

**Telecom Regulatory and Policy Environment in India:
Results and Analysis of the 2008 TRE Survey**

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List of Acronym

ADC	Access Deficit Charge	ITeS	Information Technology enabled Services
AGR	Adjusted Gross Revenues	LLU	Local Loop Unbundling
ARPU	Average Revenue Per User	MTNL	Mahanagar Telephone Nigam Limited
BSOs	Basic Service Operators	MHz	Mega Hertz
BSNL	Bharat Sanchar Nigam Limited	NIXI	National Internet Exchange of India
BPO	Business Process Outsourcing	NLD	National Long Distance
CLS	Cable Landing Stations	NRAs	National Regulatory Authorities
CPP	Calling Party Pays	NTP	National Telecom Policy
COAI	Cellular Operator's Association of India	NGN	Next Generation Networks
CDMA	Code Division Multiple Access	NLDOs	National Long Distance Operators
DoD	Department of Defence	PGCL	Power Grid Corporation
DTO	Department of Telecom Operation	RTIT	Rail Telecom & Information Technology
DTS	Department of Telecom Services	RoCE	Return on Capital Employed
DoT	Department of Telecommunications	RIO	Reference Interconnect Order
DTEs	Developing and Transitional Economies	RDELS	Rural Direct Exchange Lines
DOI	Digital Opportunity Index	SSAs	Secondary switching Areas
EBITDA	Earning before Interest Tax and Depreciation allowance	SDCA	Short Distance Charging Area
FDI	Foreign Direct Investment	TDSAT	Telecom Dispute Settlement Appellate Tribunal
GAIL	Gas Authority of India Limited	TRAI	Telecom Regulatory Authority of India
GSM	Global System of Mobile	TRE	Telecom Regulatory Environment
GDP	Gross Domestic Product	TTO	Telecommunication Tariff Order
GoT	Group on Telecom	UNE-P	Unbundled Network Elements
HHI	Herfindahl-Hirschman Index	UALR	Unified Access Licensing Regime
IMPCS	India Mobile Personal Communication System	USO	Universal Service Obligation
ICTs	Information Communication Technologies	VSNL	Videsh Sanchar Nigam Limited
IUC	Interconnection Usage Charges	VOIP	Voice over Internet Protocol;
ILD	International Long Distance	VPTs	Village Public Telephones
ISD	International Subscriber Dialing	VSAT	Very small Aperture Terminal
ITU	International Telecommunication Union	WLL	Wireless Local Loop
ISPs	Internet Service Providers	WPCC	Wireless Planning Coordination Committee
IT	Internet Telephony	WISR	World Information Society Report
IP II	Infrastructure Provider	WPC	Wireless Planning Commission

Telecom Regulatory and Policy Environment in India: Results and Analysis of the 2008 TRE Survey

1. Executive Summary

In India, like in many other developing countries, the abysmal performance of the state-owned telecommunications service provider and the increasing requirement to attract capital for the upgrading the sector were the major drivers for liberalization. At the macro level after enshrining policy in a closed centralized economic model based on import substitution for almost four decades, India made a structural shift to a market-oriented model in the early 1980s. This shift in policy and the associated institutional arrangements also had an impact on the telecommunications industry. India faced many difficult challenges in liberalizing its telecommunications industry from a monopoly to a decentralized competitive model. During monopoly era, telephone was not considered as a necessity, and, as a result, telephone penetration levels were very low and the quality of service was poor. However, long-waiting lists, technological advancement and pressure from various domestic and international stakeholders pushed the government to initiate reforms in middle of 1980's to spread telephone infrastructure.

Telecom reforms in India allowed for private entry but did not entail privatization of the incumbent erstwhile monopoly service providers. Market liberalization accompanied with the introduction of new laws and regulations was the cornerstone of reform. Regulatory agencies and regulation have become integral components of the telecom reform process, in order to protect consumers, reassure investors and, in theory, help advance competition.

The results of liberalization have been impressive. Teledensity has increased from merely 2 percent or so in 1999 to around 26.22 percent in 2008 and almost 6 million mobile subscribers are added every month. Wireless has been the principal engine for telecom growth in the country. The wireless subscriber base has grown from 0.88 million in 1999 to 261.07 million in 2008.

Given the importance of the Telecom Regulatory Environment (TRE) on the outcomes of reforms, LIRNEasia has developed a TRE index, which summarizes stakeholders' perception on certain TRE dimensions. The index is created with the help of a survey of the key stakeholders. The first survey was conducted in July 2006 in five Asian countries, India, Sri Lanka, Pakistan, Thailand, and the Philippines on six dimensions: i) market entry; ii) access to scarce resources; iii) interconnection; iv) tariff regulation; v) anti-competitive practices; and vi) universal services, for the fixed and mobile sectors. In the most recent survey carried out in July 2008, a seventh dimension dealing with the "quality of service" was added, and the survey was conducted for the broadband sector in addition to fixed and mobile sectors. The survey was carried out in eight countries, which are, Bangladesh, India, Indonesia, Sri Lanka, Maldives, Pakistan, Thailand, and the Philippines.

The following figures summarize the sector assessment results for India for 2007-2008.

