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Making India a Telecom Manufacturing Hub: Emerging Issues and Challenges

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***Abstract*—**Indian telecom services industry has been witnessing a stupendous growth since 1990s. Over the years, subscriber base has grown steadily and it crossed 950 million marks in March 2012. India with second largest subscriber base also offers one of the lowest call tariffs in the world. But in the euphoria of high growth in services, the equipment manufacturing received least priority. India mainly depends on imported components from China. Of late, it is realized that lack of domestic manufacturing may pose a serious challenge to India's continued success in the telecom sector. Therefore, the National Telecom Policy 2012 aims at developing a strong equipment manufacturing base within India. This paper realistically assesses India's true potential in equipment manufacturing and seeks to identify the emerging issues and challenges before the Indian telecom equipment manufacturing sector while it tries to make a transition from an import-dependent industry to a global manufacturing hub.

***Keywords*—**Equipment manufacturing, global hub, Indian telecom industry, issues and challenges.

I. Introduction

DURING the last decade or so, India has witnessed stupendous growth in the telecom services, more particularly in the mobile telephony segment. Subscriber base has grown steadily over the years and it had crossed 950 million marks in March 2012. India now has the second largest subscriber base in the world, next only to China. The proliferation of telecom networks can be noticed even in the remotest parts of the country including backward and hilly regions. Also not to be ignored is the fact that Indian mobile services are among the cheapest in the world. Though Indian telecom industry still faces many challenges like infrastructure shortages, low penetration level in rural areas, lack of skilled manpower etc., its growth story has remained unperturbed in spite of fluctuating fortunes in many other sectors of Indian economy.

The exponential growth of the telecom service sector in India is not a surprising development. From 1990 onwards, there has been a remarkable surge in India's (overall) service economy. During this period, the services sector has grown at a much faster rate than that of agriculture and industry. Today, services sector commanding nearly 60 percent of India's gross domestic product (GDP) has earned the reputation of 'engine of economic growth'. In contrast, the share of manufacturing in GDP has been stagnating at around 16% for long. High growth in telecom services, however, was possible due to forward thinking of successive governments and various favorable policy initiatives taken from time to time since the beginning of economic reforms process in 1991. The private sector also responded positively to take advantage of a liberalized policy regime. The initiatives taken both by the government and the industry have resulted in extensive spread of communication networks across the country and subsequent emergence of an important information economy within India.

But in the euphoria of high growth in services, the manufacturing of telecom equipment received the least priority. While a liberal trade policy enabling import of equipment with low or no duty kept both service providers and consumers happy, the lack of capacity building for domestic production poses a serious challenge to India's continued success in the telecom sector. Realizing this, the latest telecom policy of Government of India, the National Telecom Policy 2012 (NTP 2012) has laid an overwhelming emphasis on the need for developing a domestic base for telecom equipment manufacturing.

There is no doubt that equipment manufacturing can play a crucial role in the overall success of the Indian telecom sector and therefore domestic manufacturing must be promoted. Apart from economic reasons, the security considerations also suggest that India should aim achieving self sufficiency in telecom equipment. But, at present, India's domestic manufacturing base is very low and therefore dependence on import is too high, to the tune of 87 - 88 percent of total demand. Besides, the domestic producers face (and will keep on facing) relentless competition from China, the global leader in production and export of telecom equipment.

Apart from the above sector specific constraints, manufacturing in India is besieged with numerous generic problems, such as poor infrastructure, high input costs, low productivity, high taxes and rigid regulations, more particularly in labour matters. In this background, the Government of India's aim to make India a global manufacturing hub for telecom equipment needs closer examination. In this paper, an attempt has been made to realistically assess India's true potential in equipment manufacturing. In particular, the paper seeks to identify the emerging issues and challenges before the Indian telecom equipment manufacturing sector while it tries to make a transition from an import-dependent industry to a global hub for manufacturing. The rest of the discussions in this paper

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have been organized in four sections. The second section (Introduction being the first) gives an overview of the Indian telecom services sector and the following section is on telecom hardware manufacturing. The fourth section makes a comparison between Indian and Chinese telecom equipment industry. The fifth section, entitled 'the way forward' actually presents summary, conclusions along with a few suggestions.

