Mobile Infrastructure Sharing- An Indian Scenario

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INTRODUCTION

The consciousness regarding the scarcity of Natural resources has slowly been taking momentum. Today, a lot of activities are being performed and a lot of Organizations (both Government and Non-Government) have been formed to oversee the efficient utilization of the Natural Resources. But the matter of concern is that a lot of focus is being given to the efficient and proper utilization of the Tangible natural resources like coal, petroleum etc., whereas, the intangible but equally important natural resource like the Electromagnetic Spectrum and its efficient utilization is not been given due importance. The day to day communications that we make with mobile phones or even with the help of Internet are heavily dependent on the efficient utilization of this Electromagnetic Spectrum, but we neither have the time now we bother about its proper usage and efficiency. Spectrum is a limited but constant natural resource **(Forouzan, 2004)** for the whole world. Although the existing bands and Spectrum would not deplete even if used excessively day in and day out, but with the increasing population, the quantity of spectrum available to a group of people for usage will go on decreasing. There is an inverse relation between the two. So, judicious usage of Spectrum will not only be cost effective, but is also necessary from an ethical point of view. Moreover, Radio Spectrum knows no boundary - whether it be national or international. This study concentrates on how the efficiency in spectrum usage could be obtained from the commercial activities of cellular networks. Even if efficiency is obtained for the commercial usage, it does not guarantee the all round efficient utilization because many bands of spectrum are not free for commercial purposes. These are either controlled by the Defense Services or by the National Space organizations for research and development purposes. The cases vary from nation to nation.

SPECTRUM AND THE ROLE OF THE GOVERNMENT

The Central Governments of various nations play a significant role in the allocation of Spectrum for commercial purposes. Different frequency ranges are being allocated for commercial purposes by the Governments of various nations. Although the specific quantity to be allocated to the commercial agents depends solely on the central governments of different nations, but today, mostly operators of cellular services are allowed to operate in the 900 MHz or the 1800MHz band for maintaining a standard across nations **(Tanenbaum, 2000)**. But for services like Code Division Multiple Access(CDMA), bands in the range of 800 MHz are also allowed. In India, initially the operators were given licenses in the 900 MHz band, but from the past few years, the Government allowed operators to operate in the 1800 MHz band also. Today, many operators operate in multiple bands. Most of the handsets today are dual band frequency enabled, which can operate both in the 900 MHz band as well as the 1800 MHz band and that is why we do not know even if an user is constantly changing frequency bands as he moves from one cell to another in a state.

SPECTRUM ALLOCATION AND INDIA

In India, the allocation of Spectrum for Commercial Purposes is done by the Government. For Telecom and Broadband access in the country, the apex body is the Telecom Regulatory Authority of India(TRAI). The Ministry of Telecommunication is the Department of the Government responsible for the regulatory issues in the country. The Radio frequency in India is confined between 9KHz to 3000 GHz.

❁ **National Frequency Allocation Plan 2002 :** All the equipment manufacturing and spectrum usage are based on the National Frequency Allocation Plan. The different frequency bands available for India along with their usage are given in the following Table 1.In India, both GSM and CDMA services are being used. The band in which GSM works in India is the 900 MHz and 1800 MHz band. The CDMA works in the 800 MHz band. In the initial days, these frequencies were used by the defense. But with the invent of mobile telecommunication, these bands were released for the public. India could have started the mobile service in other bands also had it wished, but since the whole world is

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Table 1 : Frequency Band Distribution

Sr	Radio Service	Frequency Band
1	Radio Navigation	9-14kHz
2	Mobile (Distress and Calling)	495-505kHz
3	Broadcasting	535-1605.5kHz
4	Maritime Mobile	2065-2107kHz
		2170-2178.5 kHz
		2190.5-2194kHz
5	Fixed, Mobile, Broadcasting Radio Astronomy	610-806 MHz
6	Mobile, Fixed, broadcasting	890-960 MHz
7	Mobile Satellite	942-960MHz
8	Radio Location	1350-1400MHz
9	Mobile, Fixed, Space operation, Space Research	1710-1930MHz

Source: TRAI

using either the 900MHz or 1800 MHz band, it will create lot of problems in international roaming. So India also decided to use the standard band for its services. Moreover, mobile handsets being used are imported, so they conform to the 900/1800 MHz band. So it was an added advantage that the mobile handsets which were imported to India were already in conformance to the international standards. Had India decided to use any other band of frequency for mobile communication, the imported mobile devices would have been incompatible and in such a case, handsets had to be manufactured inside the country and it would have turned out to be very costly. Moreover, to develop the industry of Mobile Hardware Manufacturing from the grassroots itself would have taken decades for India and the rapid increase of mobile phones that India is witnessing today would not have been possible so easily. There is 25 MHz band (890-915/935-960 MHz) in the 900 MHz zone and a 75 MHz band in the 1800 MHz zone(1710 - 1785 / 1805 - 1880 MHz) that has been provides for GSM usage. The whole total of 75MHz is not used solely for commercial purposes. Some of it is still under the Defense. Presently, for start-up of mobile services, 4.4 MHz comes bundled to the operators for GSM and 2.2 MHz for CDMA services. For CDMA, 20 MHz spectrum in the range (824 - 844 / 869-889 MHz) is available. For 3G services, the Government has allocated the band of (1920 - 1980 / 2110 - 2170 MHz) **(Kaul, 2002)**.

SPECTRUM ALLOTMENT PROCEDURE IN INDIA

Before proceeding in the direction of the Indian scenario, it would be good to give some overview of the regional division of spectrum and the Asia Pacific Telecommunity. ITU(International Telecommunication Union) is the body responsible for the allocation of Spectrum on the International Basis. It is recognized by the United Nations. The ITU divides the whole world into three zones as shown below in Figure 1 and India falls in Region 3.

