Compiled from the field survey data.

There has been a relative positive change in the respondent's average HH (household) income, savings, and investments in the current job (as shown in Table 22).

Table 24
Relative Change in Average Food, Non-Food Expenses and Expenditure on Services

Variables (on average terms and in Rs)	Previous Job	Current Job	Relative Change
HH Monthly Food Expenditure	1331	3299	+1968
HH Monthly Non-Food Expenditure	1643	3725	+2082
HH Monthly Expenditure on Services	2175	6928	+4753

Source: Compiled from the field survey data.

It can be observed from Table 24 that there has been positive relative change in average monthly food, non-food expenses and expenditure on services of the respondents.

Table 25
Contribution of IT and ITES to Employment and Consumption Expenditure
at Micro and Macro Level

Contribution of employees of IT and ITES to	Contribution of single employee of IT and ITES at Micro level (as estimated from sample survey)	Projections of Contribution of IT and ITES at Macro level (16 lakh)
1. Indirect Employment Generation Share of IT and ITES in total employment	0.48	0.48x 16 00000(FY 2008) = 768000 768000/460430000x100= 0.16%
2. Consumption Expenditure Contribution of Consumption Expenditure of 16 lakh IT and ITES to total value added	Rs. 13952pcphh	Rs. 107625.4396+ Rs. 101039.069+ Rs. 84836.223 = 293500.7316 293500.7316/ 1453109x100= 20.19%
a. Average monthly Expenditure on Food Items	Rs. 3299 pcphh	i. Annual Food Exp=3299x12= 39588 ii. Share of IT and ITES in value added from agriculture= 39588/588530 = 0.0672 iii. Contribution of 16lakh IT Professionals to Value added from Agriculture= Rs. 107625.4396
b. Average monthly Expenditure on Non-Food Items	Rs.3725pcphh	i. Annual Non- Food Expenditure 3725x12= 44700 ii. Share of IT and ITES in value added from Manufacturing= 44700/707845 = 0.0631 iii. Contribution of 16lakh IT Professionals to Value added from Manufacturing= Rs. 101039.069
c. Average monthly Expenditure on Services	Rs.6928pcphh	i. Annual Expenditure on Services = 6928x12= 83136 ii. Share of IT and ITES in value added from services= 83136/1567934 = 0.0530 iii. Contribution of 16lakh IT Professional to Value added from Services = Rs.84836.223

Notes:

- i) One IT and ITES professional (not the household) hires 0.48 workers with different levels of skills. The question posed to the respondent was: Do you hire workers with different levels of skill?
- ii) pcphh stands for per capita per household
- iii) We have made projections for 16 lakh professionals because as per NASSCOM, *Strategic Review 2008*, IT sector is expected to directly employ 1.6 million professionals in the FY 2008.
- iv) Non-food items include apparel, tailoring, footwear, personal care items etc.
- v) Services include education, health, leisure, tourism, communication services etc.
- vi) Total value added figures have been taken from *The Economic Survey, 2007-08*. The figures are quick estimates of 2006-07.
- vii) Total employment in the economy (in 2004-05), by Usual Principal Status was 460.43 million /460430000(see Mitra, 2008).

Source: Based on the Field Survey Data, NASSCOM (2008), Mitra (2008).

Finally in Table 25, using micro-level data of a hundred households of 20 IT and ITES firms and combining that with macro level data, the focus of the study: can IT and ITES be an engine of growth has been examined. The main findings of the study are:

- i) A micro level study done in the Gurgaon region shows that the direct employment of one IT-ITES professional results into indirect employment generation for 0.48 semi-skilled, low skill or unskilled workers⁵. Taking this figure of 0.48 and using NASSCOM data of 16 lakh professionals who are expected to be directly employed in the IT industry (FY, 2008), we project/estimate that there would be indirect employment generation to the extent of 7,68,000 (people) at the macro level. Using total employment figures of 460.43 million (on Usual Principal Status basis) as given in Mitra (2008 for the year 2004-05), we found that the indirect employment in IT and ITES would constitute 0.16% of the total employment whereas the share of direct employment would be 0.34% of total employment in India's economy.
- ii) Similarly from micro-level data on per capita per household average monthly consumption expenditure, we calculated the annual food, non-food expenditures and expenditure on services per capita per household. Then we tried to compute the shares of these consumption expenditures incurred by IT and ITES employees in the value added from agriculture, manufacturing and services (using data on value added given by the Economic Survey). Using those shares we tried to find out the contribution of 16 lakh employees to the agriculture, manufacturing and services value added. Adding these together we arrived at the consumption expenditure of 16 lakh workers. According to our estimates the share of consumption expenditure incurred by 16 lakh employees (expected to be employed in IT sector in the year 2008) would be 20.19% total value added.

It is quite obvious from the above table that direct employment of 16 lakh workers would help to generate indirect employment for 7,68,000 workers. The consumption expenditure of 16 lakh professionals would account for a 20.19% share of total value added.

⁵ We would like to point out here that the semi-skilled, low skill or unskilled workers were hired by the respondent and not by the other members of the household. Even if it is argued that these workers were hired not by the respondent but by other members of the HH, the fact remains that it is only when household income got supplemented that these different categories of low skill workers were hired.

Assuming that the consumption expenditure of the IT and ITES workers and the total value added to be the same, one can try to assess the contribution of 2.3 million workers (who are expected to be directly absorbed by the IT sector by 2010 as per estimates given in NASSCOM, 2005) to consumption expenditure and the share thereof in total value added. It turns out to be 0.29% of total value added.