Figure 1: Sector Assessment Results for the period April 2007-March 2008: Individual Score Chart

Likert Score: 1– Highly ineffective; 2-unsatisfactory; 3-neutral; 4-satisfactory; 5-highly effective

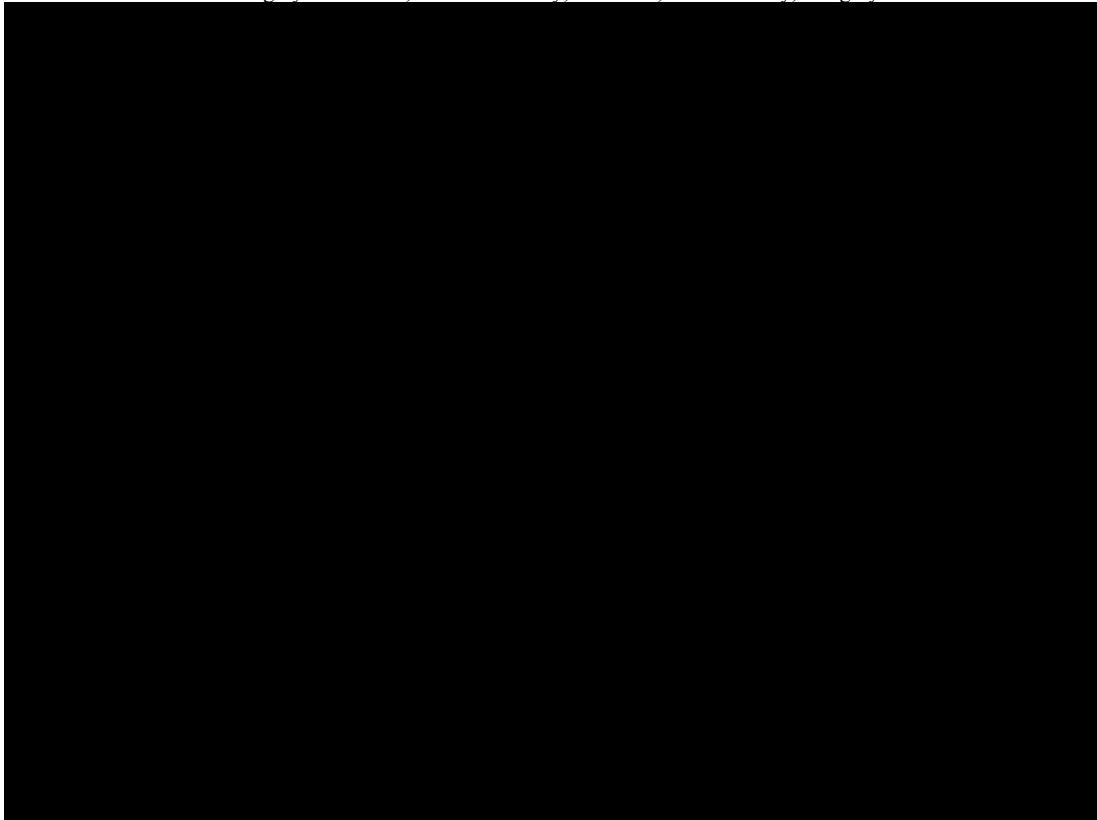
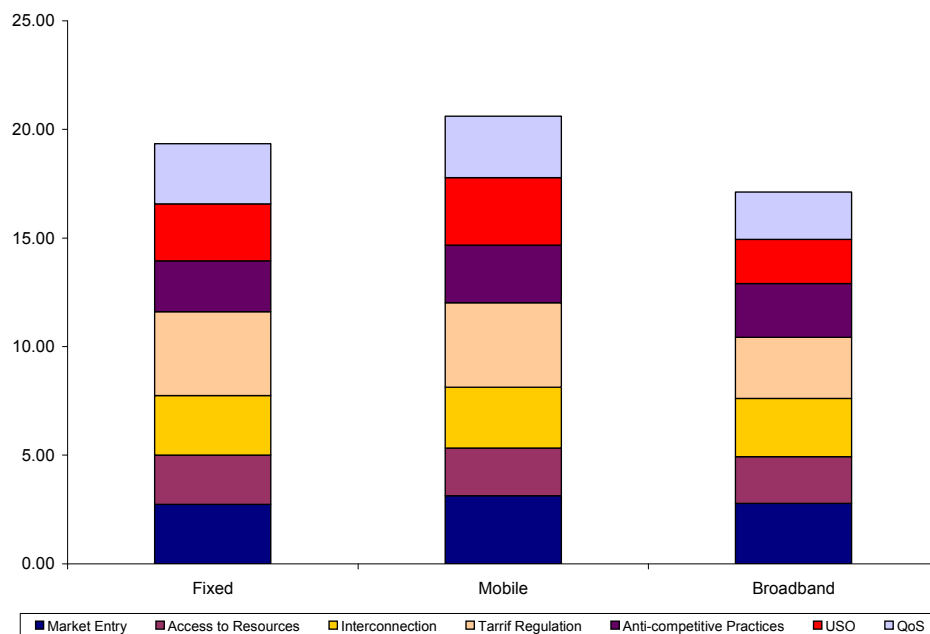


Figure 2: Sector Assessment Results for the period April 2007-March 2008: Total Output Score Chart



The results point out to the fact that the stakeholders perceive the TRE to be most conducive for the mobile sector followed by fixed and then broadband¹. Other than for Access to Scarce Resources the fixed sector lags behind the mobile sector. The fixed and mobile sectors have the highest scores for Tariff Regulation. Market entry also scores well for the mobile sector as competition is well entrenched with most of the circles with 4-5 mobile service providers. The broadband sector has the lowest score in the aggregate. The low penetration of broadband of mere 3.87 against the policy objective of 9 million at the end of 2007 clearly indicates that the regulatory environment is not very conducive. The following table is a summary comparison of the TRE scores for fixed and mobile telecommunications for the two periods (2006-05 and 2007-08) for which the survey was conducted. Since, Quality of Service was not a survey parameter for the previous survey we have dropped it in our comparison.