Figure 1 : Division Of World On Spectrum Basis

Source : http://ids.nic.in/tnl_jces_Sep_2009/Spectrum%20aLLOCATION%20pROCEDURE.pdf

Apart from the division based on 3 Regions as shown in Fig 1, special provisions are being made on the tropical area of the equatorial region for the high sensitivity of noise as the equatorial region is bulging outwards. (ids.nic.in, 2010). The implementation of Legal and Technical issues is based on different frequency zones dividing the whole electromagnetic spectrum into some distinct bands. The entire spectrum is available for all the countries, but if a world standard is not followed, various problems will creep up during integration and compatibility of the transnational devices. India also has the whole spectrum and the latter half of the study will depict how the allocation of spectrum takes place for the commercial purposes.

THE INDIAN SCENARIO

In India, the organization responsible for the allocation of Spectrum for public and private use is Wireless Planning and Co- ordination (WPC) wing of the ministry of Communication which was created in 1952. It performed various functions in the initial days like issue licenses to maintain and operate wireless stations. There are various departments under this such as:

- New Technology Group
- Licensing and Regulation
- Standing Advisory Committee On Frequency And Allocation

The Telecom Regulatory Authority of India(TRAI) was first initiated in the year 1997 by the Government of India. Now-a-days, TRAI is an independent body responsible for regulations in the telecom domain. It is responsible for deciding when to allocate spectrum and in what quantity to the service providers. Also, all the disputes and compatibility issues among the service providers should be handled by TRAI with an objective of making India powerful in the telecom sector in the world. The issue of spectrum in India is controlled according to the National Frequency Allocation Plan, which has already been mentioned previously in this study. Moreover, any manufacturing of gadgets using radio frequency must adhere to this plan.

VARIOUS STAGES OF SPECTRUM ALLOCATION

- **First Stage:** The initial allotment was done on a 2X 4.4 MHz of start-up spectrum. It was awarded to two operators in 1995 via an auction. Later, a third operator was given license in the 900 MHz band. A fourth operator license was awarded in 2001 in the 1800 MHz band. The operators had to pay a percentage of annual revenue to the government as spectrum charges apart from the fixed entry level fee. Operators were awarded additional spectrum on demand but proper justification had to be given to the government and operators also had to mention the increase in revenue which would bring in revenue for the government as *spectrum charges*. It also depended on the largeness of the subscriber base in a circle.

- **Second Stage:** In 2000, the basic Telephone Service operators approached the government with a proposal to operate in a Wireless Local Loop (WLL), thus providing mobility to its customers. After about two years of litigations between the B-Phone Providers and the GSM (Global Service for Mobile Communication) providers, finally, the government allowed the B-Phone Service Providers to provide mobility to its customers with an entry level fee which was equal to the entry level fee of the fourth Service provider in the GSM network. In early 2005, TRAI decided to review the spectrum allocation and utilization issues for the current telecom service providers. In a study conducted by TRAI, it was found that the Indian Service providers have much less spectrum for use of Commercial purposes in comparison to their international counterparts. So, it was recommended that the existing players be allowed to have a wider band of spectrum to serve the growing customers properly before allocating spectrum bands to the new players in the market. (ids.nic.in, 2010)

- **Third Stage:** At this stage, the criteria were made even more strict for spectrum allocation. But by that time, the defense released a 2 X 20 MHz of Spectrum Band in the 1800 MHz band and also an additional 25 MHz in the 2.1 GHz band. This solved the problem to some extent on a medium term basis because now the customer base could be serviced well sufficiently. The TRAI relaxed the entry of new players in the market with a relatively moderate entry fee for the operators. Moreover, 3G spectrum was being looked as a completely different picture.

- **Fourth Stage:** In this stage, the government announced the policy for 3G spectrum in August 2008. Abiding by TRAI's recommendations, the government decided to allow 2 X 5 MHz spectrum band in the 2.1 GHz band with

specified reserved price for different circles. The 2 X 5 MHz band is the minimum requirement of spectrum for providing the 3G services in the 2.1 GHz spectrum using the WCDMA technology (ids.nic.in, 2010).

EFFICIENCY IN INFRASTRUCTURE USAGE

The Government has encouraged efficient usage of mobile infrastructure. Now-a-days, for proper utilization of spectrum and other infrastructures, *pico* or *femto cells* are installed inside buildings. Moreover, smart/ Directional antennas used by many service providers also improve the utilization process. Not only this, the government has also allowed the sharing of infrastructure among the service providers. Now-a-days, the companies can share both the Passive Infrastructures (towers, rental place) as well as the Active Infrastructures(Antenna, feeder cable, technology etc) with other companies. This has led to the decrease in set up cost, ultimately resulting in the reduction of cost per minute of usage leading to the cheapest cell phone charges in the world. As a result of all these, the Mobile Virtual Network Operators are coming up, who are nothing but mobile operators without their own network infrastructures. But while considering these, the regulatory issues and availability of spectrum should also be kept in mind by the telecom players as well as the Authorities concerned.

PRICING

The pricing of spectrum followed by the Indian Government since the very beginning is given below:

❁ **1992:** After the economic liberalization, the first two rounds of spectrum allocation took place. The government raised ₹ 3400 crores for 4.4 MHz spectrum allocation, putting the price of each MHz at ₹ 770 Crores.

❁ **1999:** In 1999, a third license was given in all the circles to the state owned operators BSNL(Bharat Sanchar Nigam Limited) and MTNL(Mahanagar Telephone Nigam Limited).

