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## **The ‘New’ Economy, Knowledge Management and Growth of India: Hype or Reality**

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### **Abstract**

The modern telecommunications industry has made a significant contribution to the creation and expansion of the so-called ‘new’ economy sector in several developing but mainly more developed nations. India, in particular, achieved a phenomenal growth in the export of ‘new’ economy products during the 1990s and the early 2000s. What is a ‘new’ economy? According to the Asian Development Bank (ADB), it describes a sector or sectors of an economy that are producing or intensely using innovative or new technologies. This relatively new concept applies particularly to industries where people depend more and more on computers, telecommunications and the Internet to produce, sell and distribute goods and services. In other words, it can be considered that the ‘new’ economy (NE) has emerged out of three major sources: growth in information and communications technology (ICT), innovation of knowledge-based goods and services, and globalisation of economic activity. For the purpose of this study it is considered that the main drivers of the ‘new’ economy in India are: (a) development of information and communications technology (ICT), (b) the flow of foreign investment in IT/software services, and (c) effective provision and management of technology based knowledge. In view of the above, the major aims of this paper are: to investigate the current state of the ‘new’ economy and growth in India; to examine the significant economic, regulatory reforms and knowledge innovations that are driving the success of the ‘new’ economy sector of India; to assess and take appropriate lessons from India for governments, industry and businesses of other developing nations for advancing the ‘new’ economy opportunities in the years to come.

### **Keywords**

‘New’ economy, knowledge & innovation, telecommunications, IT/software exports, India

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## **INTRODUCTION**

In recent years, the OECD nations have been extensively reforming their telecommunications industry. The developing nations also have been following the same initiative. The reform in both developed and developing nations has taken the form of (a) full or part privatization of the incumbent monopoly carrier, (b) the introduction of new telecommunications carriers thus opening the industry to competition, and (c) the establishment of a regulatory mechanism to promote competition in the industry. All these measures, over the last decade, have transformed the telecommunications industry into modernisation and technologically efficient (Hossain and Kathuria, 2004; Graham and Hossain, 2004). The modern telecommunications industry made a significant contribution to create and expand the so called ‘new’ economy in several developing and developed nations (Brown, Hossain and Nguyen, 2004). India, in particular, achieved a

phenomenal growth in the export of 'new' economy products over 1990s and early 2000s (Nasscom and McKinsey, 2002, Nasscom 2004a).

What is a 'new' economy? It describes a sector or sectors of an economy that are producing or intensely using innovative or new technologies. This relatively new concept applies particularly to industries where people depend more and more on computers, telecommunications and the Internet to produce, sell and distribute goods and services (Park and Woo, 2003). For example, Lewis et al (2003) observes that, "printing processes once consisted of heavy machinery operated by trade persons in what was essentially a manufacturing industry. Now people in the printing industry are more likely to be behind a computer, making customised design for clients. Most jobs in the printing industry can probably now best be regarded as services, rather than manufacturing" (p. 91).

In other words, it can be emphasised that the 'New' Economy has emerged out of three major sources: growth in information and communications technology (ICT), innovation of knowledge-based goods and services, and globalisation of economic activity. For the purpose of the present study it is considered that the main drivers of the 'new' economy are: (a) information and communications technology (ICT), (b) foreign direct investment (FDI) in IT/software services, and (c) emergence of IT- Enabled services (ITES). The products of ICT and IT/Software services are well known to all (see more in Hossain 2003; Houghton 2003). But what exactly is the new ITES? "In simple terms it is the delegation of one or more IT-intensive operations to an external provider, who in turns administers and manages the selected business process based upon defined and measurable performance metrics" (Nasscom's Handbook, 2002c).

For example, services provided either by outsourcing (externally contracted), or outlocating (remote subsidiary) of an offshore business, foreign government or multilateral entity based in overseas. In other words, in recent years, Microsoft, some Departments of the US Government and World Bank have outsourced software, accounting, data management and other services to India. There are three major areas of IT-Enabled services:

- *Specialised ITES*: medical transcription, legal database processing, online education, etc.
- *General ITES*: contract/call centres, telemarketing, consumer care, technical support, back office operation, and data processing.
- *Business Process Outsourcing (BPO)*: contractual services to manage, deliver and operate business processes (Hossain, 2003).