Table 1: Comparison of the TRE score for the two periods of survey for fixed and mobile

TRE Parameter	Fixed		Mobile	
	2005-06	2007-08	2005-06	2007-08
Market Entry	3.3	2.7	3.3	3.1
Access to Scarce Resources	2.6	2.3	2.3	2.2
Interconnection	2.5	2.7	2.7	2.8
Tariff Regulation	3.7	3.9	3.9	3.9
Anti-competitive Practices	2.2	2.4	3.1	2.7
USO	2.0	2.6	2.0	3.1
Average (Total)	2.7 (16.30)	2.8 (16.56)	2.9 (17.30)	3.0 (17.78)

For both the fixed as well as the mobile sector the overall score has shown a marginal improvement over the two time periods of the survey. Though the mobile sector has performed worse in comparison to the previous on almost all the parameters, it has done exceptionally well for USO, raising the overall score. The score for mobile USO is a surprise given that the previous scores for this parameter were the worst. However, a closer examination of the reasons explains it. First, mobile operators were included as beneficiaries of USO funds from March 2007. Second, the mobile additions of 6 million subscribers every month is perceived as universalization of the service notwithstanding the poor performance of the fund itself. Scores for market entry and regulation of anti-competitive practices have declined the most for the mobile sector. Over the past year there have been many pointers to the fact that there is a possibility of a tacit collusion among the current operators, which in the absence of a functioning competition authority may have been overlooked. Moreover, the market entry procedure has been tardy as for quite a long time the Department of Telecommunications was not in favour of new entry. Moreover, any new entry is inextricably linked with the availability of spectrum for it to offer credible contestability. Given that the worst performance has been Access to Scarce Resources, this may have also impacted the Market Entry score since without spectrum entry is meaningless.

2. Methodology

In this report we use the TRE instrument² to get a perception of informed stakeholders on the telecom regulatory and policy environment of India. The TRE has many uses: it is a

¹ See Annex 1 for the regulatory events for the year of the survey

² The original TRE instrument was designed to assess regulatory effects on investment (Samarajiva & Dokeniya, 2005)

diagnostic instrument for assessing the performance of the laws affecting the telecom sector and the various government entities responsible for implementation. The detailed methodology of the application of this instrument is detailed in Samarajiva et al (2007)³.

The role of the Indian regulator is assessed on seven broad parameters: (a) market entry; (b) access to scarce resources, mainly spectrum; (c) interconnection; (d) tariff regulation; (e) regulation of anti competitive practices (f) universal service obligations (USO); and (g) quality of Service (QoS). The respondents were asked to rate the quality of the regulatory environment for each dimension on a Likert scale ranging from 1 (highly ineffective) to 5 (highly effective). Posing questions in this format ensures that responses can be easily analyzed without losing any qualitative information as often occurs when using open-ended questions. Then the scores are averaged over the respondents to get one number to allow for inter temporal and international comparisons.

However, a caveat must be added that the average score may mask some other details about the perception, as it may not represent the majority as the cardinality of the response has an effect on the outcome. So, for instance a few people giving a score of 5 can upwardly bias the average and vice-versa.

Attempts were made to get 15 respondents each for each of the following categories:

- Category 1: Stakeholders directly affected by telecom sector regulation, such as operators, Industry associations, equipment suppliers and re-sellers
- Category 2: Stakeholders who analyze the sector with broader interest, such as those working for financial institutions, Telecom consultants, Law firms
- Category 3: Stakeholders with an interest in improving the sector to help the public such as academics, research organizations, journalists, telecom user groups, civil society, former members of regulatory and other government agencies, donors.

In our observation category 3 who do not have a financial stake in the sector are the most enthusiastic respondents followed by category 2 and the operators who are most affected by the TRE are the most difficult to get responses from. We were however only able to get 42 responses. A few of the respondents did not reply for either the fixed or the broadband sector. Most of the questionnaires were served to individuals through email. However, in the case of operators field visits were essential and hence they filled up a hard copy of the questionnaire. Almost 100 people were contacted for the survey

The next section of the report documents past policy and regulatory developments that have shaped the outcomes of the industry in terms of hard indicators. In order to monitor the performance of the Indian telecommunications industry, it is important that a systematic set of economic indicators on this sector giving information on the number of licenced operators by type of services provided, infrastructure and investments, subscriber base, state of competition, degree of concentration of the market, broadband connectivity, tariffs, quality of service etc. are available. In this section, the description of the reform process is supported with objective data that quantify the outcomes of reform in its various dimensions.

In the sections that follow (Sections 4- Sections10) we analyze the reform process through the prism of TRE. Since TRE was also conducted in India for the period June 2005-06, the

³ Available at: <http://www.lirneasia.net/wp-content/uploads/2008/05/lirneasia-tre-paper-for-tprc-v8.pdf>

TRE scores for comparable sectors and comparable parameters will be analyzed for the differences. Some conclusions will be drawn based on the comparisons.

3. Development of the Regulatory and Policy Environment

Telecommunications

In India, like in many other developing countries, the abysmal performance of the state-owned telecommunications service provider and the increasing requirement to attract capital for the upgrading of the sector were the major drivers for liberalization.

After four decades of closed centralized economic model based on import substitution India made a structural shift to market-oriented model. This shift in policy and the associated institutional arrangements also had an impact on the telecommunications industry. India faced many difficult challenges in liberalizing its telecommunications industry from a monopoly to a decentralized competitive model. During monopoly era, telephone was not considered as a necessity, and, as a result, telephone penetration levels were very low and the quality of service was poor. However, long-waiting lists, technological advancement and pressure from various domestic and international stakeholders pushed the government to initiate reforms in middle of 1980's to spread telephone infrastructure.

The two key elements defining the change in the market structure were (i) the restructuring of the government operator and (ii) the entry of private operators. The restructuring of the incumbent was initiated in October 1999 involving the bifurcation of the Department of Telecommunication (DoT) into two departments, namely, the Department of Telecommunications and the Department of Telecommunication Services, later corporatised in October 2000 into a new entity-Bharat Sanchar Nigam Limited (BSNL). While the former functions as the licensor and policy maker, the latter was entrusted with the responsibility of operations. BSNL provides services in the entire country except in Delhi and Mumbai, where the government controlled corporate entity Mahanagar Telephone Nigam Limited (MTNL) continues to be the service provider.