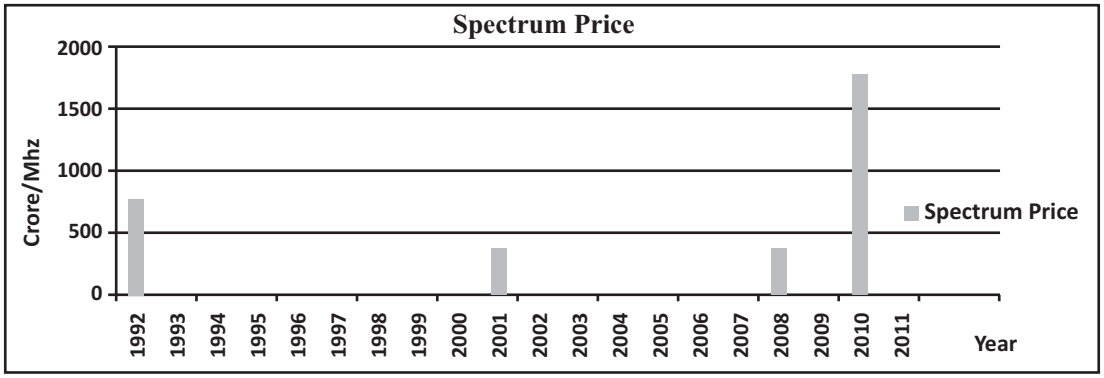
❁ **2001:** After the dot com burst, the economy slowly began to recover in this time. But the time was still fragile after the 9/11 incident. The government went forward with the auction for the fourth license for a total of ₹1,651 crore for 4.4 Mhz, valuing each Mhz at ₹ 375 crore.

❁ **2008:** In 2008, few more licenses were awarded to new players at a very moderate price equivalent to the auction in 2001 rates. The government did not consider to increase the price even though there was unavailability of spectrum and also did not consider the impact of inflation. Inspite of having resistance from many groups, the government went forward with its decision.

❁ **2010:** In 2010, 3G spectrum were auctioned at a very high price. The price went to ₹ 8,914 crore for each 5 MHz spectrum resulting in ₹ 1,782 crore per MHz of spectrum. (Broadband India, 2010).

This trend could be visualized more properly with the help of Figure 3 showing spectrum price per MHz.The Indian government provides the license with a fixed initial amount along with a revenue sharing agreement. For the 2008 spectrum, the new operators were given only at a minimal price of the 2001 auction amount. Moreover, market conditions in 2001 and later were quite different. In 2001, the operators were given licenses on Cellular Mobile Telephone Service (CMTS), which was specifically for mobile communication. But later, the government gave licenses on Unified Access Services (UAS) to the operators. The UAS was quite different, it allowed the operators to operate not only via the cellular technology, but also by any other means such as wired line. In such a condition, UAS

Figure 2 : Spectrum Price



licenses were supersets of CMTS and so the pricing of UAS licenses could never be compared with the CMTS licenses, but the government did not take a look at it. (ids.nic.in, 2010). But now the authorities concerned are trying to locate the root of the anomalies during the 2008 spectrum allocation. The government tried to take every possible step to make the next generation spectrum allocation process as transparent as possible. So the process of 3G and BWA allocation took a longer time and it was well documented in every step. These are discussed in the next part.

TIMELINE ON 3G ALLOCATION

After much delay, finally the Auction for 3G spectrum took place in India in April 2010. No player was able to bag all the 22 circles. RCom, Aircel, Bharti bagged 13 circles each and the government got a huge amount of ₹ 67,710 crore. R Com payed a total of ₹ 8,585.04 while Bharti payed ₹ 12,295.46 crore for the 3G licenses. The key circles of Mumbai and Delhi went to Vodafone, Bharti and RCom. The Government got much more than its initial expectation of ₹ 3500 Crore from the 3G auction (Times of India, 2010).

The timeline for the events could be mentioned as below:

13 May 2005: TRAI submits its recommendation on the 3G spectrum.

15 December 2008 : The DoT issued the time table for the 3G Auction.

11 September 2009 : The DoT issued the revised time table for the 3G Auction.

16 October 2009 : TRAI (Telecom Regulatory Authority of India) replies to DoT's request for comments/recommendations on access of spectrum and pricing.

16 November 2009 : A Prebid Conference was held between DoT and key Stakeholders.

12 September 2009 : The Government announced that 3G auction will be held on 7th December.

10 January 2010 : 3G bidders were allowed to pay in two parts.

24 February 2010 : The Government decided to have the 3G auction process on 9th April.

27 February 2010 : 3G services launched by BSNL in 11 cities in India.

19 March 2010 : Total of nine 3G applicants till now.

5 April 2010 : A mock auction took place for 3G and BWA.

9 April 2010: 3G Auction starts (livemint , 2010)

3G AND BWA AUCTION PROCEDURE

Figure 3 : A Base Station

The main objective of the Government for the auction of 3G and BWA (Broadband Wireless Access) spectrum were:

- To determine the prices of 3G and BWA based on the market rates transparently;
- To maintain a healthy competition in the sector;
- Ensure efficient and effective use of scarce spectrum;
- Maximize the government revenue from the process of spectrum allocation.

Both the 3G and BWA spectrum auction were conducted separately. This auction was done on an electronic basis. A mock auction was also run to familiarize the bidders with the electronic system. The following bands of spectrum were offered for a period of 20 years.

❁ **For 3G:** 2.1GHz, paired, in blocks of 5MHz, i.e. each block of 2X5MHz.

❁ **For BWA:** 2.3GHz, unpaired, in blocks of 20MHz.

The spectrum was strictly allowed only for the purpose for which the operator has a license. The award of spectrum itself does not mean that the operator is allowed to provide service in a particular circle, but for that, the operator will also have to take the UAS/CMTS license concerned to the specific circle. The Government allocated a block of 2X5 MHz of spectrum at Delhi and Mumbai for MTNL and similar blocks to BSNL for the rest of the country. BSNL and MTNL did not participate in the auction but they had to match the winning bidders price. Similarly, for BWA spectrum also, the government has already allocated a 20 MHz band in Mumbai and Delhi to MTNL and a similar band for the rest of the country to BSNL. (Technology G. o., 2010). MTNL and BSNL did not take part in the BWA bidding process but they have to pay the equivalent amount as that of the winner in the corresponding circles. The only player having won the PAN India license for BWA is Infotel Broadband Services (Reporter, 2010).

