

Consultation Paper No: 17/2010



**TELECOM REGULATORY AUTHORITY OF INDIA**

**Consultation Paper**

**on**

**Encouraging Telecom Equipment Manufacturing in  
India**

28<sup>th</sup>, December, 2010

**Mahanagar Doorsanchar Bhawan**

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## **Preface**

The telecommunications sector would continue to contribute significantly to the growth of the Indian economy over the next few years. While the growth in the spread of telecom infrastructure and provision of services is rapid, the contribution of the Indian telecommunications equipment manufacturing industry to this sector is modest. There is all-round recognition that profactive steps must be taken to repair the situation.

In this context TRAI had issued a pre-consultation paper in May this year and several issues have been identified. Based thereon, this consultation paper has been prepared raising specific issues for consideration of stakeholders, so as to enable the Authority to take further action and recommend suitable measures for Government's consideration.

Written comments on the issues raised in this consultation paper are invited from the stakeholders by 14<sup>th</sup> January, 2011 and counter-comments on the comments by 21<sup>st</sup> January, 2011. The comments and counter-comments may be sent, preferably in electronic form, to Mr Lav Gupta, Principal Advisor (TD) on the e-mail address: [tdra@traigov.in](mailto:tdra@traigov.in) or [tdra.traig@gmail.com](mailto:tdra.traig@gmail.com). The fax number of TRAI is 011-23211998. Comments and counter-comments will be posted on the TRAI's website.

**Dr. J.S. Sarma**  
**Chairman, TRAI**

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## **Introduction**

1. The global economic focus has shifted towards Asia and India today is a major focal point. According to BTI<sup>1</sup> Transformation Index rankings of 2010, India has been ranked 26<sup>th</sup> and China 88<sup>th</sup> in terms of economic and political transformation. The Indian telecom sector has contributed significantly to the growth of the Indian economy. As a result of the policy and regulatory initiatives over the years, the growth of subscribers connected to the Indian telecommunications network has seen a CAGR of 44.66% over last 5 years. The number of connections was 742.12 million at the end of October 2010 and is projected to grow to 1 billion by 2014, taking the teledensity to about 100%. The gross revenue figure reported by the service providers for 2009-10 is Rs 1,57,984.76 crore. According to a KPMG report, the sector currently has about 5 million jobs and this number is expected to increase to 20 million. With the introduction of 3G and the possibility of 4G in the near future, the data consumption is likely to multiply manifold. The prospects of continued aggressive growth and availability of a big pool of skilled manpower hold immense potential for the sector.
2. The telecommunications industry is enabled by a complex value chain that includes equipment suppliers, service providers, and users. The telecommunications value chain begins with sourcing of components like semiconductor chips and software. These components are, in turn, incorporated into equipment purchased by service providers. The service providers then use the equipment to build networks and provide service to the end users. The equipment manufacturers also

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<sup>1</sup> Bertelsmann Foundation and the Centre for Applied Research, Munich, Germany

supply terminal equipment like mobile and fixed telephone instruments to the end users. India has been able to drive innovation when it comes to software services in the telecom space. But the results are not so encouraging when it comes to developing telecom equipment. To become an important player in the global telecom space, India has to create a synergetic telecom ecosystem and build globally competitive product companies across the telecom value chain. Despite the growth in the number of subscribers, the ecosystem has so far failed to adequately spur the manufacturing segment and as a result, the domestic telecom equipment manufacturing segment has not been able to meet the demand created by other segments of the telecom ecosystem forcing the telecom operators to import most of the equipment required for their network. In 2008-09 alone, as per Directorate General of Commercial Intelligence and Statistics (DGCIS) data, equipment worth Rs. 461.58 billion was imported by the Indian telecom operators. According to a KPMG report<sup>2</sup>, the telecom equipment market in India is estimated to be Rs 450 billion and growing @20-25% p.a. Given the right initiatives by all stakeholders, the manufacturing sector can make rapid strides. The telecom system/hardware equipment market is much bigger than the telecom software market and domestic production can not only reduce our imports, but also create a large export opportunity with the consequent benefits to the telecom industry and the country.

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<sup>2</sup> "Broadband for All", India Telecom 2010

3. Domestic manufacturing of telecom equipment in India is mostly based on technology developed abroad<sup>3</sup> resulting in the benefits of sales of such products largely accruing to foreign companies. It is true that the Indian mobile handset companies have increased their domestic share to 14% in 2009-10 from 3-4% in 2008-09 and are actively competing with international giants. Nonetheless, the Hardware Task Force report<sup>4</sup> indicates that despite the huge requirement for telecom hardware and growing domestic consumption, there is a dearth of Indian manufacturers of telecom equipment who can effectively address these needs. Availability of domestic telecom equipment manufacturing will enable Indian companies to transform into new product innovators from being mere software solution developers. Moreover, with manufacturing units and their supply chains in place in India, telecom equipment manufactured in India may be rendered cheaper compared to imported equipment. Local manufacture can also help in addressing security and safety concerns, cut down the life-cycle time, and strengthen the other links of the value chain.
  
4. A pre-consultation paper was issued in May 2010 for obtaining views of the stakeholders on “Encouraging Telecom Equipment Manufacturing”. The time has come when we have to collectively discuss, debate and finalise measures that can be send as recommendations to the government. The larger issues in front of us

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<sup>3</sup> “Report of Task Force to suggest measures to stimulate the growth of IT, ITES and Electronics Hardware Manufacturing industry in India”, Ernst & Young report, December 2009 (jointly with CEMA, ELCINA, ISA, ICA, ESC, NASSCOM, MAIT, TEMA)

<sup>4</sup> “Report of Task Force to suggest measures to stimulate the growth of IT, ITES and Electronics Hardware Manufacturing industry in India”, Ernst & Young report, December 2009 (jointly with CEMA, ELCINA, ISA, ICA, ESC, NASSCOM, MAIT, TEMA)

are to see how the telecom manufacturing value chain needs to be altered to benefit the Indian telecom industry and the country and what needs to be done to make India a telecom manufacturing powerhouse. Within the perimeter of the larger issues, it is expected that the stakeholders would come out with definitive suggestions on the issues such as developing component manufacturing, R&D and innovation, creation of Indian IPR wealth, financial incentives for the sector, competitiveness of the Indian manufacturing companies, incentives to attract investment & FDI, manufacturing clusters and creation of centralised test & certification lab.

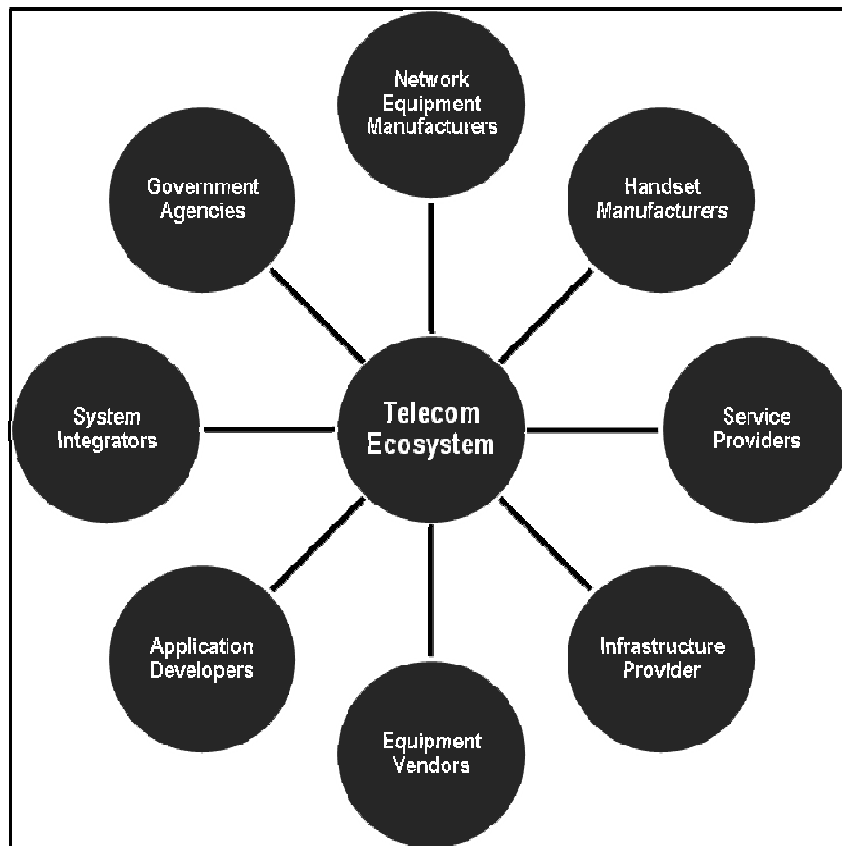
5. Arising from the consultation process, it is proposed to suggest to the Government measures for making India a telecom manufacturing powerhouse. If certain measures require regulations to be issued, the same would be carried out.
6. Chapter I of this Consultation paper brings out the telecom ecosystem and its bearing on the manufacturing segment. Chapter II covers issues relating to optimising the telecom manufacturing value chain which are summarised in Chapter III.