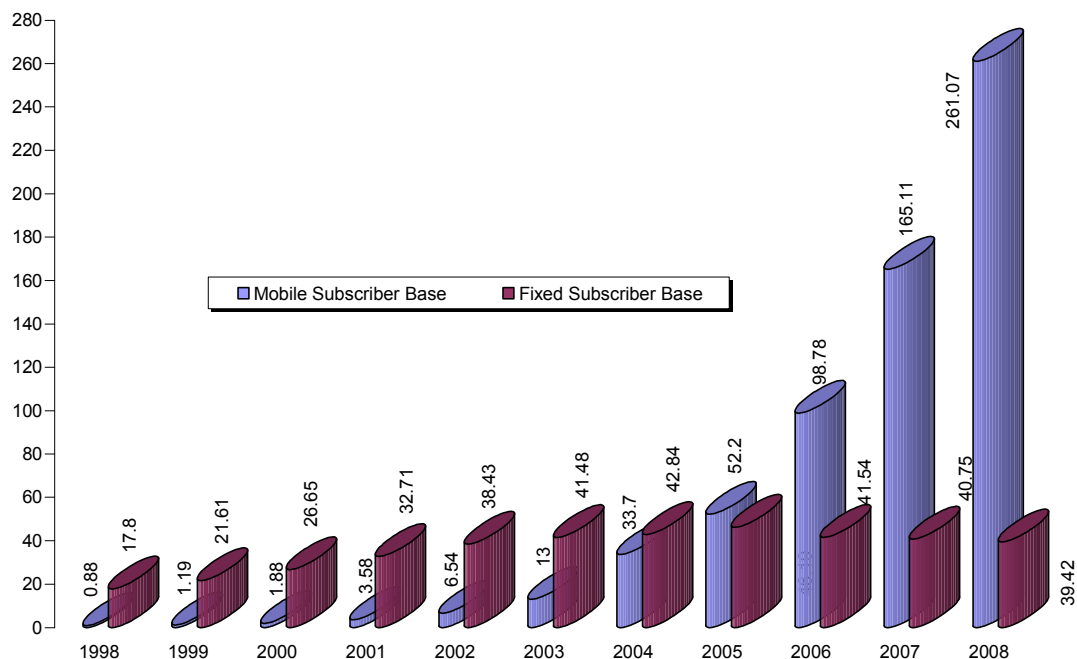
Thus, there was a shift from a static, monopolistic industry that provides a single product, telephone service to a dynamic, multiproduct, multioperator industry. It should be noted, however, that this change in market structure has taken place without the privatization of the domestic incumbent service provider BSNL and MTNL. The privatization of the overseas carrier Videsh Sanchar Nigam Limited (VSNL) in April 2002, with the strategic sale of a stake of 45% to Tatas and the government and employees retaining a stake of 26.13% and 1.97% respectively, represents the first and only instance of the government transferring control of a telecom undertaking to the private sector.

The results of liberalization have been impressive. Teledensity has increased from merely 2 percent or so in 1999 to around 26.22 percent in 2007 and almost 6 million mobile subscribers are added every month. Wireless has been the principal engine for telecom growth in the country. The wireless subscriber base has grown from 0.88 million in 1999 to 261.07 million in 2008.

Till March 2007, the stock of capital investment of the telecom services sector has reached Rs. 2346.87 billion (USD 58.67 billion) at the end of financial year 2006-07. The total revenue of

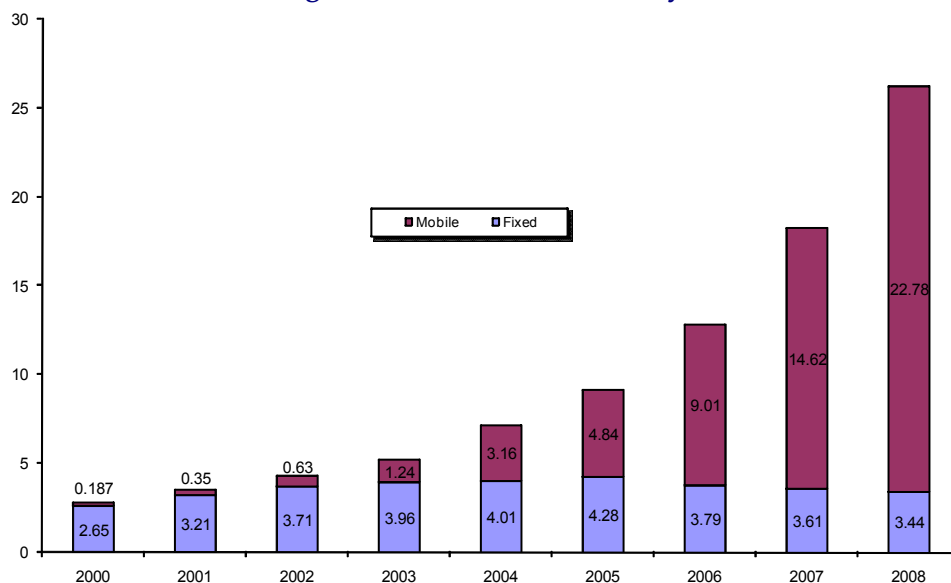
the telecom sector in 2006-07 of Rs.1053.18 billion (USD 26 billion) accounted for 2.83 percent of the GDP in current prices. The EBITDA of the telecom companies at the end of the last fiscal was Rs.391.67 billion (USD 9.79 billion) and the EBITDA margin was 37 percent.