In view of the above, the major aims of this paper are: to investigate the current state of the 'new' economy and growth in India; to examine the significant economic, regulatory reforms and knowledge innovations that are driving the success of the 'new' economy sector of India; and to assess and take appropriate lessons from India for governments, industry and businesses of other developing nations for advancing the 'new' economy opportunities. The paper has been organised in the following manner: section two presents the current state of the 'new' economy of India, section three demonstrates the economic and regulatory issues of telecommunications reform that drives this sector, section four examines the competitive edge of India, section five presents some information about India's knowledge and innovation drive in recent years and the lessons from the Indian experience are presented in the final section.

## CURRENT STATE OF THE ‘NEW’ ECONOMY

“Our aim is to make India an IT superpower house. Our objective is to create entrepreneurs and employment and ultimately make a sustainable contribution to the growth of the Indian economy” (Nasscom 2002b). These are the words of Mr. Kiran Karwik, President of the New Delhi based National Association of Software and Service Companies (NASSCOM). It seems there is some truth to this claim. It is well established that the Indian economy has been experiencing a current account deficit over the last four decades. However, the economy has turned the corner, and now a vision of a current account surplus including a sustainable impressive growth rate in GDP (6 per cent per annum) is in sight (Table 1). This is driven, mainly by the establishment of a business-service sector which helped the economy to enter into more and more service exports. Telecommunications infrastructure building and providing IT services to the outside world contributed overwhelmingly to establishing the business-service (‘new’ economy) sector in India.

**Table 1:** Macroeconomic performance (1993-2003)

Indicator	1993	1998	2003
GDP (% change):	6.2	6.8	8.2
Inflation (% change):	7.9	0.9	3.2
Current Account/GDP ratio:	-2.4	-1.0	+1.5
Exchange rate (US\$ = INR):	28	36	45.5

Source: Hossain and Mukhopadhyay (2001), Economist (2004)

In particular, the ‘new’ economy has emerged out of two major forces: one, growth in telecommunications and innovation of knowledge-based goods and services (IT), and two, globalisation of economic activity. The main drivers of these forces are: information and communications technology (ICT), foreign direct investment (FDI) in IT/Software services, and new IT enabled services (ITES) (Table 2).

**Table 2:** Growth in telecommunications market and IT industry

Type	1995	1998	2003
Fixed line (million)	9.3	14.5	42
Mobile phone (million)	neg	.88	22
IT industry (size US\$ billion)	neg	5.0	16
Software & Services (US\$ bl)	neg	3.0	12.3

Source: Hossain and Kathuria (2004), TARI (2004), Nasscom (2004a)

In other words, the ‘new’ economy mainly comprises two elements of the information technology sector: IT/software services and ITES. Between 2001 and 2003, these two elements contributed about US\$9.5 billion to exports, with a rapid growth rate in IT/software (Table 3).

**Table 3:** Software and services exports

Software and Services	1998	2003	2004
Size (US\$ billion)	1.8	9.5	12.2
Share of total exports (%)	5.0	18.6	21.3

Source: Nasscom (2004a)

These two elements so far have created more than 500,000 jobs for the Indian economy accumulating a wealth of US\$20 billion. It is now widely accepted that the 'new' economy is also expanded to the domestic economy (Table 4). In IT services, the Indian companies hold 78 per cent of the share and the MNCs hold the rest. Among the ITES companies, a 55 per cent share is held by the domestic firms and the rest by the MNCs. In terms of total market share in value, the Indian companies hold three-fourths, as against one-fourth held by the MNCs. The major destinations of export of the 'new' economy sector are to the Americas (69 per cent), Europe (22 per cent), Japan (4 per cent) (Nasscom's Handbook, 2002c).