## **Chapter I**

### **The Telecommunications Ecosystem**

1.1 The telecom ecosystem of a country consists of players who contribute to sustain a healthy and growing telecommunications industry. The ecosystem consists of different access service providers including fixed-line, cellular mobile and Internet service providers. There are national and international long distance operators who provide these services to subscribers through access service providers or in some cases directly to the subscribers. Then there are original equipment manufacturers (OEMs) and suppliers of telecom equipment who sell equipment to service providers or directly to customers. There are also infrastructure providers who install towers, fiber, duct or other passive infrastructure for the use of service providers. Application/content developers may provide services directly to the customer or through service providers. There are component, semiconductor and auxiliary equipment manufacturers from whom the telecom equipment manufacturers source their inputs. The system integrators procure hardware and software from OEMs and then provide end-to-end solutions to the service providers or enterprise customers. Various segments of the telecom ecosystem are depicted in Figure 1.1.





**Figure 1.1 The Telecommunications Ecosystem**

1.2 Different segments of the eco-system are not entirely independent. For example, the ‘Service Provider’ segment has impact on the manufacturing and vice-versa. The supply chain of a telecom product in the ‘Network Equipment Manufacturer’ segment has impact on roll-out and growth of services. The Government institutional framework has impact on various other segments. A sound policy framework for the manufacturing segment of the telecommunication sector, requires taking into account the mutual influence of different constituents of the telecommunication ecosystem. We discuss below these influences.

## **A – Service Providers**

- 1.3 Service providers who build their own networks are users of inputs from the equipment manufacturer and infrastructure segments. Competitive rates, lower lead times and availability of new technology equipment would help the service providers to roll out their networks faster and provide affordable services to the customers.
- 1.4 As per DOT's website, in India there are 19 licensed access service providers providing voice, data and leased line services in various service areas. The total revenue reported by these service providers was Rs. 1,24,435.55 crore in 2009-10. This segment requires, among others, a variety of fixed and mobile switches, transmission equipment, fiber and copper cables and various kinds of system and application software, IN platforms, subscriber management systems, test equipment and other support systems like power and air-conditioning.
- 1.5 In the long distance segment there are 29 NLDOs and 24 ILDOs out of which 13 are providing voice and rest are only in the VPN/leased line market. The turnover of NLD and ILD segments was Rs. 19,320.70 crore and Rs.8829.13 crore respectively in 2009-10. Deployment of long distance services requires, among others, switching, transmission equipment, fiber, landing stations, security systems, backend hardware and software.
- 1.6 There were 378 licenced ISPs at the end of July 2010 out of which 165 were active. The total turnover was Rs. 5282 crore in 2009-10. The

ISP business requires various kinds of IP and Ethernet equipment, backend hardware and software, applications and content.

## **B – Infrastructure Providers**

1.7 In the infrastructure segment there are about 15 players offering towers to the service providers. The industry has about 3,00,000 towers(as on February 2010) with a sharing ratio of about 1.5 and growth of about 20% per annum. The infrastructure provider can create passive infrastructures like fiber, duct and tower. All these give rise to requirement for tower material, cables of various types, power and air-conditioning equipment. Other than the Original Equipment Manufacturers (OEMs), there are telecom vendors and system integrators who may outsource equipment from many sources and provide support to the other segments of the ecosystem.

## **C – Application Developers**

1.8 An important constituent of the telecom ecosystem are application/content/VAS developers offering a variety of services in the areas of entertainment, information and m-commerce. According to a Feedback Consulting report<sup>5</sup> mobile VAS revenue grew to about Rs 11,700 crore in 2009-10 against about Rs 9000 crore in the previous year. The entertainment revenues (ring tones, CRBT, Music downloads, video clips, Games, voting) were about Rs 6750 crore of which the ring tones were the dominant category having about 52% share. The information VAS (arrival, departures, weather updates, crop prices, farming related info is catching up among rural areas)

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<sup>5</sup> OPPORTUNITIES IN THE MOBILE TELECOM SECTOR IN INDIA Date: October 2010, Feedback Consulting. The US\$ figures have been converted to Indian rupees @ Rs 45 for 1US\$

generated revenue of about Rs 4590 crore and m-commerce about Rs 450 crore. These require a variety of platforms and backend systems. M-commerce use is currently confined mainly to urban mobile users. Government is making all efforts to proliferate banking service among the unbanked population through mobile phones. This initiative is expected to generate demand for mobile handsets, POS terminals, computers and other backend systems.

#### **D – Network equipment/handset manufacturers**

- 1.9 The manufacturing segment has a big impact on the service and infrastructure segments. Availability of indigenous equipment reduces cost, increases availability and cuts down time for rollout and expansion.
- 1.10 According to DoT estimates, telecom equipment worth more than Rs 3,50,000 crore will be required by 2015. What benefit of this would accrue to the domestic companies and the country would depend on how the telecom value chain is handled and what efforts are made towards making India a credible manufacturing powerhouse.
- 1.11 There are more than 25 players of which majority are international players like Nokia, Huawei, ZTE, Cisco etc. The mobile handset requirements are also huge consistent with the growth projections. As per Voice & Data, about 108 mn mobile phones were sold in the country during 2009-10 with the sales volume of about Rs 27,000 crore up from about Rs 25,650 crore in the previous year.
- 1.12 For a strong manufacturing segment, R&D and innovation are important pre-requisites. There are hardly any world-class telecom

products which have been developed in India. There is a need to enhance R&D in the telecom equipment manufacturing segment and significantly increase the number of Indian telecom product companies in the country. R&D effort is required to develop affordable technology for the masses, as also comprehensive security infrastructure for telecom networks. More research is required for the preparation of tested infrastructure for enabling interoperability in Next Generation Networks and Green technologies.

- 1.13 The regulatory and policy institutional framework component of the telecom ecosystem plays an important role in creating a congenial environment for growth through domestic manufacturing. The stated policy of the Government of India as enunciated in NTP 1999 is as follows:

*...“strengthen research and development efforts in the country and provide an impetus to build world-class manufacturing capabilities” and “with a view to promoting indigenous telecom equipment manufacture for both domestic use and export, the Government would provide the necessary support and encouragement to the sector, including suitable incentives to the service providers utilising indigenous equipment”.*

- 1.14 Globally, Governments have created a supportive policy framework to encourage their telecom equipment manufacturing and R&D. Such support has resulted in creation of several multi-billion dollar enterprises. **China** has been actively supporting its telecom industry and has been providing significant support in the form of subsidies, loans and lines of credit to the Chinese telecom companies carrying out R&D and improve manufacturing and stimulate their exports. This has helped these companies to win large domestic business and enable them to use their home market as a base to achieve globally competition scale. The Chinese Government has also been pro-actively

pushing for telecom exports as a part of their bilateral trade and use telecom exports as a key area for bilateral trade. The Government under the Chinese Development Bank has been providing very large export financing, for example, US \$ 50 billion to ZTE and US \$ 10 billion to Huawei. **Israel** with just about 200,000 technology professionals has been able to create R&D driven companies, exporting telecom equipment globally. Israel has set up funding for R&D expenses of Israeli companies to the extent of 50% of their expenses to help them to become global technology leaders. The grants are provided as conditional loans subject to royalties of about 3-5% of sales payable only in the case of technology and commercial success. **Brazil** applies state taxes and charges to imports that can double the actual cost of importing products into Brazil. Brazil only allows the import of such products if they are not produced domestically. The Government of Brazil offers a variety of tax, tariffs and financing incentives to encourage production for export and the use of Brazilian made inputs in domestic production. Brazilian National Bank for Economy and Social Development (BNDES) provides long term financing to Brazilian industry through different programmes at lower interest than the market interest rates. Regulations allow a Brazilian state enterprise to subcontract services to a foreign firm only if domestic expertise is not available. ICT is **Canada's** one of the most invested sectors representing almost 40% of the country provide investment in research and development worth and estimated US \$ 5.7 billion in 2006. The Canadian Government encourages R&D through generous R&D tax credits to help drive innovations and through direct support of research sectors. **Finland's** Public Policy implemented in the course of last two decades has played an important role in reinforcing the country's innovative capacity, by creating adequate framework conditions for innovation.