II. Indian Telecom Service Industry

The Indian telecom service industry is often cited as a true success story of economic reforms in India. With the government initiative to liberalize the sector and active participation from the private sector, the industry has grown from strength to strength. This becomes apparent from state of the art telecom infrastructure in the country along with a huge subscriber base. According to the quarterly statistics released by the Telecom Regulatory Authority of India (TRAI), the sector's regulator, Indian telecom sector had a subscriber base of 965.5 million in June 2012. In the last two quarters (i.e. July 2012 onwards) there has been a marginal fall in the number of subscribers. But the overall teledensity in the country as shown in Table I still remained above 75 in November 2012 [1]. Total revenue generated by this sector is worth US$ 33,350 million.

India's telecommunication network is the second largest in the world based on the total number of telephone users (both fixed and mobile phone). It has one of the lowest call tariffs in the world enabled by the mega telephone networks and hyper-competition among service providers. Indian telecom industry underwent a high pace of market liberalization and growth since 1990s and now has become the world's most competitive and one of the fastest growing telecom markets. The Industry has grown over twenty times in just ten years, from under 37 million subscribers in the year 2001 to over 846 million subscribers in the year 2011.

The kind of fast growth observed in the mobile telephony segment could not be replicated in case of broadband services. However, the number of internet users in the country is increasing by day. Against a mobile phone user base of over 900 million, total internet subscriber base (excluding internet access by wireless phone subscribers) was only 24.01 million as on 30th September 2012 [2]. The reasons for tremendous growth in telecom services are many. The important ones among them are discussed below.

A. Liberalization of the Indian Telecom Service Sector

The liberalization of India's Telecom Service Industry gave private players an excellent opportunity to participate in this sector, which was hitherto reserved for the public sector. This led to huge private investment in telecom infrastructure. Pricing wars and competition among the service providers resulted in lower tariffs and better service quality. India today boasts one of the world's best telecom industries with even 4th Generation (4G) Services being launched recently in select big cities. The liberalization efforts of the Government are evident from the rising share of the private networks. The share of the private sector in total number of telephones has increased from 65.32% (134 million telephones) at the end of March, 2007 to 86.16% (808 million telephones) by November, 2012 (Table II).

The private sector is now playing an important role in the expansion of the telecom sector. Major industry groups from India viz. Tata, Birla (Idea), Reliance, Bharti (Airtel), etc. have entered into telecom business and they are giving tough competition to state-owned enterprises like Bharat Sanchar Nigam Ltd (BSL), Mahanagar Telephone Nigam Ltd (MTNL) and also a few other leading private operators such as Vodafone, Uninor etc.

TABLE I
Snapshot of Indian Telecom (Service) Sector
(As On 30th November 2012)

Item	Data (Numbers)
Total Telephone Subscribers (Wireless +Wireline)	921.47 million
No. of wireless lines (as % of total)	890.6 million (96.65%)
No. of wirelines (as % of total)	30.87 million (3.35%)
Overall Teledensity	75.55
Urban Teledensity	155.76
Rural Teledensity	40.49
Total Broadband Subscriber (>= 256 kbps download)	14.88 million

B. Policy Reforms

For a dynamic sector, reforms are necessitated by dynamics of changes including technological innovations. The telecom industry is one sector in India that has been witnessing a continuous process of reforms since 1991. During the recent years, various policy initiatives have been undertaken to give boost to the sector. Some of the recent policies relating to India's telecom sector are listed.