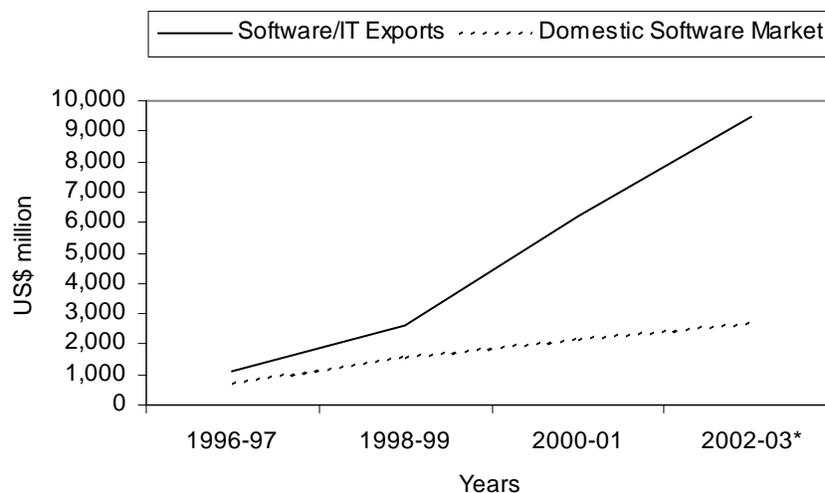
**Table 4:** Exports vs. Domestic market (US\$ million)

Year	Domestic Market	Export Market
1997	2661	1100
1999	3381	2600
2001	6213	6217
2003	7481	9545

Source: Nasscom (2004a)

### 'New' economy: export opportunities

Export opportunities are getting bigger and bigger over time with the 'new' economy products. Figure 1 presents the export growth rate in the period 1996 to 2003 in IT/Software services.

**Figure 1:** 'New Economy': Export Opportunities (US\$ million)

\* Projections

Source: Nasscom (2002c)

It appears that the total growth of exports with IT services increased six fold and the domestic market expanded by fourfold. The ratio of IT/Software exports to total exports has been increasing continuously, from almost 14 per cent of the total exports in 2001 to 18.5 per cent in 2003 (Table 5).

**Table 5:** Software Exports to Total Exports (%)

Items	2001	2002	2003
Software Exports	13.80	16.50	18.60
Other Exports	86.20	83.50	81.40

Source: Nasscom (2004a)

It will soon contribute one-fifth of the total exports. Export opportunities within the 'new' economy sector have also been changing over time. ITES share of exports to total IT services exports has been increasing continuously since 1999. Table 6 suggests that the ITES share of exports was 14 per cent in 1999, reaching almost 25 per cent in 2003. By all measures, these figures demonstrate a strong achievement by the sector within a short period of time.

**Table 6:** ITES Exports to IT Exports (%)

Year	ITE Services	IT Services
1999-00	14.0	86.0
2000-01	14.5	85.5
2001-02	19.0	81.0
2002-03	24.0	76.0

Source: Nasscom (2004a)

How was this possible? Table 7 demonstrates that the Indian IT industry has been occupying a major share of the global ITES and Business Process Outsourcing (BPO) segments of the industry. Top five business opportunities are presented in this table.

**Table 7:** Top five sources of business opportunity (%)

Source	2001	2003
BFSI	35	39
Manufacturing	12	12
Telecommunications	12	9
Retail	4	5
Healthcare	3	5

Source: Nasscom (2004b)

There are many factors behind the success of the Indian IT enterprises. Most importantly, *English language* skills give India a major competitive and technological edge over other nations (Einhorn, 2003). Secondly, more and more multinational companies are *shifting their services* to countries such as India which can offer professional workers at low cost (Hussain 2003), and

thirdly, India gains from *job shift* from more developed nations. For example, US banks and financial service companies are leading the way in outsourcing to India. It has been widely believed that the US companies have saved more than \$6 billion in the past four years by outsourcing procedures (Raghunathan 2003). The revenue generated by the top five companies in India reflects this claim (Table 8).

**Table 8:** Top five companies by revenue (US\$ million)

Company	2003	Share (% of total)
Tata Consultancy	941.1	10
Infosys Technology	733.6	8
Wipro Technology	577.1	6
Satyam Computers	414.8	4
HCL Technology	316.9	3

Source: Nasscom (2004b)

## ECONOMIC AND REGULATORY REFORM IN TELECOMMUNICATIONS

The economic reform agenda in telecommunications has been addressed in two policy documents produced in 1994 and 1999, popularly known as: National Telecom Policy 1994 (NTP, 1994) and New Telecom Policy 1999 (NTP, 1999). These policies have been the major driving force for the success of the Indian IT industry. Let us examine these policies below:

### National Telecom Policy 1994

A major programme was undertaken in 1991 to expand and upgrade India's telecom network. The programme includes: complete freedom of telecom equipment manufacturing, privatisation of services, liberal foreign investment and new regulation in technology imports. Simultaneously, the government-managed Department of Telecommunications (DoT) was restructured to remove its monopoly status as the service provider. Most value-added services, including cellular phones and radio pagers, which were virtually non-existent in the pre-reform era, have grown at an unprecedented rate (Hossain, 1998). The government programme was formalised in a telecom policy statement called "National Telecom Policy 1994" on 12 May 1994 (full record of this policy can be found in [www.trai.gov.in/ntp1994.htm](http://www.trai.gov.in/ntp1994.htm)).