To sum up, as per our study a miniscule 0.34% of the total workforce expected to be employed in the IT-ITES will contribute 20.19% to value added through consumption expenditures. The results of the present study clearly support our hypothesis that IT and ITES can indeed be an engine of growth through generating demand impulses in the economy.

VIII. Conclusions and Policy Implications

India emerged as one of the fastest growing economies of the world during the 1990s because of the remarkable performance of the services sector. India's services sector has been burgeoning fast and one of the major driver's of the growth of the services sector is IT and ITES. It is well documented in literature that IT impacts growth by different channels. In this study we try to empirically verify the question: Can IT and ITES be an engine of growth?

We argued in this paper that the growth of IT and ITES can impact the overall growth of the economy through inter-sectoral linkages by generating demand impulses in the economy. There would be consumption demand as well as production demand on the one hand (which will boost the growth of the rest of the economy) and direct employment generation for the skilled workers on the other. The consumption demand, production demand and demand for skilled workers will result into generation of secondary/indirect employment in the service sector. As IT and ITES grow, there would be increased spending by employees of this segment on food items as well as non-food items. It is this spending by IT-BPO employees on food, apparel, clothing, durable goods, travel, health and medical care and real estate services which would boost production demand and consequently lead to higher GDP growth on the one hand and employment generation on the other. It is direct and indirect employment generation, which by putting purchasing power in the hands of people can contribute to change in economic conditions and a rise in per capita living standards.

Using micro-level data of a hundred households of 20 IT and ITES firms and combining this with macro level data; the present study examined the above-referred question. The main findings of the study are:

- i. One direct job for skilled professional employed in IT and ITES spins off jobs for 0.48 semi-skilled, low skill or unskilled workers. As per our estimates, the 16 lakh workers who are expected to be directly employed in the IT sector in the FY 2008 as per NASSCOM estimates would generate secondary employment for 7,68,000 people which would constitute 0.16% of total employment. The share of direct employment would be 0.34% of total employment and together direct (16 lakh) and indirect employment (7,68,000) would account for a 0.51% share in total employment.
- ii. Using micro and macro level data, we found that those 16 lakh professionals will account for 20% of the total value added.
- iii. Assuming the consumption expenditure of the IT and ITES workers and the total value added to be the same/constant when we tried to assess the contribution of consumption expenditure of IT workers to total value added that would be made by 2.3 million workers who are projected to be directly absorbed by the IT sector by 2010 (NASSCOM, 2005). This works out to be 29% of the total value added.

A noticeable point is that the proportion of IT-ITES in total employment may be small but the contribution of this to total value added is still very high. As per our study, 0.34% of the total workforce expected to be employed in the IT-ITES, will contribute 20.19% to value added through consumption expenditures. The results clearly support our hypothesis that IT and ITES can indeed be an engine of growth through generating demand impulses in the economy. The point worth appreciating is that this sector came to the fore after 1991 (BPOs in 1993) and within 15-17 years the contribution of this sector to our economy is really commendable whether to GDP, revenue and forex generation, employment (though it may minimal at present). There is a huge potential of growth in this sector as is apparent from this study and as has been reported in various studies.

We would like to admit here that one of the limitations of the study was non-availability of comparable data. For example, to make projections for share of IT and ITES in total employment, we have used data for the year 2004-05 whereas data for GVA is for the year 2006-07. Second, NASSCOM has priced its publications beyond the reach of an ordinary researcher.

In view of the above-mentioned findings of the study indicating the huge employment generation potential of IT and ITES and the contribution of this sector to value added, there is an urgent need to handle the challenges faced by this sector. It is important to point out here that the sustainability of the impressive growth of the Indian economy has been questioned in the context of some persisting challenges in the form of lack of social infrastructure (Joshi, 2003, 2006d), physical infrastructure; IT infrastructure (Joshi, 2008b, 2006a), agricultural and industrial sector reforms, rupee appreciation and US sub-prime crisis, increasing regional disparities (reflected in digital divide), etc. All these problems can adversely affect the IT and ITES growth. Besides, there are challenges peculiar to the field of IT and ITES like rising labour costs, rapid growth in demand for talented manpower/quality staff, high attrition rate, outsourcing backlash etc are some other limiting factors (Joshi, 2008a, 2006). The growth of IT and ITES is having social, economic, health, ethical and environmental implications also (Joshi, 2006b, 2008c). Further, delay in the promotion of a conducive/enabling business environment and good governance will disqualify us from catching up with the global giants in terms of world-wide presence and scale. It is also important to point out here that the measurement of output, productivity, non-availability of data or availability of data after a time lag are the other problems confronted in the case of services in general and IT-ITES in particular. The problem gets further compounded because these new species of services (like IT, ITES, etc.) are new entrants in the national accounts and there is a lack of development of concepts. Further, the quality of each unit of the same service varies from the others. Therefore, it is too difficult to achieve the same level of output in terms of quality as has been pointed out in Cowell(1984). Further, quality improvements stemming from the application of new technologies are extremely hard to measure (Joshi, 2008d). In view of the above problems, which can adversely impact the growth of the high potential, IT and ITES segment; there is an urgent

need for policy intervention to address the above-referred problems if India is really keen to sustain a growth driven by the services sector in India.

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