FIXED REVENUE FOR THE GOVERNMENT

For the metro areas, the operators are required to pay a fixed percentage of their Adjusted Gross Revenue(AGR) to the government depending on the spectrum they possess. The percentages fixed by the government are given below (DoT) in Table 2 and Table 3:

Table 2 : For CDMA Operators

Spectrum Slab	Annual Spectrum Charges(As percentage of AGR)
Upto 5 MHz	3
Upto 6.25 MHz	4
Upto 7.5 MHz	5
Upto 10 MHz	6
Upto 12.5 MHz	7
Upto 15 MHz	8

Source: http://www.dot.gov.in/as/Auction%20of%20Spectrum%20for3G%20&%20BWA/3G%20&%20BWA%20Auctions_Notice%20Inviting%20Applications.pdf

Table 3: For GSM Operators

Spectrum Slab	Annual Spectrum Charges(As percentage of AGR)
Upto 4.4 MHz	3
Upto 6.2 MHz	4
Upto 8.2 MHz	5
Upto 10.2 MHz	6
Upto 12.2 MHz	7
Upto 15.2 MHz	8

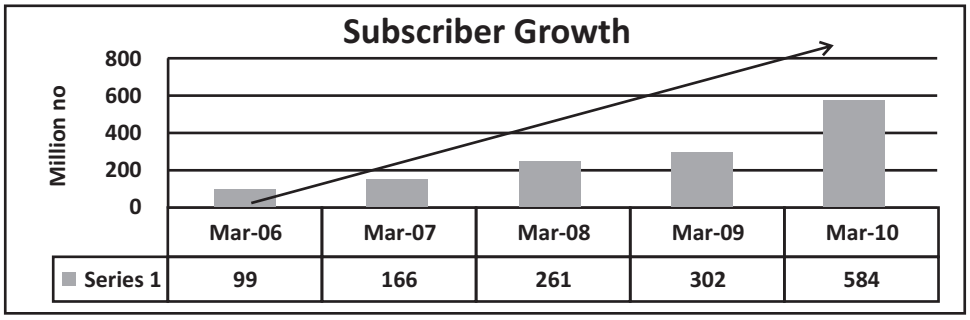
Source: http://www.dot.gov.in/as/Auction%20of%20Spectrum%20for3G%20&%20BWA/3G%20&%20BWA%20Auctions_Notice%20Inviting%20Applications.pdf

It is seen that the larger the spectrum band an operator holds, the better it is for the government to fill up its exchequer. So at many occasions, it was seen that the government tried to give more spectrum to an already spectrum-rich player instead of giving it to a smaller player.

DEMAND OF TELECOM TOWERS

From a study conducted by CRISIL, it is seen that the subscriber base in India has been increasing exponentially leading to a huge demand for towers in the near future. If the customer base is seen, it can be shown graphically as:

Figure 4: Subscriber Growth Plot



Source : TRAI

In 2008, the DoT has issued licenses to six new and three existing operators to give their services in new circles. These licenses were given in the 1800 MHz band as against the 900 MHz band. The technical requirement is such that for the same area to be covered under the 1800 MHz band, the requirement of towers is 1.7 times that of the 900 MHz band. This factor has also contributed to the increasing demand of towers (Telecom Tower : Demand Outlook, 2010) and towers have also grown considerably. A report from Business India gives the following number of towers by various companies as on July 2010.

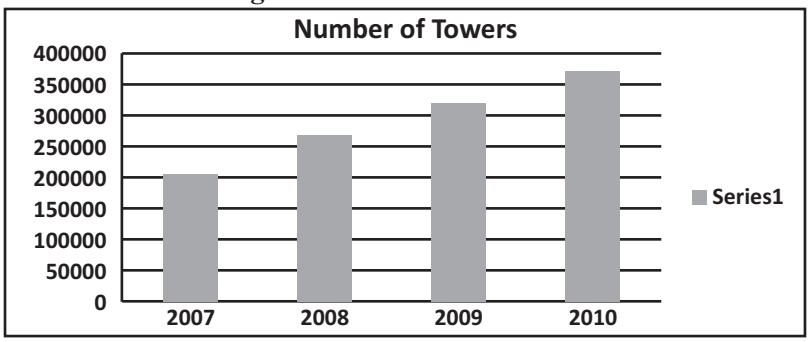
Table 4 : Number of Towers

Tower Companies	Number of towers
Indus Towers	100,000
Reliance Infratel-GTL	80,000
Tata Teleservices-Quippo	38,000
Bharti Infratel	30,000
American Tower Corp	7,000
Tower Vision	5,000

Source: Business India, July12-25,2010

Moreover, the launch of 3G, BWA and WiMax services will again add to the demand of towers. Also, as the Mobile Number portability has been implemented, the operators now face stiff competition to retain their existing customers by offering Quality in Services. This can be done by reducing the number of subscribers being served by a Base Station. As a result, more number of new towers will have to be set up in close vicinities creating mini cells and thus, increasing the demand for towers. Initially, the service providers themselves maintain their towers. But when the government allowed the sharing of passive infrastructures, many companies tied up to form a combined entity for tower maintenance. For example, in 2007, Bharti, Vodafone and Idea came together to form an entity called the Indus Towers to maintain the towers. Today, it is seen that the share of the independent tower companies has slowly been rising since 2007. They now cover a wide range in all the circles and there is no need of further Capital Expenditure for them. The independent tower companies have slowly understood the great potential of this business. The trend in the

Figure 5 : Increase of Towers



Source: Industry, CRISIL research

increase of towers is shown in Figure 6. However, gradual consolidations have taken place in the tower business during the past few years. The acquirers are not buying the targets even at huge investment amounts, understanding the potential of the market as the MNP has been implemented.