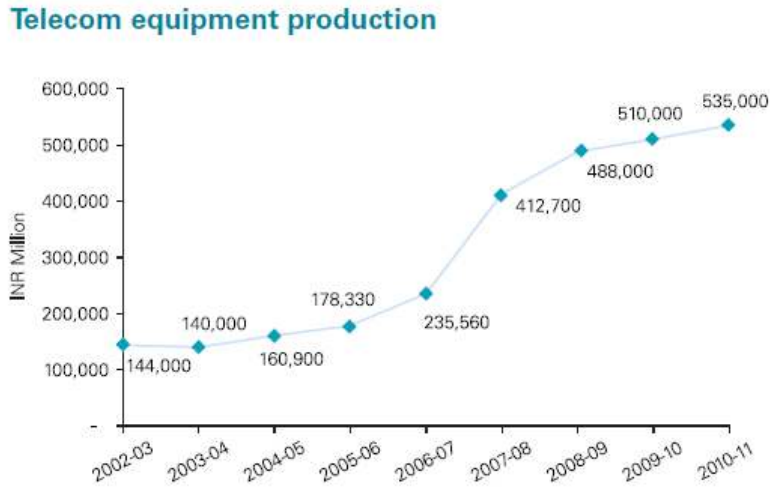
Important investment in R&D together with the establishment of an effective network of public agencies supporting public and private R&D and a cluster based approach to innovation which encouraged numerous interaction and knowledge and technology transfers amongst small and larger firms, service providers, research institutes and universities. Finnish trade and investment policies have enabled trade and investment liberalization in the last two decades and have also significantly contributed to fostering adequate framework conditions for innovations in Finland.

## **E – Current Status in India**

1.15 According to a recent report by the technology researcher Gartner Inc., India ranks fourth in telecom equipment manufacturing in the Asia-Pacific (APAC) region. The country had a 5.7% share of the region's total telecom equipment production revenue of \$180 billion in 2009. India is expected to move to the third spot (after China and South Korea) with a share of 8.5% of the total (estimated) APAC telecom equipment production revenue of \$277 billion by 2014.

1.16 The Department of Telecom data shows that production of telecom equipment in India at the end of March 2009 stood at Rs 51,800 crore with a compounded annual growth rate (CAGR) of 29% in the previous five years. As compared to this, Chinese telecom equipment maker Huawei Technologies Co. Ltd alone reported revenue of Rs 82,350 crore in 2008, up from Rs 57,600 crore in the previous year. Production of equipment has been of the order of 510 billion in 09-10 and projected 535 billion in the current year(see Figure 1.2).

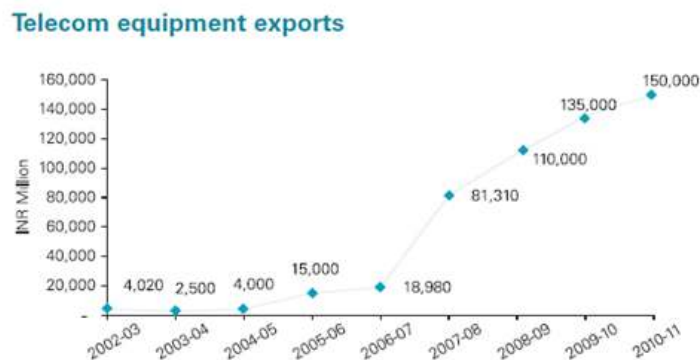
**Figure 1.2 – Telecom equipment production in India**



Source: TEPC, adapted from KPMG report India Telecom 2010

1.17 India exported equipment worth Rs. 135 billion in 2009-10 as against Rs. 18.98 billion in 2006-07, a growth of 600%, underlining the growth potential of the sector. The pace of growth of manufacturing will accelerate over next 3 years considering the growth of subscribers. As per DOT website, telecom equipment worth Rs. 3500 to 5000 billion will be required by 2015

**Figure 1.3 – Telecom equipment exports**



Source: TEPC, adapted from KPMG report India Telecom 2010



- 1.18 Technology in general has evolved dramatically in the last 20 years, since Indian liberalization programme was initiated in the early 1990s. The global telecom equipment industry has also changed in products, methods and business models. The beginning of 1990s saw introduction of mobile services and now the stress is on creation of a converged network for delivery a variety of services. These changes have helped stimulate a whole new set of devices and services for consumers and technologies for the network operators. In addition, the constant desire for mobility and portability drives a continued expansion and improvement in mobility technology. The result is that there is now a pressure on development of new technology equipment, the processes of production, creating partnerships, transmission of goods and services produced and in general altering the manufacturing value chain to bring more value into the country.
- 1.19 While the estimates of impact of growth of telecom on a country's economy may vary from study to study, one cannot deny the fact that telecom is a critical infrastructure sector having significant impact on other sectors and the economic growth. To become a force in the global telecom space, India has to create an ecosystem and build globally competitive product companies across the telecom value chain from components, devices to infrastructure. As the value chain gets altered to get more activities within the boundary of India an all-round impact on the telecom sector and the Indian economy would be evident.
- 1.20 Telecom equipment manufacturing was delicensed in 1991 and value added services were declared open to the private sector in 1992, following which radio paging, cellular mobile and other value added services were opened gradually to the private sector. This has resulted

in quite a few manufacturing units being set up in the country. A major breakthrough was the clear enunciation of the government's intention of liberalizing the telecom sector in the National Telecom Policy resolution of 13th May 1994, which said:

*“Taking into account India's size and development, it is necessary to ensure that India emerges as a major manufacturing base and major exporter of telecom equipment.”*

The New Telecom Policy of 1999 stated the following about manufacturing in India:

*“Strengthen research and development efforts in the country and provide an impetus to build world-class manufacturing capabilities”*

And,

*“With a view to promoting indigenous telecom equipment manufacture for both domestic use and export, the Government would provide the necessary support and encouragement to the sector, including suitable incentives to the service providers utilising indigenous equipment.”*

1.21 According to the Telecom Equipment Manufacturers Association (TEMA) the demand for telecom equipments in India has exceeded a trillion rupees this year. Because of the lack of a strong domestic manufacturing base, most equipment has been imported with hardly any value addition done in India. As we shall see in succeeding paragraphs, if activities like product development and component sourcing are done within the country then much more value is added than just assembling packaging and selling. The value chain geared up for producing and distributing products developed and manufactured in India gives maximum advantage to the country.

Local manufacturing would create the jobs in the manufacturing, logistics and services sector. It is important that focus is shifted to creation and use of indigenous telecom products that meet global standards of technology, quality and lower in cost.

1.22 The growth potential of the Indian telecommunications market is well recognized. Massive growth in the number of subscribers would require networks to be upgraded, new technologies inducted and new services offered. This would create huge demand for switching, transmission and subscriber equipment. It is estimated that for 3G alone the investment would be of the order of US\$ 15 billion. Demand for the network elements would translate into requirement for components, test and auxiliary equipment. The overall requirement is expected to be of the order of US \$100 billion. There is need and scope for meeting much of India's demand for components and finished products from domestic sources. Full value would be realized if the intellectual property resides within the country. It would then be possible to leverage the domestic production base to increase exports. As per the report of the Task Force, set up by the Department of Telecom and IT in August 2009, telecom equipment manufacturing can contribute up to US\$ 10 billion in export revenues and can treble the country's current employment base by 2014. Concerted efforts would be needed to strengthen the weak links in the value chain, recognize and remove barriers and take steps in the right direction to make India a manufacturing super-power.

1.23 Manufacturing locally has many benefits. It could contribute in providing this inclusive growth that India is looking for. Locating plants in rural area would help provide employment and income generation opportunities thereby providing livelihood. This would help

rural people to access better education facilities for their children and in turn is likely to improve country's literacy rates and employability. Better telecom connectivity and other innovative applications can play a vital role in extending health care services to the remotest part of the country. In general manufacturing industry is expected to generate employment for millions. It has immense export potential. It would help create valuable IPR. It would reduce dependence on imported products and help India become self reliant in many sectors. It would help in easy availability of the equipment and enable faster roll out at lower cost making the services more affordable.

1.24 India has the required strengths in highly skilled manpower, experienced technical and R&D experts, strong management experience in critical functions such as supply chain management, high tech manufacturing systems, operational management, value chain with EMS companies, MNCs investing in India, auxiliary component manufacturing base (e.g., for cables, cabinets, shelves, power electronics, tooling, bare PCBs, etc.), Large IT service companies doing telecom projects, strong academic and research labs, manpower for electronics circuit assembly, testing and integration, capability to move the value chain by offering design capabilities and not merely low cost facilities, availability of capital. It is therefore believed that there is a high scope in the growth of domestic telecom equipment manufacturing.