The major provisions incorporated by the NTP 94 are:

- to allow new entrants to provide basic telephone services to supplement DoT's service;
- to maintain DoT's status as sole provider of long distance services, confirming that DoT will remain a government Department;
- to set targets for providing all villages with access to a telephone by the end of 1997;
- to endorse the existing policy whereby the private sector will be the main provider of value-added services;
- to encourage pilot projects which envisage inflow of new technology and management techniques, generally involving foreign investment; and
- to indicate that a mechanism will be set up to protect consumer interests and ensure fair competition (Hossain, 1998: 218).

What was the outcome of NTP 94? Compared to its commitments and provisions endorsed by the 1994 statement, the outcome was less satisfactory. Only a handful of the targets set by this policy agenda were achieved.

“For example, as against providing one Public Call Office (PCO) per 500 urban Indian population and the telephone coverage of 576,490 villages in India, the DoT has achieved an urban penetration of one PCO per 522 and has been able to provide telephone services to only 310,000 villages. However, the DoT also has provided 8.73 million telephone lines against the eighth Five Year Plan target of 7.5 million telephone lines.” (Selvarajah, 2000: 68)

Overall, the NTP 94 was not sufficient to make India’s telecommunications sector fully open and liberalised. The incumbent monopoly (DoT) was indifferent to implementing the national telecom policy effectively, due to its lack of commitment and also due to instability at the Centre (frequent changes of governments) over 1994 and 1998. This paved the way for designing a new policy framework for telecommunications, called the New Telecom Policy 1999 (NTP 99) which was delivered by the new government led by the *Bharathiya Janata Party* (BJP) coalitions.

### **The New Telecom Policy 1999**

The New Telecom Policy 1999 (NTP 99) was developed as the backdrop of three major events witnessed by the Indian economy after the reform process began in 1991. First, although NTP 94 was a right step towards bringing reform in the telecommunications industry, it failed to achieve its desired goal until 1997. Second, the coalition government of Atal Behari Bajpai led by the BJP brought stability to the Central government when it came to office in 1998; and, third, immediately after assuming power, the BJP-led government was keen to bring further reform in telecommunications to attain an effective and efficient communications sector. In order to achieve this, the BJP-led coalition government immediately formed a high powered committee to develop the Internet Services Development Policy headed by the Chief Minister, Chandrababu Naidu. The commitment of this committee and the major interest of the Prime Minister in transforming the telecommunications sector gave birth to the NTP 99 for the Indian telecommunications sector (a full record of the NTP 99 can be found in [www.trai.gov.in/npt1999.htm](http://www.trai.gov.in/npt1999.htm)).

According to Selvarajah (2000):

“Overall, the NTP 99 is a comprehensive and progressive telecom policy framework. It addresses the outstanding issues of telecommunications development and the challenges of modern telecommunications technology. NTP 99 recognises the crucial role of private sector investment in the development process of the sector and to bridge the much-needed financial resources gap.” (p. 69-70)

Among other things, the NTP 99 has endorsed policies under five policy frameworks:

- Framework for Services Deployment
- Framework for Licensing of Telecom Services
- Framework for Restructuring of Telecom Organisations
- Framework for Further Liberalisation of Services
- Framework for Regulation.

India's economic reform in telecommunications goes hand in hand with regulatory reform from the early 1990s. Telecommunications regulatory reform in India can be divided into two categories: reform introduced under the NTP 94 and reform introduced under the NTP 99. The section below presents an illustration of reform measures taking these two documents into considerations.

The regulation began with the introduction of an independent regulatory agency called the "Telecom Regulatory Authority of India (TRAI)" in March 1997. NTP 94 had a provision to introduce such an independent entity to regulate telecommunications in India. It was felt that such an authority was needed due to on-going liberalisation and economic reform introduced to the industry following the government's publication of NTP 94. Among other things, NTP 94 has brought the following changes in the industry:

- New entry for basic telephone services will be permitted as duopolies (that is, DoT and one other operator) in the twenty one 'Circles' into which the country has been divided;
- DoT will retain the long distance monopoly for five years, after which the decision would be reviewed; and
- Foreign ownership of telecom operators will be welcome up to 49 per cent of equity (from World Bank, 1995: 104-5).