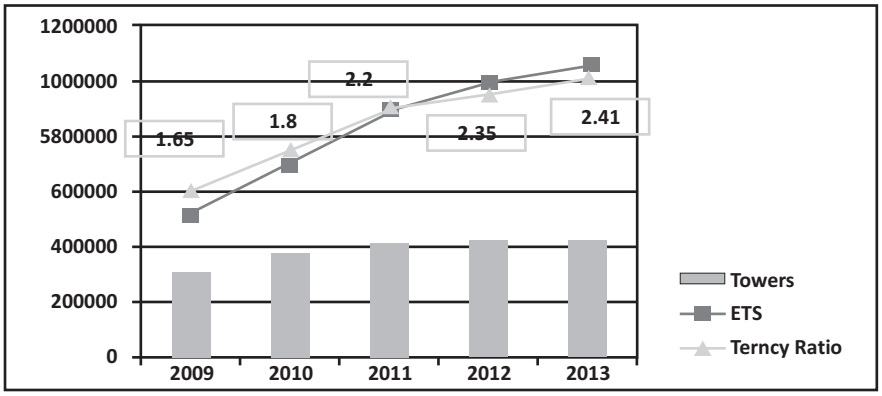
Table 5 : List Of Acquisitions In The Business

Date	Target	Acquirer	Stake (%)	Investment Amt. (₹ million)
Dec-07	Spice Comm	Quippo Tele	100	5,000
Feb-08	Tower Vision	Morgan Stanley	Undisclosed	14,000
Jan-09	Tata Teleservices (WTTIL)	Quippo Tele	49	24,000
Mar-09	Xcel Telecom	American Tower Corporation	100	7,000
Jan-10	Aircel Cellular	GTL Infrastructure	100	84,000
Feb-10	Essar Telecom	American Tower Corporation	100	20,000
Mar-10	TTML	Quippo Tele	100	13,180
Jul-10	Reliance Infratel	GTL Infrastructure	100	325,000 (E)

Source: CRISIL Research

GTL infrastructure is now the largest player. In January 2010, GTL took over 17, 500 towers from Aircel and Reliance Infratel - the tower arm of Reliance Communications (RCom). Reliance Communications (RCom) agreed to merge its 50,000-tower portfolio with GTL Infrastructure in a cash and stock deal, making it arguably one of the largest merger and acquisition transactions in India. But as on 6th September 2010, the deal between Reliance Communication and GTL did not go through and the deal collapsed. Although the exact reason for the failure is not being made public yet, the stock prices of both the companies went down (Reuters, 2010).The demand for towers has constantly been increasing and CRISIL has estimated that the required number of towers till 2013-14 would be 439,000 from the existing number of 318,000. The industry will grow at CAGR of 16%. The demand forecast is shown graphically as below in Figure 6.

Figure 6 : Tower, Tenancy Ratio And ETS



Source: CRISIL Research

INFRASTRUCTURE SHARING LEVELS AND INDIA

Technically, there are 5 levels at which infrastructures could be shared among the players. It is shown below:
The various levels are:

Level 1: Sharing of Sites and Passive Elements.

Level 2: Sharing of Antenna including feeder cable, coupler etc.

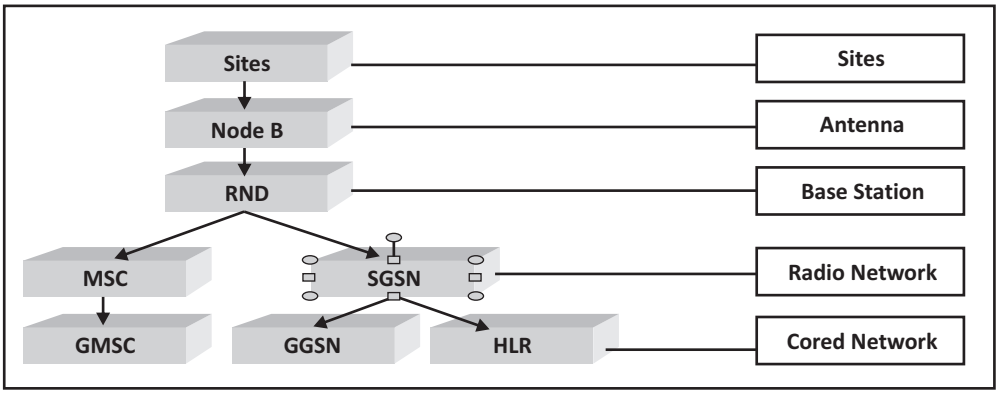
Level 3: Sharing the Base Station (B node).

Level 4: Sharing the Base station Controller.

Level 5 : Sharing Network Core Elements.

Presently in India, most of the sharing is taking place upto level 3. But in the near future, upper levels will also be

Figure 7 : Levels of Infrastructure Sharing



Source: http://www.netlab.tkk.fi/opetus/s38041/k04/index.shtml#material

shared. As the levels of infrastructure sharing goes higher and higher, the scope of the Infrastructure sharing business also improves in the same proportion. So the tower companies should now try to propagate and try to create an environment in which they get clients for sharing infrastructure in all the levels including the higher levels 4 and 5. The study makes an effort to understand the business in more depth.