### **Export Promotion**

1.25 Though the volume of manufacturing of telecom equipment within the industry has grown, bulk of the telecom equipment is still imported from other countries as domestic equipment manufacturers could not

match the pace of technological developments due to inadequate R&D facilities in the country. During the last few years, the import of telecom equipment has increased approximately 24 times, whereas export of telecom equipment increased only 7 times (refer table 1.1). In contrast, some countries like Brazil and China have significantly enhanced their exports during the same period by leveraging their home markets' demand and developing the telecom industries.

**Table 1.1: Import & Export of Communications equipment**

(in US\$ millions)

Country		1999	2001	2003	2005	2007
<b>Brazil</b>	Export	402	1337	1349	2844	2332
	Import	1588	2193	599	1150	3187
<b>Russia</b>	Export	131	105	166	271	476
	Import	690	1090	1376	3804	7035
<b>India</b>	Export	49	84	101	161	<b>355</b>
	Import	352	753	2674	5402	<b>8320</b>
<b>China</b>	Export	3738	8759	14558	36303	82035
	Import	4904	7416	7812	6544	19618
<b>South Africa</b>	Export	182	219	186	193	274
	Import	1322	1165	1216	2342	2785

Source: OECD

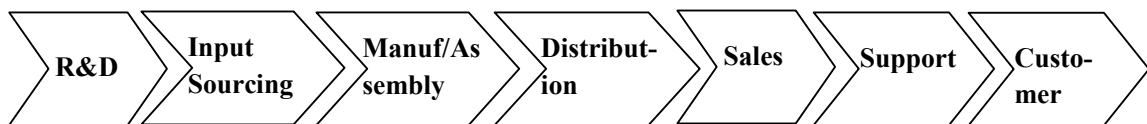
1.26 The Ministry of Commerce & Industry and Ministry of Communications & IT, Government of India has set up Telecom Equipment and Services Export Promotion Council as a first step in promoting exports from India, both for “Indian Products” as well as for “Indian Manufactured Products”. As per the council, the production amounted to Rs. 51,000 crore and exports Rs. 13,500 crore in 2009-10.

## Chapter II

### Optimising the telecom manufacturing value chain

#### The Manufacturing Value Chain

- 2.1 The value chain provides an important construct that facilitates the understanding of the distribution of returns from the different activities of the chain (Kaplinsky and Morris, 2001). By breaking a chain into its constituent parts of design, supply, production, and distribution, one can better understand its functioning and assess its scope for systemic competitiveness. Value chain analysis also highlights the issues of chain coordination or control (McCormick and Schmitz, 2001).
- 2.2 A value chain depicts the chain of activities required to bring a product from its conception to its final consumption through stages of value addition. Recognition of this chain of value addition encourages the investigation of the distribution of that value among the various actors and promotes a search for upgrading strategies for increasing value for domestic actors. A generic representation of telecom manufacturing value chain is given in Figure 2.1. If all the activities of the chain are confined within national boundaries then it is national value chain. If some processes happen outside the country then it is a global value chain. The end customer may, however, perceive that the product has been provided via the company they interacted with.



**Figure 2.1 Telecom Manufacturing Value Chain**

2.3 Research and Development (R&D) activity creates and tests new ideas and product concepts. R&D can be carried out in-house or with partners. In the former case, the Intellectual Property would reside with the organization carrying out research and patenting designs while in the latter case Intellectual Property Right (IPR) would be shared. Intellectual Property is then used to create new products that are marketable and efficient and bring value to the company. Manufacturing/Assembly segment deals with the ability to mass-produce the product that has been developed. Equipment manufacturers with national value chain manufacture products based on their own IPR and under their own brand thus getting high value out of the chain. Components and auxiliary equipment not manufactured within the country would be imported. In India, most telecom network equipment is either imported or assembled in units set up by multinational companies owning the IPR and the brand. In these cases, value addition within the company is quite small. Distribution requires moving the manufactured goods to the warehouses from where they are delivered to customers after the sales are made. A number of Indian manufactured telecom equipment are actually assembly of the knocked down heavy equipment, already manufactured abroad. Foreign companies also set up local distribution, sales and support channels to take care of local cultures and languages and to meet equipment uptime requirements.

2.4 We have to see how Indian companies fit within the context of the value chain for manufacture of telecom equipment. The dynamics of the system are important as well as the relationships, who delivers what in the chain and to whom. A company's position in the value chain of the industry reflects where its business is currently positioned and what opportunities may be available for the future. If a

company is only manufacturing products based on foreign intellectual property then it has possibilities of manufacturing based on own or indigenous design. This would bring more value to the company and to the country. However, competition spreads across the entire value chain, from planning to design, to manufacturing to distribution, to post-sales support. It is important to clearly understand where the value-creation happens in telecom equipment manufacturing. In the context of this paper we shall discuss in some detail the status and challenges brought out by the stakeholders during pre-consultation and the suggested measures relating to the following:

- A. Research & Development**
- B. Sourcing of inputs**
- C. Manufacturing of equipment and subscriber terminals**
  - i. Indian manufactured products
  - ii. Indian products
- D. Measures for promoting domestic manufacture**
  - i. Access to markets
  - ii. Setting up of special zones or telecom clusters
  - iii. Testing, standardisation and accreditation
  - iv. Funding/Foreign Direct Investment
  - v. Export promotion
  - vi. Duties and taxes

## **A - Research and Development**

2.5 Research and Development (R&D) is an important link in the value chain which has the potential of bringing immense value to the country. The importance of domestic R&D and consequent creation of intellectual property cannot be over-emphasized. It is widely accepted that over 85% of the value is created by the organization that does the



R&D, designs the product and owns the IPR and the brand. The physical manufacturing of telecom equipment contributes less than 15% of the total value. According to a Price Waterhouse report<sup>6</sup>, “the 11% value-addition in telecom manufacturing being done in India is understood to be mostly in terms of assembling the sub-parts of telecom equipment and final packaging – requirements mostly to ease the transport of bulky telecom equipment to service providers.”

2.6 According to Research & Development statistics published by Department of Science & Technology, as on April 2005 there were approximately 3,91,000 personnel working in the R&D establishments in the country including in-house R&D units of public and private sector industries. According to the same statistics, only about 40% of the manpower was performing the R&D activities. The rest were performing auxiliary, administrative and non-technical activities. According to the World Development Indicator Report 2010 of World Bank, there were only 136.9 researchers per million people in India in 2005, which is far behind that of several developing and developed countries (refer Table 2.1)

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<sup>6</sup> “India Telecom Export Promotion Strategy for TEMA-EPF”, Price Waterhouse Coopers, October 2007

**Table 2.1: Number of Researchers in R&D (per million people)**

Country	2005	2006	2007
<b>Australia</b>	-	4231	-
<b>Brazil</b>	588	628.7	-
<b>Canada</b>	4157	-	-
<b>China</b>	852.5	926.6	1071
<b>France</b>	3319	3440	-
<b>Germany</b>	3302	3392	3453
<b>India</b>	136.9	-	-
<b>Italy</b>	1407	1499	-
<b>Japan</b>	5531	5568	5573
<b>Korea, Rep. of</b>	3780	4187	4627
<b>Malaysia</b>	-	371.5	-
<b>Mexico</b>	459.5	-	-
<b>New Zealand</b>	4193	-	4365
<b>Pakistan</b>	76.52	-	152.1
<b>Philippines</b>	80.66	-	-
<b>Russian Federation</b>	3245	3258	3305
<b>South Africa</b>	359.9	381.9	-
<b>Turkey</b>	549.9	591.8	680.3
<b>United Kingdom</b>	2897	2909	2881
<b>United States</b>	4584	4663	-