TABLE II
Share of Public and Private Networks in Telephone Lines

Year	Wireline		Wireless		Total (wireline +wireless)	
	PSU	Private	PSU	Private	PSU	Private
2007	91.88	8.12	20.55	79.4	34.68	65.32
2008	89.37	10.63	16.98	83.0	26.47	73.53
2009	86.72	13.28	14.46	85.5	20.84	79.16
2010	84.77	15.23	12.76	87.2	17.04	82.95
2011	82.61	17.39	11.99	88.0	14.89	85.11
2012 (Nov.)	79.83	20.17	11.57	88.4	13.83	86.17

1. Mobile Number Portability (MNP)

The MNP was launched in India during January 2011. The MNP service allows subscribers to retain their existing mobile telephone number even when they switch from one access service provider to another irrespective of mobile technology or from one technology to another technology of the same or any other access service provider within the same service area. Implementation of MNP has not only given wider choices to the Indian subscribers but has also induced service providers to offer innovative, affordable and competitive traffic plans for the benefit of the masses. As per the data reported by the service providers, by the end of November 2012 about 77.13 million subscribers have submitted their requests to different service providers for porting their mobile number.

2. Telecom Commercial Communications Customer Preference Regulations (TCCCPR) 2010

TCCCPR 2010 came into force on September 27, 2011. It gives options to customers to exercise their preferences, separate number for telemarketers starting with 140, easy registration of the telemarketers, sharing of database, blacklisting provisions, filtering of calls and SMS by service providers, effective complaint redressal system and financial disincentive on access providers.

3. Foreign Direct Investment

The policy of foreign direct investment (FDI) provides an investor-friendly environment for the growth of the telecom sector. At present, 74% to 100% FDI is permitted for various telecom services. Telecom has emerged as the third major FDI attracting sector after services and computer software. The inflow of FDI in Telecom Sector since 2006-07 is reported in Table III.

4. National Telecom Policy 2012

On 31st May 2012, the Department of Telecommunications (DoT), Government of India unveiled a new telecom policy that envisions providing secure, reliable, affordable and high quality converged telecommunication services anytime, anywhere for an accelerated inclusive socio-economic development. The main thrust of the Policy is on the multiplier effect and transformational impact of such services on the overall economy. Apart from setting a few targets like raising rural teledensity to 70 by 2017 (further to 100 by 2020), repositioning mobile phone as an instrument of empowerment and broadband for all at a minimum download speed of 2 Mbps etc, the NTP 2012 encourages domestic manufacturing of telecom equipment.

III. Indian Telecom Hardware Sector

The Indian equipment manufacturing sector has come a long way in the past few years. Though it started as an import-centric industry, the move right now is towards becoming a global telecom equipment manufacturing hub. The key players in the industry are Motorola, Nokia Siemens Networks (NSN), Ericsson, ZTE, Alcatel- Lucent, Huawei and the state-owned ITI Ltd.

In the last decade, India has witnessed an exponential growth in number of telephone users, particularly in mobile segment. The growth of Indian telecom market has also enabled various telecom equipment companies to flourish in India. Whether it is passive or active infrastructure in telecom or mobile devices, the growth has been phenomenal. On the mobile devices side, there are a number of Indian companies such as Micromax, Karbonn Mobiles, Lava, Spice etc that had come up in recent years. A few Indian companies such as HFCL, Coral Telecom, Tejas Networks, VMC etc., had ventured into core telecom space much before the these handset companies came into existence. These telecom equipment companies are offering various transmission, access and core network equipment that are demanded by service providers in India.