Figure 3: Fixed and Mobile Subscriber Base



Source: Various Performance Indicator Reports, TRAI

Figure 4: Growth of Teledensity



Source: Various Performance Indicator Reports, TRAI

Table 2: Financial Summary of the Indian Telecom Industry

Indicator	2004-05	2005-06	2006-07
Total Revenue (Rs. billion)	716.7373	867.1955	1053.18
Contribution of Govt. Companies	421.7420 (59%)	452.3298 (52%)	454.72 (43%)
Contribution of Pvt. Companies	294.9953 (41%)	414.8657(48%)	598.45(57%)
Total EBITDA (Rs.billion)	267.8570	301.3792	391.67
Govt. Companies EBITDA	186.1320	187.0912	195.86
Pvt. Companies EBITDA	81.7249	114.2880	195.80
Capital Investment (Gross Block ⁴)	1788.31	2006.66	2346.4
Gross Block - Govt. Companies	66%	64%	57%
Cross Block - Pvt. Companies	34%	36%	43%
Capital employed ⁵	1538.64	1700.87	1898.34
Capital Employed – Govt. Companies		1042.31	1030.71
Capital Employed - Pvt. Sector	599.25	658.56	867.63
Return on Capital Employed (RoCE)		7.82%	10.64%
Cumulative FDI in Telecom (Rs. Billion) (Percentage of total FDI)	113.13 (8.3)	143.36.18 (8.88)	166.91 (7.91)
Gross Domestic Product (Rs. billion)at factor cost) Current Prices	28439	32006	37175
Share of Telecom sector to GDP	2.52%	2.71%	2.83%
Total Employees of Telecom Companies	436891	429400	432771
Govt. Companies	394334	382105	369035
Pvt. Companies	42557	47295	
Subscribers per Employee at year end			
Govt. Companies	132	158	193
Pvt. Companies	1089	1678	2110

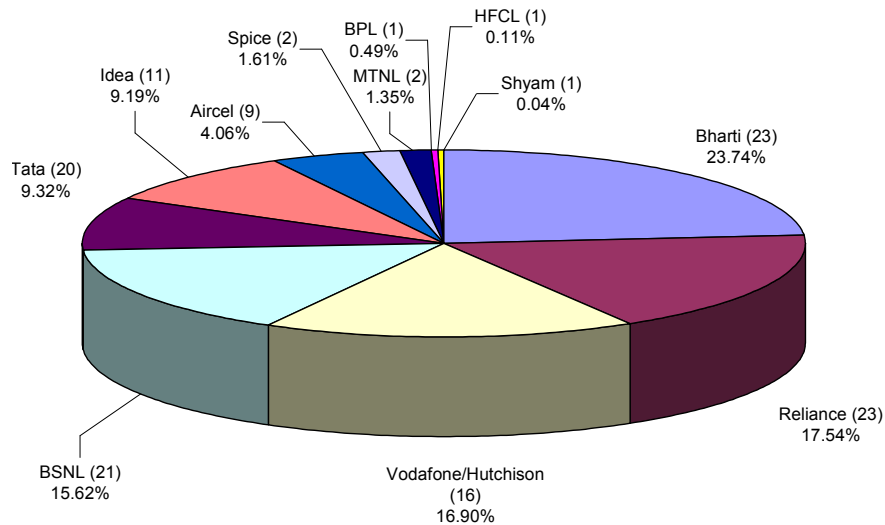
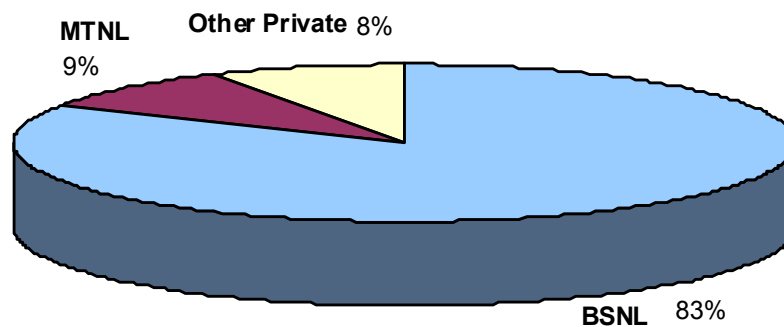
Source: TRAI various Performance Indicator Reports.

As mentioned earlier, the outcome in terms of increased connectivity is a consequence of a liberal pro-competitive policy and regulatory regime (which we discuss in the following sections) which increased affordability, of the once considered “luxury” item by Indian policy makers,⁶ for a large unserved population of India. This competitive regime has resulted in an oligopolistic market structure (with many sellers), of the Bertrand kind, where the prices have reduced substantially. The presence of many sellers makes it difficult for any single operator to wield its market power by setting prices far above what fetches it the “normal rate of return”.

⁴ Gross Block is the Gross Capital Investment or the stock of investment

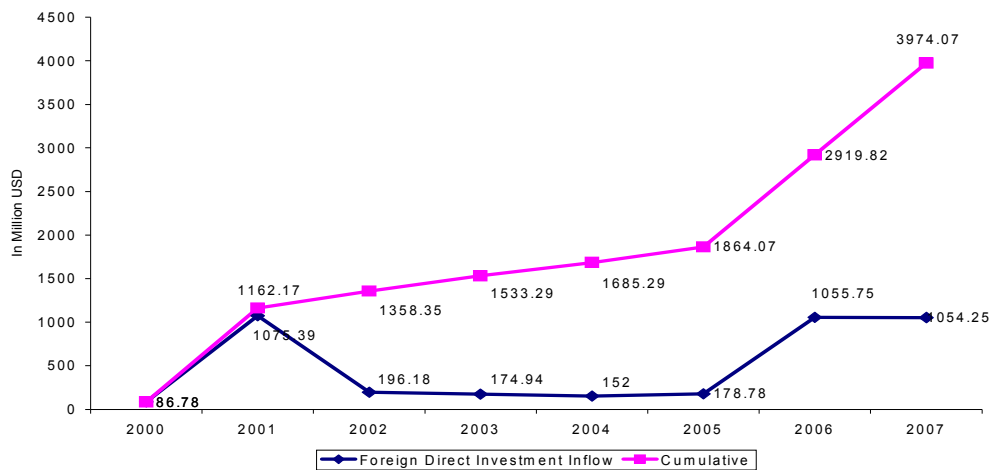
⁵ The Capital Employed is the fund deployed to operate the business

⁶ <http://www.columbia.edu/~ap2231/ET/et102-December%2027%202007.htm>

Figure 5: Market share of the mobile operators as of March 31, 2008⁷**Figure 6: Market share of the fixed operators as of March 31, 2008**