With all these changes in place, an independent regulator for the industry was overdue. The Telecom Regulatory Authority of India Act 1997 established the TRAI in January 1997, with a view to provide an effective regulatory framework and adequate safeguards to ensure fair competition and protection of consumer interests. To achieve the objectives of the TRAI Act, TRAI was given power to give directions to service providers, make regulations, notify tariffs by Order, and adjudicate disputes arising between government (in its role as service provider) and any other service provider. Among all the powers and duties, its authority and jurisdiction to settle disputes among the service providers has been important. However, there was a ruling by Delhi High Court against the TRAI about its power and jurisdiction in July 1998. The High Court ruled, "It was not mandatory for the Indian government to seek recommendations of the TRAI prior to issuing licences for telecommunications services in the country" (quoted in Selvarajah 2000: 71). The judgement affirmed the powers of the DoT, i.e. the government, to issue licences without recommendations from TRAI. It also clarified that TRAI did not have the power to override the licence conditions. The High Court concluded that "the powers of the TRAI cannot be construed as a precondition precedent to the exercise of any other powers by the DoT on behalf of the government under the Indian Telegraph Act No.13 of 1885" (quoted in Selvarajah, 2000: 71). With this ruling in place, the new and the independent telecom regulator in India had a controversial and bumpy start.

In addition, another High Court judgement in January 2000 observed that the TRAI Act 1997 did not empower the regulator to *fix* interconnection terms and conditions between service providers, and that TRAI had merely a policing function in this regard. This meant that the Calling Party Pays (CPP) regime for cellular mobile that TRAI sought to introduce in November 1999 that specified, *inter-alia* explicit revenue shares for calls from Basic to the cellular network could not be implemented. Soon after this judgement, the TRAI Act was amended and a new Act, the TRAI (Amendment) Act 2000, was introduced. These episodes of conflict between the incumbent and the regulator undermined the credibility of the regulator during the initial years of telecom liberalisation in India. Prior to this, DoT was responsible for the industry regulation as a

part of government operation. According to Selvarajah, “overall, the TRAI has the powers and functions of a typical telecom regulator” (2000: 71). It appears that in practice the TRAI faced major hurdles to function appropriately in the initial period due to some High Court rulings sought by the DoT about the jurisdiction and obligations of the TRAI. This has made TRAI less effective and has forced a process of continuous transformation in the early years. The next section provides a brief overview of the players in regulation as it stands in India at present.

### **Players in Regulation**

India’s telecommunications sector is regulated by the Ministry of Communications through three government bodies - the Telecom Commission, the DoT, and the TRAI. The Telecom Commission performs the executive and policy-making function, the DoT is the policy-implementing body, while the TRAI performs the function of an independent regulator.

#### **A. Department of Telecommunications, Ministry of Communications**

The DoT, Ministry of Communications, is the authority in India that looks after the licensing and overall policy making. Until recently, DoT was also the main service provider. This role, however, has been separated from DoT, and is now functioning as a corporate body, *Bharat Sanchar Nigam Limited* (BSNL). Two other government corporations are also established as service providers. *Mahanagar Telephone Nigam Limited* (MTNL) operates in Mumbai and Delhi with licence for, *inter alia*, basic service, cellular mobile and Internet access. *Videsh Sanchar Nigam Limited* (VSNL) has a monopoly in the international call segment and has a licence for providing some other services including the Internet. The government is a major shareholder in both MTNL and VSNL, and has substantive control over the decisions of these service providers. In fact, they may also end up competing with each other for the same market. This has already started happening in certain cases, for instance, with MTNL and VSNL for the Internet market. A competitive situation would require greater autonomy for MTNL and VSNL.

#### **B. Telecom Regulatory Authority of India**

On 24 January 2000, an Ordinance amended the TRAI Act 1997 and altered a number of aspects. For example, the adjudicatory role of the TRAI has been separated and has been provided to the Telecom Dispute Settlement and Appellate Tribunal (TDSAT)<sup>3</sup>. This Tribunal has been provided the powers to adjudicate any dispute between a licensor and a licensee; two or more service providers and a service provider and a group of consumers.