Source: World Bank

Note: “-“ indicates data is not available

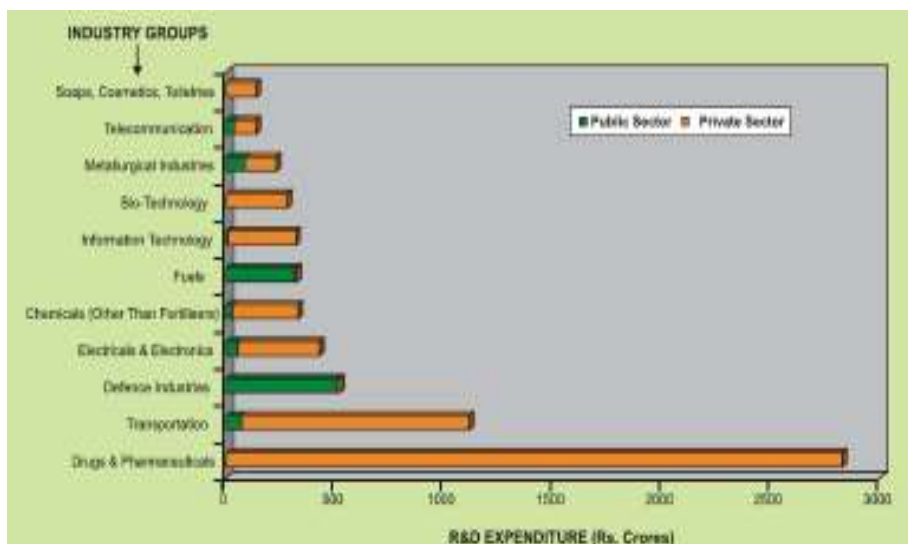
2.7 In India, expenditure on R&D is low as compared to several developed and developing countries. While most of the developed countries spend 2% or more of their Gross Domestic Product on R&D, in India it is only 0.8%. Table 2.2 gives R&D expenditure across many countries:

**Table2.2: Expenditure on R&D as % of GDP**

Country	2005	2006	2007
<b>Brazil</b>	1.00%	1.00%	--
<b>Canada</b>	2.10%	2.00%	2.00%
<b>China</b>	1.30%	1.40%	1.50%
<b>France</b>	2.10%	2.10%	2.10%
<b>Germany</b>	2.50%	2.50%	2.60%
<b>India</b>	0.80%	0.80%	0.80%
<b>Japan</b>	3.30%	3.40%	3.40%
<b>Korea, Rep. of</b>	3.00%	3.20%	3.50%
<b>New Zealand</b>	1.20%	--	1.30%
<b>Pakistan</b>	0.40%	--	0.70%
<b>Russia</b>	1.10%	1.10%	1.10%
<b>South Africa</b>	0.90%	1.00%	--
<b>Turkey</b>	0.60%	0.60%	0.70%
<b>United Kingdom</b>	1.80%	1.80%	1.80%
<b>United States</b>	2.60%	2.60%	2.70%

Source: World Bank

**2.8** Even in this low expenditure, Telecom accounts for a modest effort. Expenditure on R&D in Pharmaceutical and Transportation sectors is significantly more as compared to that in telecommunications sector. Secondly, most of the expenditure is from the Government funding. Figure 2.2 gives the expenditure made by different industries on R&D.

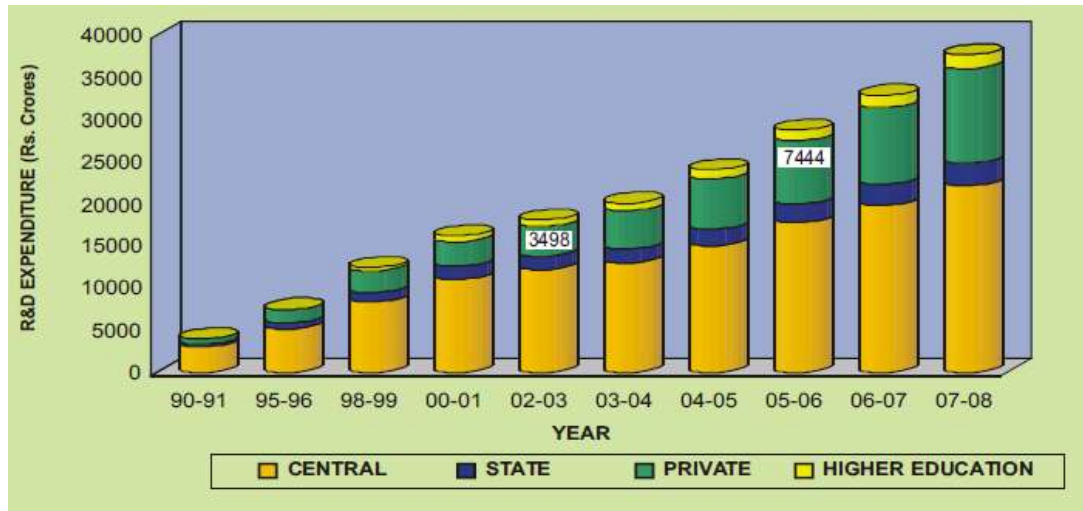
**Figure 2.2: R & D Expenditure by leading Industry Groups (2005-06)**

Source: Department of Science & Technology<sup>7</sup>

The success of Indian products in Pharmaceutical and Transportation sector is a clear indication of the value that can be created if sufficient investment is made on R&D in telecommunication sector as well.

**2.9** As seen in Figure 2.3, the share of Central Government was 57.5%, Public sector industry 4.5%, private sector 25.9%, State government 7.7% and higher education 4.4% in the year 2005-06. The industrial sector R&D expenditure for public and private worked out to be 30.4%. In developed country this is usually more than 50%. The annual compound rate of growth of private sector industries was 28.6% compared to 14.0% of central sector during 2002-03 to 2005-06. The share of private sector investment increased from 19.3 to 25.9%. 74.1% of the total R&D expenditure was met from Government sources and 25.9% from private sources.

<sup>7</sup> Research and Development Statistics at a Glance: 2007-08

**Figure 2.3: Sector wise Status of R & D Expenditure in India**

Source: Department of Science & Technology

**2.10** Research involves time, money and painstaking human effort. The intellectual property so created in the form of ideas and designs may be protected with the help of local laws for commercialization. Intellectual property protection is critical to fostering innovation. Without protection of ideas, businesses would not reap the full benefits of their inventions and would focus less on research and development. Table 2.3 below demonstrates the upward trend in the IPRs granted in India during the last 5 years. It may also be mentioned that, no significant contribution is seen from scientific and R&D organisations in the country and no R&D organisation from telecom sector figures in top 10 major applicants for IPRs

**Table 2.3: Trends of IPRs Granted**

<b>Year</b>	<b>2004-05</b>	<b>2005-06</b>	<b>2006-07</b>	<b>2007-08</b>	<b>2008-09</b>
<b>Patents</b>	1911	4320	7539	15316	<b>16061</b>
<b>Designs</b>	<b>3728</b>	<b>4175</b>	<b>4250</b>	<b>4928</b>	<b>4772</b>

Source: Controller General of Patents, Designs, Trademarks & Geographical

### 2.11 Challenges to R&D in telecommunications

- (i) Analysis of the value chain and available data shows that stress had been more on the assembly of low value products resulting in lower accruals to the Indian companies. Stress has been less on R&D and innovation, creation of IPR, creating a component supply chain, and developing and manufacturing high tech products. This situation needs correction.
- (ii) Telecom product development requires heavy investment, sometimes with indefinite outcomes. It is felt that there are no meaningful R&D grants that are available from the Government. Other countries provide liberal R&D funds as grants or low interest loans for developing telecom products.
- (iii) Presently the demand for telecommunication equipment is largely met through imports which could be the reason for meagre R&D work within the country.

2.12 It is crucial to focus on creating R&D driven “Indian Products” for which IPR is with Indian companies. Creation and protection of IPR is considered essential for the promotion of technological, industrial and economic development of a country as it provides incentives for the innovation and ensures adequate returns on investment made for commercialisation of the innovations. IPRs thus provide the

foundation for a beneficial cycle of innovation, through reinvestment in R&D which further spurs innovation. As per a Deloitte Report<sup>8</sup>, while lower cost production may get a nation to the table as a viable global manufacturing competitor, capacity for innovation driven by plentiful and talented workforce at all levels is what will ultimately differentiate the long-term winners in this industry.

2.13 Learning from the successes of many other countries, an environment has to be created to boost R&D in telecom sector which may include grants or soft-loans for meeting certain percentage of the R&D costs. The primary aim behind this R&D funding should be development of IPR that allows Indian companies to take leadership position for productizing, within next 4-5 years, technologies for the next-generation of telecom networks.

2.14 The possible measures for promoting R&D suggested by the various stakeholders in the pre-consultation exercise included the following:

- (i) Collaboration between various academic institute and R&D labs to promote standardization and creating of intellectual property right globally would promote R&D efforts. It would be useful to leverage upon the existing Telecom Centres of Excellence (TCOE) initiative to promote R&D.
- (ii) Telecom R&D and product development requires a lot of up-front investment, which often may or may not result in commercial success. The government needs to encourage such efforts in the form of grants/soft-loans, so that adequate R&D is done and telecom products and IPR can be created in India.
- (iii) A dedicated R&D fund may be created from the proceeds of auction of spectrum and the balance from underutilised USO

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<sup>8</sup> “2010 Global Manufacturing Competitiveness Index”, Deloitte

fund. The fund should be chaired by some reputed industry person on lines of UID and should include people from academia (like IIT's, IIMs, etc.) and senior members of DoT, DIT, TRAI, etc.