However, if we look at the market shares of fixed service providers, it is quite evident that it is still public sector incumbent-dominated, with BSNL and MTNL accounting for almost 92 percent of the market. Even after so many years, private entry into the fixed services has been largely restricted to the large cities. Ironically, this is despite the fact that India has 670,000 route kms optical fibre network connecting 30,000 exchanges; of which, 27,000 are in rural areas. Backbone Optical fibre covers virtually the entire country. But due to an absence of a policy on infrastructure-sharing, the private basic service operators have resorted to (quite understandably) extending their networks mainly to high-revenue customers. Thus while in the urban areas the fixed sector has seen private entry, small towns and rural areas are largely served by the public sector companies. This classic cherry-picking model of entry characterizes the entry process of both the mobile and the fixed sector, but in the mobile segment, competition has been more aggressive, as there was no incumbent presence at the time of entry. The absence of competition in the fixed segment has had an impact not only on voice services, but also on data services. It is not surprising therefore that broadband penetration in India remains lower than the potential (of course PC penetration is also low owing to demand side factors but the proportion of broadband to total internet subscribers is very low).

⁷ The number in the brackets of the diagram represents the “circles” (each circle being contiguous with individual states, in addition to the four metros) More than six cellular service providers are present in each circle,

Figure 7: Foreign Direct Investment Inflow in Telecom

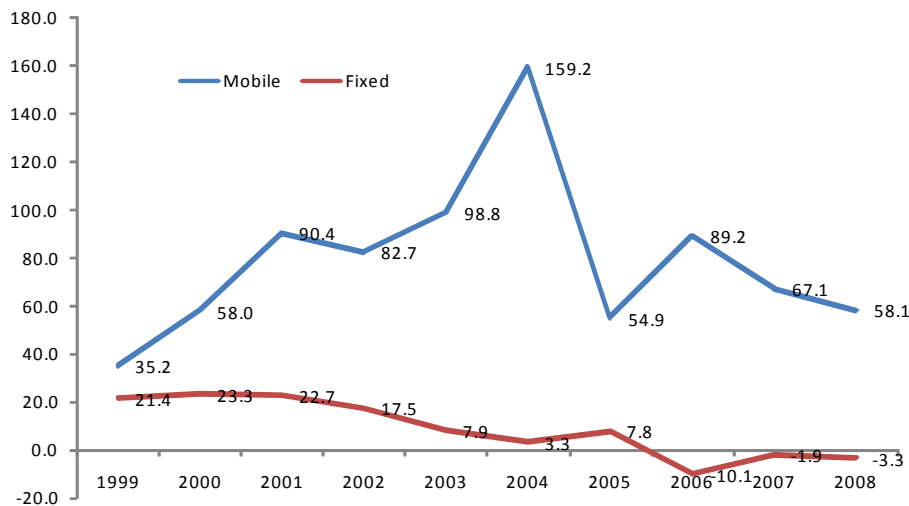
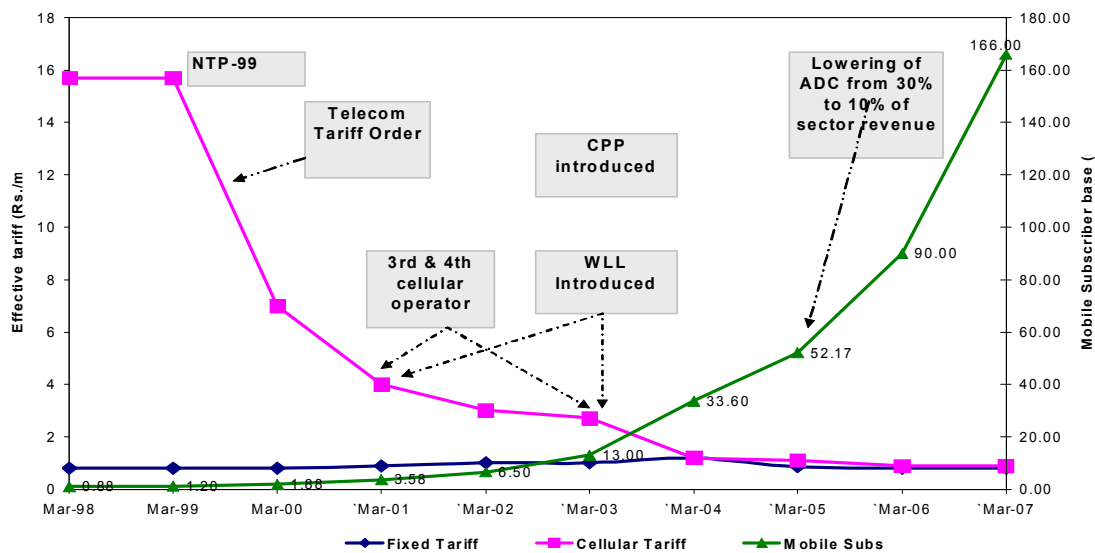
Another important feature of the Indian telecom growth story is that it is driven by domestic investment; with only 4 billion USD coming from Foreign Direct Investment. Unlike many countries in the region, FDI in telecom only accounts for 8.13 percent of the total FDI flows to India.

There is no doubt that policy and regulatory initiatives can go a long way in making markets more effective as a mechanism for universalizing the service. Navas-Sabater, Dymond, and Juntunen, 2002 had called these the, market efficiency gaps which is the difference between what markets actually achieve under current conditions, and what they can achieve if market barriers are removed. Effective competition, private provision of service, and market-oriented policies and regulations that create a level playing field for new entrants have a potential to bridge this gap.