TDSAT has been given additional powers those it inherited from TRAI; for example, it can settle disputes between licensor and licensee. Further, the decisions of the Tribunal may be challenged only in the Supreme Court. The remaining functions of TRAI have been better defined and expanded in the TRAI Act (2000). For instance, with respect to powers relating specifically to interconnection conditions. TRAI now has the power to ‘fix the terms and conditions of inter-connectivity between the service providers’ (TRAI (Amendment) Act 2000), instead of ‘regulating arrangements between service providers of sharing revenue from interconnection’ (TRAI Act 1997). The new legalisation signalled an attempt to re-establish a credible regulator. The government would be required to seek a recommendation from TRAI when issuing new licences. The adjudication of licensor-licensee disputes would be undertaken by an independent tribunal specialised in telecom. In terms of interconnection arrangements, TRAI was given the powers to override the provisions of licence agreements signed with DoT. However, while there has been an increase in the powers of TRAI (other than dispute

settlement), the Ordinance has led to a weakening of the guarantee that was provided in the Act with respect to the five-year working period for the TRAI Chairman and Members. This statutory guarantee was done away with by the Ordinance, which provides for less stringent conditions for removal of any Member or Chairman of TRAI. To that extent, the independence of TRAI has been whittled down. More on TRAI is provided in the next section.

Since the regulatory outcome of the NTP 94 has been disappointing, the government proposed new regulatory policies in its NTP 99 policy statement. The regulatory reform introduced by the NTP 99 can be summarised as follows:

- Reaffirm the commitment for a strong and independent telecom regulator
- Arbitration powers given to the regulator in settling disputes between the government and other service providers
- Licensing and policy making will, however, continue to fall under the government's jurisdiction
- Prohibition of the provision of voice services over the Internet Protocol
- Recognition of the need for changes in the existing telecom legislations (Selvarajah, 2000: 70).

NTP 94 spelt out five basic objectives of which two objectives, (1) availability of telephone on demand and (2) universal service (connecting all villages), were targeted to be realised by 1997. Both of these objectives remained unrealized. In regard to (3) quality of service, matching 'world standard' and providing the 'widest possible range of services' 'at reasonable prices' were stated aims. Two other objectives were: (4) to make the country a major manufacturing base and exporter of telecom equipment, and (5) to ensure the country's defence and security needs. The powers of licensing and spectrum management were retained by the government on the grounds that both need to be strictly monitored in order to protect the strategic interests and security of the country.

There were serious gaps in the policy document with respect to provision of a suitable environment for entry of private service providers and on the issue of meaningful regulation. The NTP 94 policy was designed with the fact in mind that services should continue to be provided largely by a strong incumbent that faced little competition. The same view seems to be reflected in the 'guidelines' for selection of private basic service operators. Efforts to involve the private sector under NTP 94 encountered certain obstacles. In addition, while major targets were specified in NTP 94, an accurate assessment of the underlying resource requirements was not done. For example, to realise the enunciated objectives, an estimated INR.230 billion of additional resources were required. A need for private sector contribution to the effort was clearly recognised, but various implementation problems including incomplete reforms mitigated the efforts to achieve the targets. Meanwhile, convergence arising due to changes in technology and the overall market structure for service provision had changed, and there was a need to provide fresh directions through another policy.

The opening up of the Internet sector setting the background to NTP 99 is a major attempt to plug the loopholes in the NTP 94 policy. Its policy objectives in itself are marked improvements. Provision of 'universal service' (including unconnected rural areas, re-targeted for year 2002) is sought to be balanced by the provision of sophisticated telecom services capable of meeting the needs of the country's economy. The latter objective is further amplified to include 'Internet' access to all district head-quarters (DHQs) by 2000 and providing high speed data and

multimedia capabilities to all towns with a population of 200,000 and above by 2002. Apart from a target average penetration of 7 per cent by year 2005 (and 15 per cent by 2010), targets for rural 'teledensity' have been set to increase from the current level of 0.4 per cent to 4 per cent during the same period.

To meet these teledensity targets, an estimated capital expenditure of INR. 4,000 billion for installing about 130 million lines will be required. Recognising the role of private investment, NTP 99 envisages multiple operators in the market for various services. The most important change has been a shift from the existing licence fee system to one based on a one-time entry fee combined with revenue share payments.