BUSINESS OF TOWER SHARING

As the study has already suggested initially, the subscriber base has constantly been rising for the Indian telecom industry. The industry has been adding 8-10 million customers per month for the past several months and the demand is still growing. According to TRAI, the total subscriber base in India at the end of March 2010 was 584.32 million. As a result of this huge subscriber base, the big players are getting huge revenues and are expanding to the foreign lands. For example, Bharti has bought the Kuwait-based Zain telecom for its African operations for USD 10.7 billion, making Bharti the 5th largest telecom operator in the world **(Singh, 2010)**. It is estimated that the tower infrastructure itself costs about 50% of the total Capital Expenditure for an operator **(Romain Delavenne, 2010)**. In order to reduce the infrastructure costs, the telecom companies approached the TRAI for its recommendations on sharing the telecom infrastructures. Telecom towers' importance increased to a huge fold when the government allowed the sharing of the Passive infrastructure which includes physical sites, towers, buildings, shelters, masts, battery back up and power supply. TRAI submitted its recommendations long back in 2007 regarding the sharing of both Active infrastructure and Passive infrastructures. The regulatory body had anticipated a huge increase in towers long back itself, as in 2007, there were only 1 lakh towers in the whole country and it forecasted the demand to shoot up to about 3.3 lakh towers by the end of 2010. Moreover , after the launch of 3G in 2010, the demand for towers has increased exponentially. So if the infrastructure could be shared among the operators, a huge amount of cost could be avoided and ultimately, the benefit could be passed on to the subscribers in the form of lower call rates and increased value added services. This model should work quite well in India because India has the highest number of operators operating today ie 15 players (Reuters, 2010) as of September 2010. The government allowed the sharing of passive infrastructure in 2007 and then later in 2008, sharing of active infrastructure was allowed.

The Cellular Operators Association of India (COAI) has played an active role in initiating the sharing of mobile towers among the operators. Its main objective was to bring down cost by sharing towers, which enable both GSM and CDMA operators to operate from the same infrastructure. Also, the better coverage was an important objective to be achieved. With these objectives in mind, project MOST (Mobile Operator's Shared Towers) was initiated. It was initially started at Delhi, Chennai, Mumbai and Karnataka. In fact, as a result, India has created a record of creating a 6 operator sharing site for the first time in the world (India, 2010) (See Figure 8) .

Immediately, the telecom providers saw a new business of towering coming up and many of them hived off their tower assets into separate tower infrastructure subsidiaries. Bharti hived off Bharti Infratel, Tata teleservices formed Wireless TT Info Services and Reliance Communications set up Reliance Infratel. Moreover, Bharti partnered with Idea and Vodafone to form Indus Towers **(Singh, 2010)**.

Figure 8 : Multiple Operators In A Single Tower

Source : http://www.reliancebroadban.com

NEED FOR TOWER SHARING

The primary reasons for tower sharing are:

1. Sharing of towers help to lower the operational costs of the companies.

2. Telecom companies are able to focus more on their core business of providing quality services to the consumers.

3. Duplication of efforts and costs can be saved.

4. Reduced incremental capital requirements.

5. Lower operational costs and favorable capital structure (Research, 2007)

For example, Aircel has signed an agreement with BSNL to share its passive infrastructure in all the circles of the country. It is supposed to share 45000 towers that BSNL has. BSNL has a coverage of 96% in the whole country and if this sharing agreement goes through successfully, then Aircel would be able to imprint its footprint in almost all the areas in the country. This will be a major cost saving step for Aircel and more importantly, it would be time saving in a competitive market. The setting up cost of a tower is roughly ₹ 4 lakhs, but the operational costs vary from places to places. While it might be easier to have easy security and back up facilities in the urban areas, the rural areas lacks it and so by sharing the infrastructures, the companies can actually save on their operational costs. Since it is gradually getting difficult for telecom operators to maintain their infrastructure both in rural and urban areas with the same quality of service delivered and also keeping the costs low, new independent tower companies are evolving.

INDEPENDENT AND OPERATOR OWNED TOWER BUSINESS

In the initial years, all the operation and maintenance of towers are done by the operators. But now-a-days, a different trend is visible altogether. Now-a-days, some independent players have ventured into the tower business such as the GTC and QUIPPO. These companies do not have cell phone services in India, but they are only into the tower business. The major source of revenue for the operator owned towers are from their own operators. On the other hand, the Independent players like GTC and QUIPPO depend mainly on the new entrants and on the regional operators as they do not have an assured customer base of their own.

The success of a tower depends on the *Tenancy Ratio*. Tenancy Ratio is expressed as the fraction of total number of operators sharing the towers/total number of sites present (The Financial Express, 2009).Presently, the tenancy ration in India is 1.4, but for companies to have a ROI of more than 15% , the tenancy ratio should be more than 2. The tenancy ratio is expected to go up because of the new licenses to new operators like Swan telecom, Unitech Wireless and others who are required to roll out their services in 10% of their services in their allotted locations. Operator owned tower companies have an added advantage, which is that they have one confirm tenant i.e. the parent telecom operator. (The Financial Express, 2009).

THE FUTURE COURSE OF TOWER SHARING

The towering business is growing up and has good prospects in the future. Most of the towering players are expanding their capacities to meet the increasing demand in the future. American Tower Company is looking for Greenfield expansion. Indus towers is looking for Customer satisfaction and improvement in its services. It has tied up with oracle to improve its operational efficiencies. Quippo, after getting contracts from Unitech-Telenor, Sistema-Shyam , Etisalat-Swan and Datacom is planning to increase it capacity to 60,000 towers by 2011.Presently, the towers are 40-50 meters high, but in the near future, new towers having more power will be set up, which will be about 80 m tall and will be able to serve 4-5 tenants simultaneously. In future, the telecom companies will be responsible only for the customer services and the infrastructure maintenance will be the job of independent tower companies **(Singh, 2010)**.