TABLE III
Foreign Direct Investment in Indian Telecom Sector

FDI Inflows (in million US$)					
2006-07	2007-08	2008-09	2009-10	2010-11	2011-12 (Till Sept.)
478	1261	2558	2554	1665	1901

Initially, most of the Indian core telecom equipment companies operated as resellers for foreign companies. Global players, with an intention to enter the fast growing Indian telecom market partnered with local companies who acted as Indian subsidiaries or local partners to these players. Companies such as Fibcom, Anda Telecom, GOIP Global Services, Tirumala Seven Hills, Savitri Telecom, etc. have all started (and most of them are still continuing) as resellers of SDH-based transmission equipment in India. A decade or so before, India was identified by telecom MNCs as an ideal location for research and development (R&D) centers with some of the top companies in the industry getting embedded design and software development work done from here. From NSN, Ericsson to Huawei, many global telecom companies used India as an R&D destination through both captive and/or vendor models. This development also acted as another enabler for the growth of Indian home grown telecom equipment companies. A few Indian companies such as VMC and Tejas Networks (apart from ITI Limited) have invested in their own manufacturing facilities along with building R&D capabilities.

According to a TRAI report [3], the demand for telecom equipment in India is expected to grow from Rs. 769 billion in 2012-13 to over Rs. 1700 billion by 2019-20 (Fig. 1).

The Indian telecom hardware sector is fraught with many problems. The areas of major concern include the following issues.

A. Import Friendly Government Policy

The Government Policy in India is so framed that promotes imports over domestic manufacturing of telecom hardware. The manufacture of telecom hardware requires use of several electronic components, the manufacture of which does not happen in India. While there is no import duty on finished products, the Government has put tariff barriers on electronic components required to manufacture telecom hardware. This reduces cost competitiveness of local manufacturers.

B. Lack of Volumes

While foreign telecom hardware manufacturers have a global client base, Indian firms are yet to obtain both trust and capability to undertake orders even on a national scale, let alone a global one. As such, the volumes that Indian manufacturers possess are abysmally low in comparison with that of global giants such as Alcatel-Lucent, Ericsson, Nokia-Siemens, Motorola, Huawei and ZTE. The high volumes give global suppliers an opportunity to reap benefits of economies of scale, making them more competitive than their Indian counterparts.

C. Failure of Government Owned Firms

Earlier the government owned Indian companies such as ITI Limited, Centre for Development of Telematics (C-DOT) were able to design and make world-class switches. But over a period of time these companies failed to update their capabilities to match to modern requirements of the industry. The new economic policies such as privatization did not help them either. Therefore, though the policy of privatization has helped Indian telecom sector to grow, the government owned telecom equipment companies have gone weaker as they could not stand the competition.

D. Lack of Self Sufficiency

The Indian Telecom Hardware Industry is completely dependent on imports for manufacture of telecom equipment. As such, it is also plagued by higher production costs (due to high import dependence), longer lead time and regulatory hassles. Al these factors are discouraging entry of private players into this industry.

IV. A Comparison of Indian and Chinese Telecom Equipment Industry

The future development of Indian industry will depend a lot on how successfully Indian firms can compete with their Chinese counterparts as China has acquired almost an unassailable lead in the manufacturing of electronics and telecom products. The data presented in Table IV shows that, in 2008, China had a share of above 26 percent in the world electronics production, which is expected to rise further to 32 percent by 2013. Almost half of all mobile handsets produced in the world are of Chinese origin [4]. There is a noticeable difference in development patterns and processes between India and Chin. Therefore, a India-China comparison will certainly help us understand where India stands today vis-à-vis its neighbor.

Telecom equipment manufacturing is a part of larger electronics industry. In China, electronics industry has emerged as one of the country's leading industries. Due to the established large electronics industry, the Chinese telecom equipment manufacturers find components relatively cheap. Except for semiconductors which are mostly imported, other components are readily available in Chinese market. In contrast, India's electronics industry lacks the required strength to support telecom equipment manufacturing.