- (iv) Efforts have to be continuously made to develop affordable technology for the masses, as also comprehensive security infrastructure for telecom network.
- (v) Research is required in the area of Next Generation Network. Modern technologies inductions are being promoted. Emphasis needs to be given to technologies having potential to improve rural connectivity. Instead of focusing in all areas, we should focus our R&D and create telecom products in the core areas of technology that are important from strategic as well as long-term commercial interests. Learning from the success of much other government should provide upto 50% of the R&D costs in the form of grants or soft-loans. The government can create a Telecom R&D corpus for this purpose, by using the revenues generated in the telecom services sector. In addition, industry-academia partnership for joint development of Products and IPR can significantly benefit the Indian industry.
- (vi) To ensure that telecom products developed through Indian R&D and IPR also become commercially successful, they should be provided preferred market access and should be encouraged so that they get volumes to get cost-competitive.
- (vii) In order to avoid fragmentation of R&D funds across a large number of telecom research programs, to begin with, we may identify a few core areas of technology that are important from a strategic perspective and also serve long-term commercial interests.



**The following issues for consideration emerge regarding the R&D effort:**

- 1. What should be the objective and focus of the R&D effort for the year 2020?**
- 2. Flowing from the above, what should be the objective and focus of the R&D effort for 2015?**
- 3. What is the level of 'Indian Products' that we should attempt to achieve at the end of 2015 and 2020?**
- 4. What is the broad level of investment required for this effort?**
- 5. Which Institutions, whether in the Public or private sector, are best suited to carry out this effort? And why?**
- 6. What can be the linkages established with Institutions or Indians abroad? Will this reduce time delays?**
- 7. What should be the role of the Government and the Industry in regard to the R&D effort? In particular, what should be the investment, if any, by the Government?**
- 8. Should an R&D fund be set up? If so, how can the fund be managed effectively to meet its objectives?**
- 9. What could be the fiscal incentives to be offered by the Government? Should such incentives be linked to any outcome?**

#### **B - Sourcing of Inputs**

2.15 Sourcing of inputs is of strategic importance as it has a significant effect on the profitability of a manufacturing concern. In taking strategic decision about sourcing one has to decide whether to make, buy within country or buy globally at competitive rates. It is also important to create a proper supplier base so that production is not adversely affected if the single source dries up. The 'make' strategy

may be more flexible for a company but it may have high management and wage costs. The 'buy' strategy may enjoy high-powered market incentives, but on-time delivery, quality and cooperation from the suppliers may become important issues. Regarding the supplier base, number and location of suppliers are important. Manufacturers often safeguard against the supplier's exploitation by establishing multiple sources, which promote competition among suppliers; they expect to be given better control of price levels as well as more reliable supply through diversification of risks.

2.16 Manufacture of sophisticated telecommunications equipment requires many electronic components. Although Indian production facilities in the telecom sector have fostered the growth of many local partners and suppliers for electrical and electromechanical components, not all components can be sourced locally and are procured through global suppliers. Most of the critical components like Integrated Circuits (ICs) and Application Specific ICs (ASICs) and other sophisticated sub-assemblies are all imported. Production of semiconductor wafer and ancillary production is being encouraged in India but have not yet come upto the level which would ensure cost effective electronics components availability inside the country and, thus, help in reducing overall equipment cost. Non-availability of indigenous components is a major constraint facing the manufacturing industry. So India will have to make an extra effort to see how these component suppliers can set up base in the country. This will, in turn, help in lowering the cost of procurement, thereby making manufacturing cost effective.

2.17 Dependence of domestic manufacturers on imported components would expose them to price fluctuations in the international market, higher international cost, import duties and delay in deliveries.

Component obsolescence in international market requires frequent changes in design for the indigenously developed products. If the volume of import is not large, then support from chip set manufacturers may be lacking.

**2.18** The following challenges have been identified by the stakeholders in sourcing of inputs:

- (i) Domestic manufacturers importing components may face erratic supplies, price fluctuations and delayed deliveries.
- (ii) In case of discontinued components, domestic manufacturers may have to change design or look for alternatives.
- (iii) Currently, there is a lack of competitive supply chain for electronics components in India and very few world-class electronic component manufacturing and supply chain facilities. Therefore, 95% of the material cost has to be imported into the country.

**2.19** The following measures for sourcing of inputs have been identified by the stakeholders during the pre-consultation exercise:

- a. Indigenous manufacturing facilities for electronic components, chips etc., should be established to have a strong component base.
- b. R&D units that are capable of developing ICs and owning their IPR should be encouraged by declaring their product as indigenous for policy purposes even if the ICs are fabricated abroad. This will lead to establishing a strong market presence and the setting up of commercially viable fabrication facilities.
- c. Duties on inputs to the component industry also need to be rationalized.

- d. India must strive for 75-80% component sourcing within the country, either through existing companies or bringing in companies who have been partnering with vendors and EMS players abroad.
- e. The Government needs to promote supply chain development in major manufacturing hubs. This will lead to cost advantages as well as help the manufacturing process with easy availability of components.
- f. Setting of Electronic Manufacturing Service (EMS) companies should be incentivised.
- g. Further, capability and strength of making indigenous VLSIs, providing telecom & embedded solutions require full exploitation of the country's infrastructure and export market. In view of this, indigenous manufacturing of electronic components should be encouraged to have a strong component base to eliminate delays in productionisation process on account of component procurement. Duties on inputs to the component industry should be made zero under deemed export status

**The following issues emerge for consideration:**

- 10. What are the components that can be manufactured in the country with due consideration to commercial viability?**
- 11. What should be the degree of indigenous manufacture of components that we can reasonably achieve in time frames of 5 and 10 years?**
- 12. What, do you think, is the feasibility of setting up of commercially viable fabricating units to manufacture chips, ICs?**

- 13. Is the Duty on components currently being levied high? If so, on what components can the duty be reduced? What are the financial implications and the corresponding benefits?**
- 14. Should electronic Manufacturing service companies be incentivised? If so, how?**

**C - Manufacture of equipment and subscriber terminals**

2.20 According to newspaper reports, the phenomenal growth in subscribers is expected to fuel the demand for telecom equipment worth about Rs 3200 billion and Rs 4700 billion by 2015. Currently, Indian telecom operators import most of the equipment required for setting up a network. In 2008-2009, equipment worth Rs 462 billion was imported by operators. These statistics clearly indicate the huge opportunity that lies ahead for manufacturers to reap the benefits from this ever booming sector.

2.21 Despite being the second largest telecom market in the world, telecom equipment manufacturing in India is still to take off. Last fiscal year, the telecom equipment market in India grew by 18.6 per cent, with an overall revenue at Rs 1,368 billion in 2009-10 up from Rs.1154 billion in 2008-09. Among the various telecom equipment sub-categories, the enterprise equipment segment grew by 31% to touch Rs 200 billion. The switch and router segments showed 92% and 65% growth, respectively. According to industry experts, this industry will continue to register robust growth after the roll out of 3G and broadband wireless services.

2.22 It is important to distinguish between **India Manufactured Products** and **Indian Products**. The former are the products manufactures/assembled in India whose IPR resides with companies abroad. The manufacture may be by the IPR holding company itself or by a domestic company by way of technology transfer. In such cases, the value addition to the manufacturing value chain is small. On the other hand, the Indian Products are those that are manufactured in India based on indigenous design and the IPR resides in India. In this case, the value addition is higher.

2.23 As a result of Government policy, some progress has been seen in the availability of Indian Manufactured Products in the country. The domestic equipment-manufacturing base for foreign telecom products has grown during the past few years. However, growth of the sector is not significant as compared to telecom service sector (refer Table 2.4). More importantly, this has not resulted in a significant value creation in India, since all the IPR and technology for such manufacturing and products, were owned by the foreign companies. The equipment production of “Indian Products” was negligible and whatever manufacturing happened in India, consisted of only low value-adding assembly/soldering activities, as per the PWC report<sup>9</sup>.