ENVIRONMENTAL AND HEALTH EFFECTS

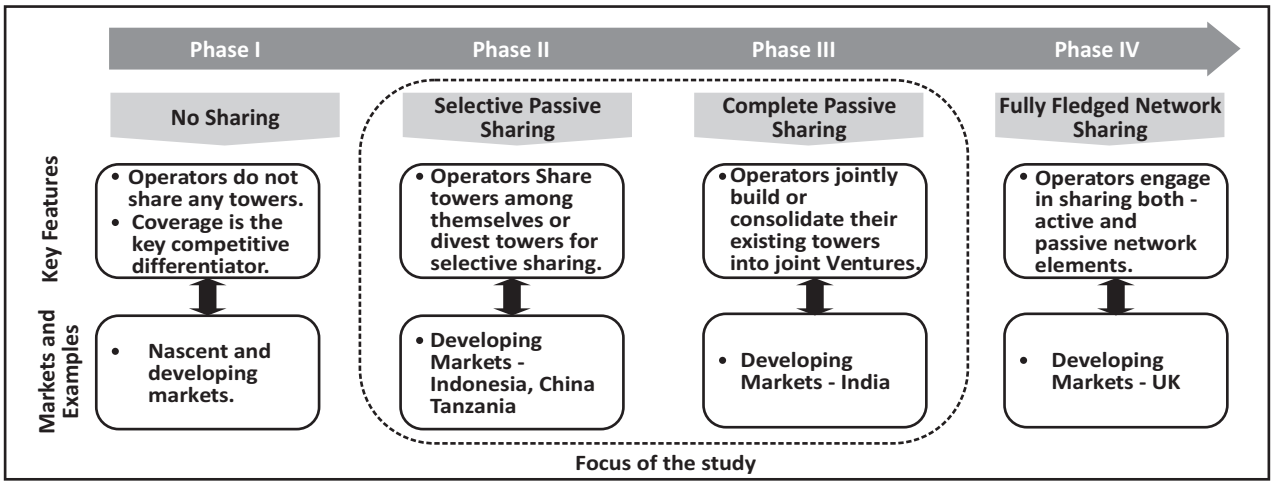
It has been seen in many big cities that the residents of a locality oppose the setting up of mobile towers in the vicinity because of the fear of health hazards and radiations. Although many studies have revealed that the impact of radiations from towers is quite low, people are not willing to accept the facts. As a result, it has become more and more difficult to find space for the emerging need of towers in the congested cities. However, to reduce the problem of space, many solutions have been suggested, including the set up of Green Towers which are compact and they could be fitted on top of buildings, which is catching up in the foreign countries. Moreover, proper experiment results have to be shown to convince the people that the towers do not radiate waves that are harmful for the human body **(Voice and Data, 2010)**.

TOWERS IN THE URBAN AND RURAL INDIA

Tower companies as well as telecom operators face a lot of problem in setting up towers in Rural India. Some of these problems are: Approval of Local Bodies, Legal Approvals, Lack of Transport and Electricity, the Myth of Radiation Hazard etc. Presently, the telecom operators are catering to the growing teledensity in the rural areas, which has the purchasing power, but is limited by the lack of infrastructure. The government has a vision and it is planning to set up 10,000 towers in the rural areas by the end of this fiscal. Moreover, there is a plan to set up about 1,70,000 towers in 2-5 years. It will serve as an additional source of revenue.

According to a model developed by Capgemini, the tower sharing can be attributed to four stages as shown below.

Figure 9: Phases of Infrastructure Sharing



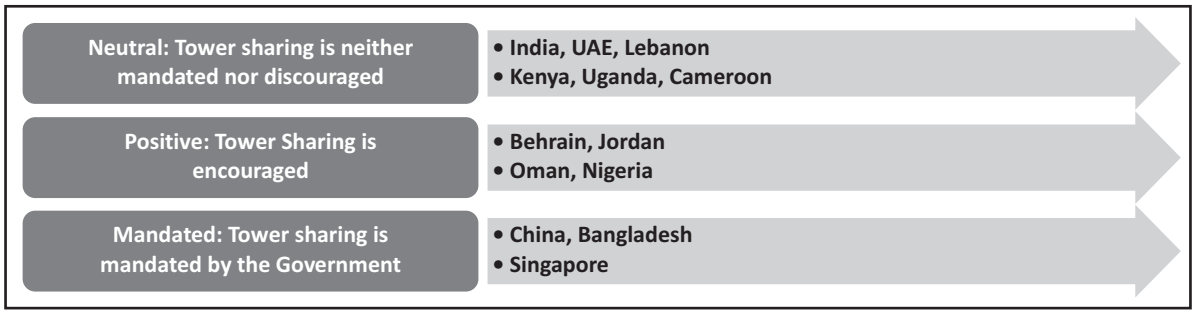
Source: Capgemini TME Lab Analysis

In the Developed nations like the UK, Full Fledged Network sharing has already taken place, which includes both Passive as well as Active network sharing. In developing markets like India, the trend of active sharing has not yet picked up, but passive sharing has already picked up, which is a phase III stage. In phase II, selective sharing takes place and in Phase I, no sharing takes place at all. In order to survive the steep competition among the operators, India will soon migrate to phase IV **(Romain Delavenne, 2010)**.

REGULATIONS IN VARIOUS COUNTRIES

The above section shows only the phases and the countries which are presently in various phases. It is possible for a country to migrate to any phase but the regulatory issues were not discussed earlier. Although tower sharing has both advantages and disadvantages, various types of regulations has been put up in different countries. In India, the sharing of towers is not mandatory, but in many countries, it has been made mandatory. Specially in the ecologically sensitive areas, towers should be minimized and so such an step should be taken. Below are a few countries along with the stance taken by the governments there:

Figure 10 : Regulations In Various Countries



The Main purpose of effective regulation is to have a healthy completion among the telecom companies of the world and to optimize the usage of the scarce resource. Also it encourages not to have a monopoly for any country in the world. Moreover consumer rights should be protected and the issue of privacy should be dealt properly **(Technology H. H.)**.

BENEFITS OF TOWER SHARING

The Major benefits of tower sharing are discussed in two parts in the portions to come.

❁FOR THE INCUMBENT

❁**Reduction In Operating Expenditure :** Operating expenditures(OPEX) related to the maintenance of a tower forms a major chunk of OPEX for the operator. The operating expenditure only for the tower costs about 60% of the total OPEX and mainly includes diesel for generators, power back up facilities etc.These costs increase to many folds in rural areas due to poor infrastructures like roads, electricity etc. For an existing operator, sharing of a tower with a tenancy ratio of 2 would help the existing player to save 10%-15% of its OPEX **(Romain Delavenne, 2010)**.