Moreover, India's focus has always been more on software

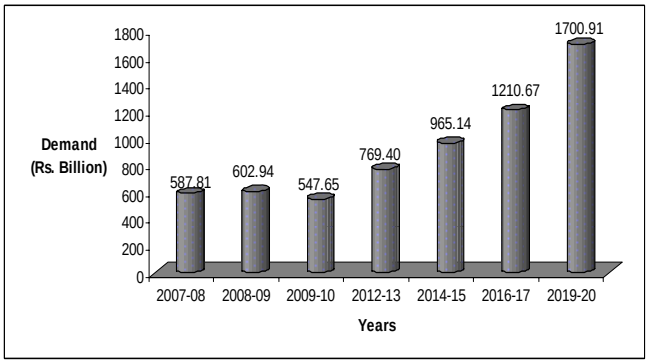

Fig. 1 Demand for Telecom Equipment in India

and information technology (IT) enabled services. This is perhaps the main reason behind China's growth in telecom equipment whereas India's growth in telecom services.

In any country, a healthy competition among firms with almost similar technological capabilities promotes industrial development. Although many Chinese local firms do not possess the same technological capabilities as those of foreign affiliated firms, they have formed their own advantages through competition among themselves. The competition in Chinese market is more or less homogenous as the top firms are unable to differentiate and become the dominant market leaders in the industry. During the 2000s, the top four firms had 10% to 15% of the market share between them. Moreover the rank is unstable. Equality is the property of competition in the Chinese market. The Indian market structure, on the other hand, is not homogenous. There exists a disparity between a few major firms and others. Thus, unlike China, the positive effects of competition have not appeared in India. As a result, the Chinese industry enjoys higher competitiveness as compared to India.

The market entry conditions are different in these two countries. Barrier to entry have been relatively low in China. In 1980s, Chinese local governments set up firms and in addition to firms transformed from defense industry, many new firms entered communications and electronics market. Although market entry was primarily led by the local government and not by private players, the condition for competitive market was set through such investment. For the local new entrants in India, it is considered that partial

liberalization gave incumbents and large-scale firms some preferential position in the industry which acted as a kind of entry barrier. On the contrary, entry of foreign affiliated firms and imports had given shocks to the major local incumbents. Consequently, after the entry of foreign affiliated firms, local firms lost their market shares.

China's competitiveness is also founded upon its low cost of production and a lower tax rate. China has world-class industrial parks that provide tax incentives to firms located therein. The corporate tax rate in China is low (maximum of 15%) as compared to India (30%) and many other nations. The Indian Government on other hand had extended tax holiday facility to IT/ITES industry rather than the hardware industry.

China also has the advantage of low labour cost. Quoting a 2011 report of the US Bureau of Labor Statistics**,** the VentureOutsource.com mentions that "China's hourly manufacturing labor rates (US$ 1.36) are far below the rates in Japan (US$ 27.80) and Taiwan (US$ 8.68) but roughly on par with nations like the Philippines (US $1.68)" [5]. The labour rate in India is slightly lower than that of China. But India's low labour productivity nullifies this advantage to a large extent.

The Ministry of Foreign Trade and Economic Cooperation (MOFTEC) has recently posted China's policies for trade and foreign direct investment. They clearly state the incentives and describe the industries that are open for foreign direct investment, especially in the western regions. In India, though the FDI policy is in place, the actual inflow has been occurring more towards the telecom services and not towards equipment manufacturing.

Lastly, these two countries differ in respect of fundamental structure of the economy. India is a service-driven economy with services sector having about 60 percent share in country's GDP. In comparison, China with its huge base in manufacturing is known to be the factory of the world. Thus 'engines of growth' are different for India and China. The economic reform process also started at different points in time. In China, economic reforms started in late 1970s, whereas India adopted full liberalization policy only during 1990s. No doubt economic reforms have played a key role in promoting growth in both the countries. But its impact on industry and overall economy differ significantly between these countries due to differences in nature, duration and speed of reforms. The fact that the ratio of secondary industry including telecom and electronics to the whole economy in China is much higher than that of India is one such reflection.

V. The Way Forward

In today's age, secure, reliable and vibrant telecommunication networks are critical for economic and social development of a country. India has achieved remarkable success in telecom services. However, in manufacturing of telecom equipment the country has remained rather laggard, though some improvement could be noticed during the last few years. But a sustainable growth in telecom industry demands presence of an expanding manufacturing sector within domestic economy based on indigenous technology and also supported by a proper innovation systems.