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<sup>9</sup>“India Telecom Export Promotion Strategy for TEMA-EPF”, Price Waterhouse Coopers, October 2007

**Table 2.4: Telecom revenue and Production of telecom equipment**

(in million Rs)

Year	Telecom Revenue	Total Equipment Requirement	Total Imports	Equipment Production
2004-05	716740	303585	142685	160900
2005-06	867200	448430	270100	178330
2006-07	1172680	576976	340416	236560
2007-08	1290830	828700	416000	412700
2008-09	1671030	936000	448000	488000
2009-10	1579850	1248000*	672160*	575840*

\*Projected

Source: DoT, TRAI, OECD &amp; DGCIS

**2.24** The stakeholders have indicated the following Challenges in manufacturing of equipment:

- a. In the equipment manufacturing industry, it is necessary to get high-volumes to get economies of scale, arising from lack of required pricing support from component suppliers.
- b. It has often stated that Indian telecom equipment companies face strong competition from companies in other countries, which have been provided high level of government support and financial incentives on a sustained basis over the last several years, and have now reached global economies of scale. According to them, this is a big challenge as the current telecom policies in India do not provide any incentive or support to Indian telecom manufacturers to come out of this vicious circle. Besides, zero customs Duty on telecom equipment imports is also cited as a reason for the Indian Industry being non-competitive.

- c. Indian companies also face lack of long-term financing at competitive interest rates (LIBOR+2%), which is being provided by the banks of other countries such as China, US, Sweden etc.

**2.25** The following measures have been identified by stakeholders during the pre-consultation exercise

- a. It has been suggested that global practice of domestic market access to Indian product companies should be introduced so that they can become price competitive against global players.
- b. Duty on imported equipment must be levied.
- c. Provision of long-term and low interest-bearing finance.
- d. Indian companies lose out on getting business from customers, who want to stretch their payment terms.

**The following issues emerge for consideration:**

- 15. Should the concept of mandatory use of Indian products/Indian manufactured products be introduced in the Indian context? If so, can this be introduced immediately or should it be introduced at a later date? If so, by what date?**
- 16. What could be the percentage to be stipulated for both these categories?**
- 17. What should be, if any, the incentives to be given to individual service providers for use of Indian equipment?**
- 18. Likewise, what could be the disincentives, if any, for use of imported equipment? This is compatible with international agreements?**
- 19. What could be the duty structure to be imposed on imported goods?**



## **D – Promoting domestic manufacture**

### **Access to markets**

2.26 Presently, telecom service sector is very competitive with 12-14 service providers providing service in a circle. The competition among them for market share is very intense, and this competition is focused mostly on price. In order to reduce their expenditure, service providers prefer importing their equipment from large vendors of telecom equipment based abroad who can offer the equipment at the cheapest rates.

2.27 Indian Product companies, being late starters, are unable to get to economies of scale in the fast-growing domestic market because of dominance of imported products. There have been demands of preferred domestic market access so that they can get volumes necessary to make them price competitive against global players. However, while considering such preferred access one needs to see that the domestic service providers, who buy indigenous equipment, are not put at a disadvantage in terms of quality, technology standards and prices as compared to the global vendors. It is also suggested that induction of Indian products into the network by domestic operators needs to be promoted by way of proportionate reduction in the licence fee. We shall consider these and other issues in the measures suggested by the stakeholders.

**2.28** When innovative indigenous telecom equipment is domestically manufactured for the first time, lack of experience or past performance in supplies often serves as a huge impediment in gaining entry into the domestic market. For companies making path-breaking

Indian Products there should be a mechanism to get a fair chance of participation in tenders in India, even though they may not have a lot of past experience. For this, the procurement policies of government telecom service providers may need a re-look so that Indian companies that have successfully developed products and are globally competitive on technology and quality, get an opportunity to address 30% of the total domestic demand, so that they can use this volume-base to become price competitive not only on domestic but a global level.

**The following issues emerge for consideration**

- 20. Should a percentage of the Indian market be reserved for the Indian manufacturers? If so, what should be the percentage?**
- 21. What, if any, could be the implications of such a step?**

**Setting up special zones or telecom clusters**

2.29 Clustering of technology companies in an area is well-documented as being very beneficial to developing new industries in a country. Taiwan is an illustrative success story. As described in the Task Force report<sup>10</sup>. Taiwan's Hsinchu Science Park, spread over 632 hectares, has clusters of most of the semiconductor component manufactures, thus saving on time and cost for assembly. This park includes independent wafer foundries, IC design companies, fabricators, as well as packaging and testing companies for the semiconductor industry

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<sup>10</sup> "Report of Task Force to suggest measures to stimulate the growth of IT, ITES and Electronics Hardware Manufacturing industry in India", Ernst & Young report, December 2009 (jointly with CEMA, ELCINA, ISA, ICA, ESC, NASSCOM, MAIT, TEMA)

all at one place. The model is now being replicated by China and Malaysia as well. In such clusters, one can find trained people more easily and form inter-relationships between suppliers and vendors that make development of products faster, cheaper and even lead to better innovations. Most countries have typically evolved clusters naturally over a time period. But, few such as Germany in the case of Solar Cell Industry or China as in the case of electronics have done this by design.

2.30 Clusters are much larger in area (100 km radius for instance) than a typical SEZ would be and typically does not involve subsidized acquisition of land. Unlike a chemical plant or automobile manufacturing plant, telecom product companies' facilities do not require large land area. Thus, it is sufficient to provide proximity instead of land subsidy for related facilities, suppliers and other telecom product companies.

2.31 It is also believed that telecom clusters of related industries may be anchored by a large facility. This anchor facility could either be a shared testing and certification lab or a research centre or a large-scale incubation laboratory. According to a recent study conducted by the CII<sup>11</sup>, formation of telecom clusters is estimated to result in ~15% improvement in profitability of domestic manufacturers through lower investment in common facilities, cluster financing and marketing expenses.

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<sup>11</sup> "Realizing the potential of ICTE manufacturing in India – a Framework", CII, October 2010

2.32 For developing an effective manufacturing supply chain, the Draft Paper on National Electronics/IT Hardware Manufacturing Policy of the Department of Information Technology states that a 'Hardware Manufacturing Cluster Park' needs to be set up across the country. These would be special areas with each location having its own focus. Industries promoted in these Parks should not be seen in isolation but in relation to each other – as forward and backward linkages in the value chain. These Parks would be provided infrastructural support in terms of uninterrupted power supply, water, telecom facilities and other infrastructure needs. Most importantly, these areas are to have single window clearance and special tax benefits

2.33 The Government has set the targets for making India a hub of telecom manufacturing by facilitating a large number of telecom specific Special Economic Zones (SEZs) to achieve exports of 10 billion during 11th Five year plan and doubling the telecom equipment R&D by 2010 from present level of 15%. The Government has also undertaken steps to encourage the establishment of a supply chain facility through local manufacturers as well as international investment, and has put together incentive schemes like the SEZ and EHTP. These special schemes have:

- Income tax exemption for 5 to 15 years
- Duty free import of components and consumables
- Duty free import of capital goods
- Duty free import of leases, rentals, free of cost transfers and second hand capital goods
- Duty exemption on local procurement of components, consumables
- Refund of local taxes paid on local procurement of components and consumables

- Duties exempted even if the components are used in the manufacture of products for domestic sale
- Extension of duty free benefits to EMS companies suppliers
- “Fast Channel” customs clearance process

**The following issues emerge for consideration**

- 22. What, if any, are the advantages of setting up of clusters for manufacture of Telecom equipment within the country?**
- 23. What is the investment required for setting up of such clusters?**
- 24. How can the financing of such clusters be best done, based on international experience?**
- 25. What would be the lead time required for setting up of such clusters?**
- 26. What are the considerations for the location of such clusters?**

**Testing, standardisation and accreditation**

2.34 India does not contribute much in setting of standards by the international standard setting bodies e.g. 3GPP etc. It is a general feeling that India should actively drive global standards, so that it can build products that are suitable for Indian requirements. This will also give a first-mover advantage to Indian R&D and product companies. Funding for such participation should be provided to interested people/companies in government as well as private sector.

2.35 Products developed in India need to be tested extensively for interoperability before bringing them to market. For this purpose, specialised laboratories are required that house common telecom test

facilities such as environmental test labs, radiation test labs etc along with the associated test and measurement equipment for use by Indian product companies and manufacturers at nominal rates. Also, facilities should be available in India to test products to meet global standards, since the current option is to go to international test and certification labs and this is very expensive.

2.36 Telecom testing is an important requirement for manufacturers and designers. Setting up of Common Test & Certification lab (TCL) will help electronic product designers and manufacturers achieve their compliance requirements as quickly and efficiently as possible. Moreover, there is a long standing demand of the telecom vendors and operators to have an indigenous lab to get the telecom equipment certified and checked. This will also take care of the Govt. concern of any security related issues pertaining to telecom network. Provision may be made for Indian Service Providers, which may offer live test beds free of cost for a limited period where field trials of these products can be conducted. Establishment of such facilities requires significant investment beyond the reach of individual manufacturers. It is important to ensure that such facilities are established by an agency which would make these facilities available at affordable costs and in a non-discriminating manner to all the Indian telecom manufacturing companies.