Whereas NTP 94 only acknowledged the need to enlist private participation in a big way into value added as well as basic services, and to 'ensure fair competition', NTP 99 goes further in targeting a greater competitive environment and level playing field. Other regulations include, for instance, a limitation on sub-licensing, on transferability of shares for a specified period (i.e. five years), and the licensee being treated as a defaulter when there is a non-compliance of any licence condition. It must be borne in mind that over time, the government has made attempts to remove restrictions that adversely affect performance of the licensee. For example, there was earlier a condition that the last mile linkage should be with copper wire only, but this condition has been relaxed.

NTP 99 allows DoT/MTNL to enter as third cellular mobile operators in any service area if they wish to provide these services. To ensure a level playing field, DoT and MTNL will have to pay a licence fee, but DoT's licence fee will be refunded because it has to meet the USO guidelines. It is worth noting that to the extent that the fee will be specifically refunded to bear the cost of USO, this aspect should be accounted for when calculating the USO levy and apportioning the revenues from that levy. Some of the other notable advances marked by the NTP 99 are as follows:

- Speeding up competition in long distance, including usage of existing backbone network of public and private entities in rail transport, power and energy sectors for data (immediately) and for domestic long distance voice communication when the latter is opened to competition from January 2000. This opens up the scope for entry of a new category of infrastructure providers or 'carrier's carrier';
- The Fixed Service Providers (FSPs) shall be freely permitted to establish 'last mile' linkages to provide fixed services and carry long distance traffic within their service area without seeking an additional licence. Direct interconnectivity between FSPs and any other service provider (including another FSP) in their area of operation and sharing of infrastructure with any other type of service provider shall be permitted;
- Policy to convert PCOs, wherever justified, into Public Teleinfo centres having multimedia capability like ISDN services, remote database access, government and community information systems, etc;
- Transforming in a time-bound manner, the telecommunications sector to a greater competitive environment in both urban and rural areas providing equal opportunities and a level playing field for all players;
- Strengthen research and development efforts in the country and provide an impetus to build world-class manufacturing capabilities;
- Achieving efficiency and transparency in spectrum management;
- Commitment to restructure DoT;

- Interconnect between private service providers in same Circle and between service provider and VSNL along with introduction of competition in domestic long distance;
- Undertaking to review interconnectivity between private service providers of different service areas, in consultation with TRAI;
- Permission for 'resale' of domestic telephony;
- Clarity regarding number of licences that each operator may be granted. (This could lead to consolidation of industry operators over the long term); and,
- Emphasis on certain other issues including standardisation, human resource development and training, disaster management and change in legislation.

## INDIA'S COMPETITIVE EDGE

As stated earlier there are many factors behind the success of the Indian IT enterprises. However, the Kellogg School of Management have identified five major areas: quantity and quality of IT workforce, strength of the workforce, increased productivity, low cost and English language skills. Table 9 presents a comparison of India with that of China in respect to some selected criteria of the industry.

**Table 9:** India and China: a comparison on selected criteria

Criteria	India			China		
	2000	2001	2005	2000	2001	2005
IT Market (hardware, packaged software and IT services), US\$ bl.	5.14	5.51	14.47	13.72	16.34	38.05
Software and services exports (US\$ billion)	6.20	7.20	23.00	.30	.60	1.5
CMM (Capability Maturity Model) Certified Vendors		77			30	

Note: 2005 figures are projections; Source: Nasscom (2002a)

It has been expected that by 2005, the IT market in China will be the largest in Asia-Pacific (excluding Japan), at more than US\$38 billion, whereas India having US\$15 billion. As far as the software and services exports are concerned India will achieve US\$23 billion as against China's mere US\$1.5 billion. While India's software exports have been cruising with sustainable pace, China's capture of hardware export markets has been remarkable. In 2000, China's IT hardware exports have been reported to be over US\$24 billion making it the third largest IT hardware supplier to the world market (Nasscom 2002a). In other words, it appears that the two vast nations on earth have been enjoying competitive edge in two major complementary areas of the IT market: hardware and software.

The 'new' economy sector of India without doubt having significant contribution to the following growth areas: skilled labour force employment, exports of IT based products,

attraction of MNCs to invest in IT and related businesses, and so on. It has been established that the average revenue per employee in the Industry reached to US\$17,500 per annum (INR 65,000 per month). The number of employees currently estimated to be 500,000 employed in more than 5000 companies. By any standard, these are phenomenal growth within a period of only ten years.