TABLE IV
SHARE OF CHINA IN WORLD ELECTRONICS PRODUCTION

Region	Production (Million Euro)		Share (%)		Compound Annual Growth Rate (%)
	2008	2013	2008	2013	2008-2013
Europe	251124	246724	22.1	19.0	-0.4
North America	204317	184900	18.0	14.2	-2.0
Japan	162760	163970	14.3	12.6	0.1
China	296607	416070	26.1	32.0	7.0
Other Asia-Pacific	184383	244075	16.2	18.8	5.8
Rest of the world	36356	42487	3.2	3.3	3.2
Total World	1135548	1298226	100.0	100.0	2.7

The need for enhancing domestic manufacturing was emphasized by several past policy pronouncements of the government. But the latest telecom policy (NTP 2012) is a concrete step towards building a strong domestic manufacturing facility. In fact, the policy not only targets to meet Indian demand to the extent of 60% and 80% with a minimum value addition of 45% and 65% by the year 2017 and 2020 respectively, it aims to make India a global hub for telecom equipment manufacturing and a centre for converged communication services [6].

The National Telecom Policy 2012 has a whole section dedicated to the promotion of domestic telecom equipment manufacturers. Proposals include promotion of R&D, design development and manufacturing of telecom equipment; creation of a road-map to align technology, demand, standards and regulations for enhancing competitiveness of domestic manufacturing and to assist entrepreneurs to develop and commercialize Indian products by making available requisite funding (pre-venture and venture capital), management and mentoring support.

The new policy is definitely a welcome move that promises a good future for Indian telecom sector, particularly manufacturing. However, as the things stand today it certainly appears to be over ambitious. In the following paragraphs we examine the realistic chance of India emerging as a global hub for telecom equipment manufacturing.

As of now, the size of telecom equipment manufacturing in India is small relative to country's GDP and also as compared to the same sector in other countries, particularly China. The manufacturing segment is dominated by foreign firms and Indian companies occupy only a small space in the total domestic manufacturing base. Though there is a sizeable demand for telecom equipment which is also growing, supply

is largely met through imports from China and Europe. This comes apparent from the fact that, during 2009-10, the contribution of all domestic products has been 12-13% while 'Indian products' could meet just 3% of the Indian demand. This also means that majority of sales revenue arising out of a fast growing Indian telecom market is actually accruing to foreign companies either operating in India or abroad.

Presently, mobile device (i.e. handset) is the only telelcom equipment which has a respectable manufacturing base in India and it is also exported from the country. But here again the products manufactured by MNCs including Nokia, Samsung and LG command an overwhelming majority (about 85% in 2009-10) of market share leaving a little scope for market manoeuvring by Indian players like Micromax, Lemon, Karbonn, Spice, LAVA etc. Even most of these so called local manufacturers are mere assemblers of imported components coming from China.

A relatively low spending on research and development (R&D) by Indian firms has been a major reason behind country's high dependence on foreign technology. Of the 141 government-funded R&D projects approved by the Department of Science and Technology (DST) in 2009, only five were for the telecom sector. Moreover, of the Rs 16 billion investment in R&D by DST in 2009, only Rs 120 million was allotted to the telecom sector [7].

Besides, India's export-import policies for long favoured imports over manufacturing at home. For vast majority of electronic components, while duty was levied on the import of components, the finished products could enter the country duty-free. This put domestic manufacturing industry at a definite disadvantage.

But a high growth of telecom services continuously for several years has created a huge opportunity for sale of telecom equipment in India. The domestic manufacturing industry can certainly take advantage of it. The demand for equipment in India is not only high today, it is also expected to increase rapidly with the full fledged rolling out of 3G & 4G services and broadband wireless access services. India's information and communications technology equipment consumption is expected to touch 11.5% of the global market by 2015 [8]. By the year 2020, total demand for various types of telecom equipment would be around US$ 34 billion (i.e. approx. Rs 1700 billion) [3].