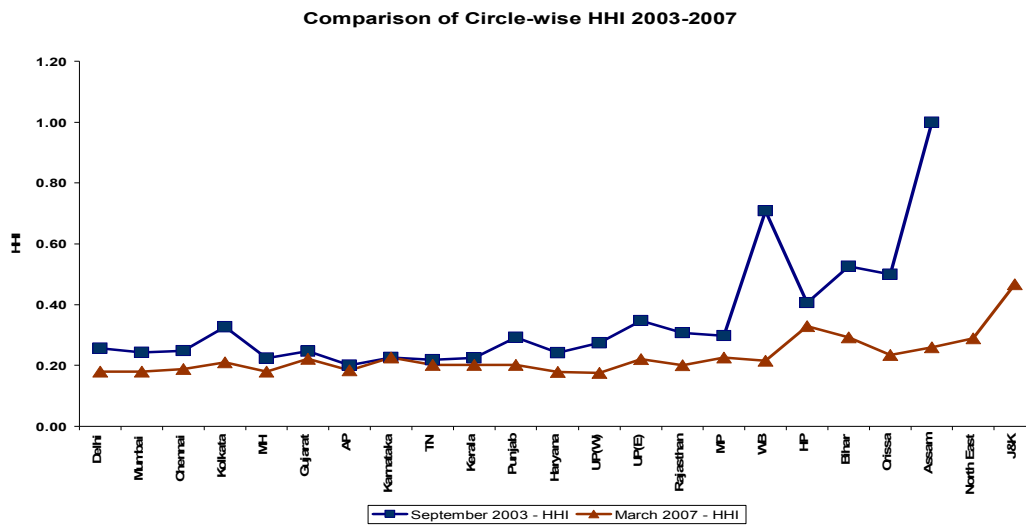
Competition allows for a range of price and quality options, making service possible to regions and income levels that a monopoly provider would never have considered. In fact one salient reason for opening up the sector for privatisation has been the realisation of scarcity of the incumbent's funds and the consequent pent-up or unmet demand that was met by the new entrants.

Malik (2007)⁸ shows that competition induced decline in tariffs (and hence increased affordability) resulted in wireless telephony boom in India. Tariff reduced up to 35 percent during 2003-04. IPLC charges decreased by 35 percent for low capacity and 70 percent for higher capacities. The Indian case study clearly demonstrates that competition can deliver, and hence should be fostered by regulation and policy. This is evident from the year on year growth experienced in the mobile sector that not only surpassed the fixed sector growth but also lead to increased substitutability between the fixed and mobile telephones. This consequence may be attributed to the fact that since the regulator was unable to foster competition in the fixed sector due to the presence of the incumbent, it diverted its regulatory efforts to the mobile sector.

⁸ Malik (2007), An Analysis of the Reform's of India Telecommunication's Industry: Policy, Regulation and Indicators, LIRNEasia Multi component 6 country study. <http://www.lirneasia.net/wp-content/uploads/2007/04/malik-2007-6cmcs-india.pdf>

Figure 8: Mobile substituting fixed services? : YoY growth Mobile vs. fixed**Figure 9: Decline in Tariffs due Policy and Regulatory initiatives**

The measures taken by TRAI to reduce tariffs through encouraging increased competition included: introduction of a Unified Access Licensing Regime; introduction of the Calling Party Pays regime; lowering of the Access Deficit Charge (ADC) from 30 percent to 10 percent of the sectoral revenue and finally scrapping it from April 1, 2008; allowing cheaper handsets to be sold at the time of delivery (with the rest of the money charged in installments); and allowing cheaper intra-network calls, among others. The Government encouraged the process by changing high entry fee with revenue share and reducing the revenue share further in 2001 and 2003 by accepting the recommendations of the regulator in this regard. If one takes the HHI as a measure of the level of competition not only they show low market concentration, but have also continuously improved in all the circles.

Figure 10: Increasing competition 2003- 2007

In a low income market like India, vendors too have a role to play, in addition to the regulators' efforts to create a positive investment climate for operators, to serve rural subscribers. Indian operators are currently operating at very low Average revenue per user per month (ARPU) of USD 6, but they are still making profits as revealed by their EBITDA. Estimates have been made that the telecom business in India is viable at a low ARPU of USD 4, without a handset subsidy. Some observers argue that low ARPU model of affordability is sustainable due to operators cutting investments (to reduce their costs) on improving the quality of service. Hence the full exploitation of the network as expressed in high Minutes of Usage (MoU) for India at 471 minutes per user, points to the fact that the operators are working at full capacity and at the minimum efficient scale of their investment.

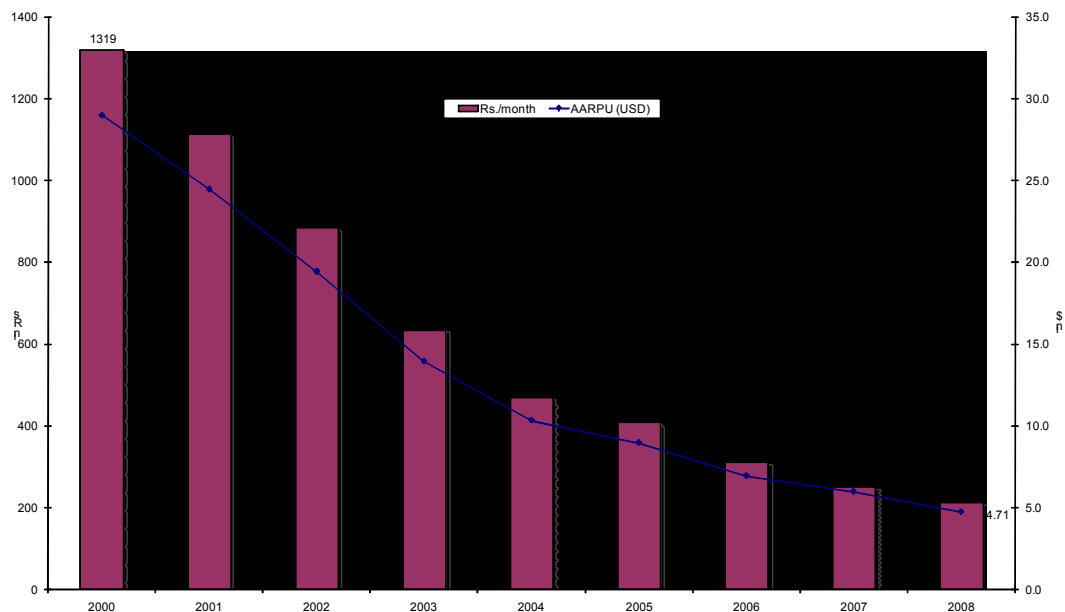
Figure 11: Average revenue per subscriber/per month