**The following issues emerge for consideration**

**27. What, in your opinion, would be the best agency to set up and manage such a Common facility/ies?**

- 28. What would be the facilities and the level of investment required in such a facility?**
- 29. How will such an investment pay for itself?**

### **Funding/FDI**

- 2.37 Capital requirements and economies of scale to achieve a competitive cost structure are the main requirements of the equipment industry. Financial incentives like availability of loans at reduced interest rates, a conducive tax structure are believed to work as a catalyst to Indian equipment industry.
- 2.38 It is important for small companies and start ups to have access to capital. Many have to rely on venture capitalists due to the difficulty in raising funds. Increased access to capital for Indian telecommunications companies would mean increasing Indian development capacity. Long long-term financing should be available at globally competitive rates. Since many operators in India do not have adequate working capital, they require equipment vendors along with the banks, to provide them with long-term financing for upto 7 years, at LIBOR+2% rates.
- 2.39 An attractive trade and investment policy and lucrative incentives for foreign collaborations have made India one of the world's most attractive markets for the telecom equipment suppliers and service providers. No industrial license required for setting up manufacturing units for telecom equipment. 100% Foreign Direct Investment (FDI) is allowed through automatic route for manufacturing of telecom equipments. Payments for royalty, lump sum fee for transfer of

technology and payments for use of trademark/brand name on the automatic route.

2.40 In recent years, there has been increased flow of FDI in various sectors of Indian Industry. In the first half of 2010 alone, it is reported that more than 300 private equity and venture funds are operating and investing in India, with investments totalling over US\$6 billion for the current year. However, most of these investments are not in the telecom equipment sector, especially since there is no explicit policy support for Indian Products thereby resulting in limited success of such Indian Product companies. The experiences of nascent telecom equipment manufacturers are that funds for growth or start-ups in this sector remain scarce.

2.41 A number of ways ranging from private venture funds to government funding to something like Taiwan model have been suggested by the stakeholders. The Taiwan model involves funding and operation of a large-scale incubation centre adopted by Industrial Technology Research Institute (ITRI) of Taiwan, which has proven to be a good model for building a new Industry. ITRI of Taiwan is credited to be a catalyst for developing Taiwan's semiconductor as well as Display Panel industries. This approach differs significantly from traditional national research laboratory model followed by several countries including India in the past. In this approach, seed funding and operational expenses are provided to hire and build a workforce that is trained to develop state-of-the art products for a couple of years with the explicit understanding that the entire research unit along with IP and the people employed will be spun off as a commercial unit in few years time. The spinning off can be accomplished by auctioning the unit to a private industrial group that would undertake to develop and



build a company around the product. Alternatively, the unit could also be funded by a private equity group and be owned by the management and employees of the spun-off unit. Auctioning off the research unit in this manner would generate funds that can be ploughed back and used to develop other such units. The key aspect here seems to be hiring good people with a clear understanding that in few years upon successful completion of a project they would be expected to leave the institute and become employees of a commercial venture.

**The following issues emerge for consideration**

- 30. What, in your opinion is the likely requirement of Capital for companies that could take up the manufacture of telecom equipment?**
- 31. What could be the best manner of facilitating availability of capital to such firms?**
- 32. Would setting up of Institutions like ITRI be desirable and feasible?**

**Duties and Levies**

2.42 It is believed that because of the existing duties and levies, the domestic production is at a disadvantage vis-à-vis imported equipment. India was one of the 69 signatories to WTO's (World Trade Organization) ITA (Information Technology Agreement) Act, 1995 that came into force on 1<sup>st</sup> January 1998. As per this Act, India committed itself to remove tariff barriers on the import of six categories of IT products that included telecom equipment. ITA 95 marked a new chapter in the era of telecom liberalization and contributed to the availability of low cost telecom services in the country. At the same

time, it also had an adverse impact on the development of the domestic telecom manufacturing industry since foreign equipment were now available at zero import duties, and there were no incentives or tariff barriers to facilitate growth of an Indian telecom equipment industry.

2.43 The most notable tax break has come in the form of the extension of the benefit of 4% SAD (special additional duty) exemption on mobile phone parts, components and accessories w.e.f. March 31, 2011, from the earlier June 2010 deadline. Accordingly, the three key accessories, battery packs, chargers, and hands-free headphones, are expected to see mass production in India as their basic duty, CVD and SAD have all been exempt.

**2.44** It is felt by the stakeholders that there are no tax/financial incentives available for developing telecom products, and unlike the Indian software industry which has got an income tax holiday in India for over 15 years, the telecom equipment industry gets no such financial incentives or subsidies to kick start the industry and help them compete with global players, who are already having large economies of scale. According to them, creating a conducive tax structure is important. Exempting companies from MAT, reducing or abolishing excise duty, treating goods provided to the domestic operators by the Indian manufacturers as deemed exports, offering financial incentives like lowering of license fee, spectrum charges to the operators adopting the indigenously manufactured products are some measures that have been suggested and are brought out later in the appropriate sections.

**33. What would you suggest should be the tax structure in respect of imported and indigenous manufacture of telecom equipment, keeping in view the international agreements?**

## **Chapter III**

### **Issues for Consultation**

#### **Research & Development**

- 3.1 What should be the objective and focus of the R&D effort for 2020?**
- 3.2 Flowing from the above, what should be the objective and focus of the R&D effort for 2015?**
- 3.3 What is the level of 'Indian Products' that we should attempt to achieve at the end of 2015 and 2020?**
- 3.4 What is the broad level of investment required for this effort?**
- 3.5 Which Institutions, whether in the Public or private sector, are best suited to carry out this effort? And why?**
- 3.6 What can be the linkages established with Institutions or Indians abroad? Will this reduce time delays?**
- 3.7 What should be the role of the Government and the Industry in regard to the R&D effort? In particular, what should be the investment, if any, by the Government?**
- 3.8 Should an R&D fund be set up? If so, how can the fund be managed effectively to meet its objectives?**
- 3.9 What could be the fiscal incentives to be offered by the Government? Should such incentives be linked to any outcome?**

#### **Sourcing of Inputs**

- 3.10 What are the components that can be manufactured in the country with due consideration to commercial viability?**

- 3.11 What should be the degree of indigenous manufacture of components that we can reasonably achieve a period of 5/10 years?**
- 3.12 What, do you think, is the feasibility of setting up of commercially viable fabricating units to manufacture chips, ICs?**
- 3.13 Is the Duty on components currently being levied high? If so, on what components can the duty be reduced? What are the financial implications and the corresponding benefits?**
- 3.14 Should electronic Manufacturing service companies be incentivised? If so, how?**

**Manufacturing of equipment**

- 3.15 Should the concept of mandatory use of Indian products/Indian manufactured products be introduced in the Indian context? If so, can this be introduced immediately or should it be introduced at a later date? If so, by what date?**
- 3.16 What could be the percentage to be stipulated for both these categories?**
- 3.17 What should be, if any, the incentives to be given to individual service providers for use of Indian equipment?**
- 3.18 Likewise, what could be the disincentives, if any, for use of imported equipment? This is compatible with international agreements?**
- 3.19 What could be the duty structure to be imposed on imported goods?**

**Promoting Domestic Manufacture**

**3.20 Should a percentage of the Indian market be reserved for the Indian manufacturers? If so, what should be the percentage?**

**3.21 What, if any, could be the implications of such a step?**

**Setting up of Special Zones or Telecom Clusters**

**3.22 What, if any, are the advantages of setting up of clusters for manufacture of Telecom equipment within the country?**

**3.23 What is the investment required for setting up of such clusters?**

**3.24 How can the financing of such clusters be best done, based on international experience?**

**3.25 What would be the lead time required for setting up of such clusters?**

**3.26 What are the considerations for the location of such clusters?**

**Testing, Standardisation and Accreditation**

**3.27 What, in your opinion, would be the best agency to set up and manage such a Common facility/ies?**

**3.28 What would be the facilities and the level of investment required in such a facility?**

**3.29 How will such an investment pay for itself?**

**Funding/FDI**

**3.30 What, in your opinion is the likely requirement of Capital for companies that could take up the manufacture of telecom equipment?**

**3.31 What could be the best manner of facilitating availability of capital to such firms?**

**3.32 Would setting up of Institutions like ITRI be desirable and feasible?**

**Duties and Levies**

**3.33 What would you suggest should be the tax structure in respect of imported and indigenous manufacture of telecom equipment, keeping in view the international agreements?**