Increasing domestic manufacturing of telecom equipment in the country will help service operators reduce their dependence on foreign sourcing, thereby saving them as well as the country from high import bills**.** Otherwise, there is a genuine possibility that one day the import bill for telecom equipment may surpass that of petroleum products, putting country's balance of payments (BoP) position under tremendous stress. Manufacturing within India can be a savior in this regard.

Security concerns over imported equipment can act in favour of larger demand for domestically manufactured products. Huawei and ZTE, two Chinese telecom manufacturing majors account for close to 70% of the Indian military telecom hardware. The Center for Land Warfare Studies (CLAWS) has warned that such a high percentage of Chinese equipment poses a high risk to the Indian establishment [9]. In a more recent development the Cabinet Secretariat of the Indian Government has expressed concern over induction of large scale foreign telecom equipment, especially of Chinese companies ZTE and Huawei, in private and government networks, without testing [10].

India has always tried to solve her own problems in technology front in a unique manner. But with respect to telecom manufacturing, the major hurdle it faces is the lack of ancillary industries, such as semiconductors and microprocessors industry. At present, India does not have both technical and commercial know how in this domain. Therefore, any attempt to promote domestic manufacturing may not take off if adequate attention is not paid towards supporting industries. The NTP 2012 seems to have overlooked this aspect.

The proposal in the new policy to set up venture capital for entrepreneurs is a right step. However, common social malaise like corruption and nepotism can substantially reduce its effectiveness in India. Another obstacle in developing domestic manufacturing capacity in India is that the country may not be able to impose drastic trade barriers on imported telecom equipment. At the initial stage, stringent trade restrictions on imports can be a useful ploy to create demand for locally manufactured products to a minimum sustainable level. Given India's commitment to promotion of free trade as agreed in recent free trade agreements (FTAs) with neighboring countries as well as to the WTO, it would be politically difficult for India to put such trade barriers in place.

Mere creation of production facilities will not help the industry much unless service providers are encouraged to source most of their requirements from within the country. Telecom operators demand that the government should incentivise them for using indigenously designed and manufactured products. In order to increase domestic participation, the government can also provide tax holidays and capital support to domestic manufacturers.

Apart from rolling out incentives and tax waivers, the government has to make the entire process of setting up manufacturing units hassle-free. At present, one has to take several approvals (e.g. NOCs) from multiple agencies to set up a unit in India, unlike in the East-Asian countries where there is a single window clearance system. Findings from the World Bank's Doing Business 2013 Report reveal that India with a rank of 132 (out of 185 nations) in 'ease of doing business' does not present a very healthy business environment. The Report indicates that it takes 27 days to start a business in India as compared to only 3 days in Singapore [11].

The governments in India, therefore, need to do much more than expressing the right intentions through NTP 2012. Otherwise, it may take a longer time to achieve the targets set by the policy or the targets may remain unfulfilled. First, there is utmost need for implementation of all strategies articulated

in the new policy. Further, it has to create a suitable environment through various fiscal, financial and institutional measures to supplement the policy already announced for ensuring a healthy growth of equipment manufacturing in India. The private sector must play its part as well. India should aim at building a conducive ecosystem for equipment manufacturing so that the domestic industry not only achieves a healthy growth but also attains the capability to compete with the best in the world. If all things move in right directions India can achieve its long cherished desire of making the country a global hub for telecom equipment manufacturing. But it will require astonishing efforts from all concerned- the government, industry, research institutions, academia etc. It is also possible that the journey towards this goal may encounter many new challenges not envisaged by today's policymakers. It's therefore too early to say whether India will actually emerge as a global telecom manufacturing hub or not. However, looking at the industry potential and the policy environment, the prospects look very exciting at the moment.

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