❁**Expanding Reach In A Cost Effective Manner :** It is estimated that an additional total of 100,000 towers will be required in the next 5 years. If towers are shared without duplicating the resources, a potential saving of US $ 8 billion could be saved **(Romain Delavenne, 2010)**. Moreover, as the cost decreases, it will also provide suitable environment with proper infrastructure for the emergence and development of Next Generation Network Interconnect Exchanges(NGN IE) (TRAI).

❁FOR THE NEW ENTRANT

❁**Reduced Time To Market:** By sharing towers with the incumbents or with independent towering companies, new entrants can remarkably reduce its time to roll out its services in the market **(Romain Delavenne, 2010)**.

❁**Reduction In CAPEX AND OPEX :** When infrastructure is shared, there is a substantial drop in both CAPEX and OPEX.

DRAWBACKS OF TOWER SHARING

The main drawbacks of tower sharing are:

❁**Lack of Competitive Advantage :** When towers will be shared by different players, all the players will have the same competitive advantage and there will not be any point of differentiation. Operators cannot find any Point of Difference

based on network coverage or Voice Quality or network reliability. A new player entering in the market will have the same advantages as an existing old player from the point of view of towers **(Romain Delavenne, 2010)**.

❁**Information Security Risks:** There is the possibility of information leakage from one company to another with the sharing of the staff and same equipments.

❁**Long Lock-in Tenures:** The lock in period in India is quite high as long as 15-20 years in which case companies lose their financial flexibilities. For example, the tie up between Reliance Communication and Swan telecom is for 15 years.

RECOMMENDATIONS

❁**For The Incumbents:** As stated in section 12, in the urban areas, the number of incumbents has already started to increase since 2007 and now they have a wide coverage and there is no need for fresh CAPEX. So in urban areas, the incumbents can gain an extra revenue by sharing their infrastructure with some new entrants. It will also help them to reduce their OPEX . But in case of rural markets, the penetration level is not so good for the incumbents. So they need to increase their penetration level there. But the CAPEX is really huge in rural areas as stated in section 16 because of poor infrastructure. So the incumbents can tie up with other incumbents so that the CAPEX as well as OPEX could be shared to some extent and at the same time, minimizing their financial risks.

❁**For The New Entrants:** In the urban area, the new entrants can directly approach the incumbents and share the towers in already depreciated assets. The incumbents wont be reluctant in sharing the towers because in urban areas, they already had high penetration along with other incumbents, so it is not a differentiating factor for them and so they would not hesitate to share the existing infrastructure with a new entrant.

But in the rural areas, the new entrants should approach an independent tower company for its purpose of reducing the initial CAPEX and quick delivery of services. This is because the incumbents will be reluctant to share their existing infrastructure with the new entrants, because the existing infrastructure with the penetration is the Point of Differentiation for them and they would be reluctant to share.

As in August 2010, the Government of India was also drafting a plan to impose fine on those telecom operators who have bagged the license as well as the spectrum a long time back, but still has not rolled out its services. The penalties for the same have not been fixed yet, but the main reason could be attributed to the lack of initial CAPEX by the telecom companies for rolling out the services. In fact, if the infrastructure could be shared among the operators, it will act as an added benefit for few telecom operators as they can avoid the payment of a huge amount as fine for their delay in services.

LIMITATIONS OF THE STUDY

This study is conducted mainly based on secondary research and limited amount of primary research. One limitation is that its findings are not generic on a global basis, but is mainly India focused because the regulations and implementations of the model will differ from country to country. Moreover, the study will be valid only for the contemporary period due to the rapid enhancement in the technological field, especially in the telecom domain. Moreover, the future course of action is just a prediction which may very well change in the near future depending upon the market conditions and technological innovations.

CONCLUSION

A new era in the Indian telecom sector is taking place. Although it has not been very fast, the trend of having independent tower companies are coming up. If the telecom operators can efficiently utilize the existing infrastructure, it will not only be saving cost for the companies, but will also improve the aesthetic value of our cities and rural areas. It will, at the same time, reduce redundant use of electricity, combustion fuel etc., which will benefit the nation. Initial fears about the terms and conditions regarding the Passive and active Infrastructure sharing will no doubt be there for the telecom companies, but as time passes by, things will become more clear and companies will not hesitate in sharing infrastructure. With these provisions in hand, it will definitely help to have the minimum number of towers erected for the 3G services and also for the 4G services to be launched in the near future.

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GLOSSARY

- **RNC :** Radio Network Controller
- **GGSN :** Gateway GPRS Support Node
- **HLR :** Home Location Register
- **GMSC :** Gateway Mobile Switching Center
- **MSC :** Mobile Switching Center
- **SGSN:** Servicing GPRS Support Node
- **BWA :** Broadband Wireless Access
- **WLL :** Wireless Local Loop
- **MNP:** Mobile Number Portability
- **GPRS:** General Packet Radio Service
- **MMS:** Multimedia Messaging Service
- **GSM :** Global Service for Mobile Communication
- **EDGE :** Enhanced Data rate for GSM Evolution
- **OFDMA :** Orthogonal Frequency Division Multiple Access
- **SC- FDMA :** Single Carrier Frequency Division Multiple Access
- **ITU :** International Telecommunication Union
- **WTDC :** World Telecommunication Development Conference
- **WPC :** Wireless Planning and Co - ordination
- **CDMA :** Code Division Multiple Access
- **WCDMA :** Wideband CDMA
- **CMTS :** Cellular Mobile Telephone Service
- **UAS :** Unified Access Services
- **AGR :** Adjusted Gross Revenue
- **FIPB :** Foreign Investment Promotion Board

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