It has also been argued that the success of the 'new' economy sector was made possible due to five major reasons:

- Shortage of skills in Europe and US
- Abundant skills in India
- Availability of good quality skills
- India's ability to respond and deliver on time
- The cost advantage (India's cost is half the cost of EU, one third of typical US region and one fourth of SV) (Nasscom 2004b).

## **KNOWLEDGE AND INNOVATION**

### **Knowledge superpower**

Moreover, India's current status of a most preferred destination for IT outsourcing services was due mainly to its unprecedented achievements in the knowledge and innovation areas over the last two decades. Recently, the *New Scientist* journal has regarded India as a knowledge superpower. It says, "India was 'stealing' jobs from wealthy nations – not industrial job, like those that had migrated to South East Asia, but the white-collar jobs of well-educated people. Today we know that the trickle of jobs turned into a flood. India is now the back office of many banks, a magnet for labour-intensive, often tedious programming, and the customer services voice of everything from British Airways to Microsoft" (*New Scientist*, 2005).

In fact these are not the real reasons for India becomes a knowledge superpower. It is the recently established R&D labs for more than 100 Indian IT firms. This pushed India as a major partner in the global scientific and innovative research. As mentioned earlier, India has been producing a huge number of engineering, computing and science graduates every year. One account suggests that the nation has more than 250 universities which cater 3.2 million science and technology students. The IT outsourcing revolution in the last decade was the major source of employment of such a huge number of science and technology graduates. As a result, the IT industry's contribution to GDP in 2004 reached 3 per cent compared to only 1.3 per cent in 1999.

### **Rise of the middle class**

It has been claimed that the knowledge revolution was the major source of a rise of the middle class in India and is estimated to be somewhere between 130 million and 286 million. The emerging middle class is having an unprecedented impact on consumption pattern. For example, India although a developing nation, experiencing car sales rising by more than 20 per cent a year in recent years. In addition, it was mentioned earlier that growth in telecommunications in the last ten years has been extraordinary, particularly in the area of mobile phone services in both urban and rural areas. For example, Reliance Infocomm, an Indian telecommunications firm, has laid recently 80,000 kilometres of fibre-optic backbone to connect the base stations making up its

wireless network. This mobile infrastructure will contribute to connect more than 5000 towns and 400,000 villages by the end of 2005 (Cohen 2005).

## CONCLUSION

IT and related businesses have been the fastest growing sector of the Indian economy over the last ten years. There is still an opportunity to grow further in the future. There are numerous lessons from the Indian experience. The present paper articulates at least three significant lessons for other developing nations:

First, the India telecom sector presents a picture of “managed competition”. While the traditional public monopoly is coming to an end, effective competition has been hard to achieve for a number of reasons. The incumbent with an extensive network has retained market power. The number of networks that have come up or are about to come up are limited because of the costs of building the network. The availability of spectrum is a constraint in the market especially for cellular mobile services. Given these circumstances, however, the expansion of telecommunications services has been phenomenal over the last decade.

Second, new market-based approaches to the supply of telecommunications services have been introduced in India and technological changes have led to cost reduction and expanded scope of product choice. The number of initiatives on the drawing board makes impressive reading and present immense opportunity for the sector and thus for the economy. Telecommunications Regulatory authority (TRAI) has already issued consultation papers on Internet Telephony and Interconnection and opening of international long distance (ILD) services to private competition. These initiatives suggest a greater reliance on market forces than before. As market-based approach to the provision of telecom services has been adopted, the question to be addressed is whether there should be more or less regulatory intervention.

Third, under the given market-based approach and the current regulatory framework in place, the telecommunications industry has contributed to establish a ‘new’ sector in the economy driven by the IT/Software and IT enabled services. Within a short period of time, the ‘new’ economy sector has substantially contributed to reversing the age-old current account problem and has created hundreds and thousands of jobs in newly established domestic companies and in India based major MNCs. These make the recent achievements in growth in India a reality and not hype and by all means sustainable. These achievements, however, are not immune from any threat in the future. The major challenges can be identified in terms of India’s image problem to outside world, gradual withdrawal of tax incentives in place, WTO intervention on behalf of the other member nations and direct competition faced from South East Asian nations including China.

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