Table 3: Important milestones Policy and Regulatory in Indian telecom sector

New Telecom Policy – 1999	The service – providing arm of the Department of Telecom separated from the policy making and licensing functions
	Creation of corporatised BSNL in October 2000
	BSNL/MTNL allowed to enter as the third cellular service provider in all circles
	National long distance market thrown open for competition
	Wireless Planning and Co-ordination Committee created to review and enforce spectrum allocation policy
Lowering the Licence fee – 1999	Government changed the prevailing fixed annual licence fee to a revenue share regime
Interconnect Usages Charges regime – 2003	IUC regime of 2003 specified the interconnect charges clearly
	Paved the way for a calling party pays (CPP) regime – subscriber no longer had to pay for incoming calls, making the mobile phone highly affordable to the low usage customers who mainly used it for incoming calls
	The termination charges made uniform for all types calls – cellular mobile, fixed and WLL (M)
Unified Licence	Allowed an operator to provide fixed and/or mobile service using any technology
	The objective was to allow the exploitation of technological developments to the fullest extent to provide new applications and services
	The first phase of implementation, the Unified Access service licence, was readily adopted by most of the major operators
Lowering of Access Deficit Charge	Feb 2005: The per minute ADC on domestic long distance calls reduced by up to 60%, and the ADC on international calls by up to 40%
	March 2006: The per minute ADC for domestic calls replaced with a revenue share fee of 1.5% of non-rural (wireline) AGR, coupled with a sharp 60% drop in per minute ADC on international calls
	March 2007: ADC on percentage revenue share reduced to 0.75% from 1.5% of AGR. Per minute ADC on outgoing International calls reduced to zero, and on incoming International calls reduced to Rs. 1.
Lowering duty of telecom equipment - 2003-05	Union Budget 2003-04 cut the customs duties on telecom sector capital goods from 25% to 15% and on cell phones from 10% to 5%
	Union Budget 2004-05 exempted imports of capital goods for manufacture of mobile handsets from customs.
Roaming Charges	Jan 2007: Roaming rental reduce to zero. Reduction of roaming tariffs to the extent of 22%-56%
Port Charges	February 2007: Port charges reduced by 23-29%.

Source: TRAI consultation paper on cap on access providers, April 2007

Broadband

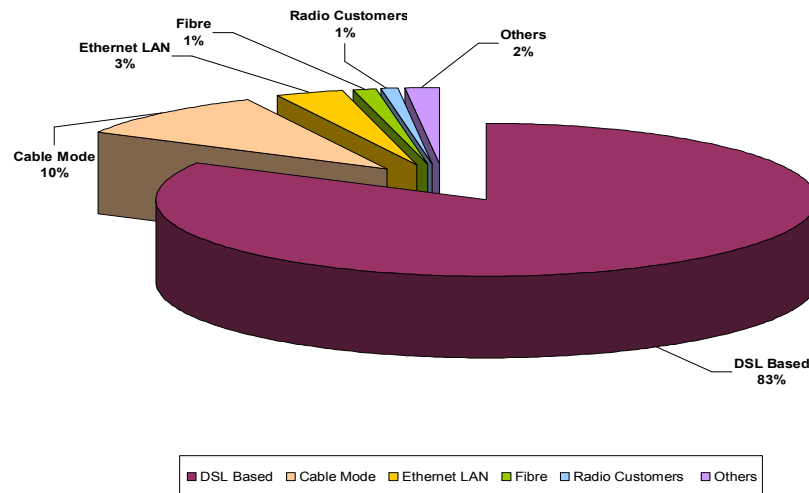
While regulatory reform in the telecommunications sector aimed at introducing competition was fairly successful for certain technologies, such as mobile telecommunications as reflected by the HHI index of market concentration, it was less successful for the fixed, or wireline, network.

Regulatory and policy neglect of the fixed sector has an impact on the diffusion of broadband services, not only in India, but also in many developed countries⁹. The diffusion of access to broadband services is important due to the positive externalities offered by the adoption of such advanced technology. Broadband access can be provided *via* different technological platforms or types of networks. An important feature therefore is the role of the legacy telecommunications systems already in place and to what extent market power derived from the legacy system can be transferred to the emerging broadband market. In the Indian context broadband through coaxial cable does not provide any credible competition to the DSL

⁹ An international comparison in the wireline access markets shows that for most OECD countries the market share of the incumbent wireline firm is well above 90 per cent. As wireline access remains key in providing broadband services in most countries, policy-makers have to find ways to address the problem of market dominance.

offered through the incumbent's copper. Hence the regulatory and policy initiatives to promote broadband have to be directed towards the legacy fixed line network.

Figure 12: Broad Band Subscribers by Type of Technology



At the end of March 2008, the Internet subscribers were 76.59 million and broadband subscribers were just 3.87 million. It may be important to mention that 65.50 million subscribers are accessing Internet through wireless networks (GSM/CDMA) of Unified Access Service Providers (UASPs) and Cellular Mobile Service Providers (CMSPs). Therefore the growth of Internet subscribers is satisfactory but India is seriously lagging behind in broadband. The broadband subscriber growth initially (during 2005-06) was high (more than 600 %) but subsequently declined to an annual growth of just 60-70%. The high growth rate of broadband in initial years was on a narrow base. The targets fixed for the Broadband Policy are unlikely to be achieved. There are critical issues inhibiting broadband expansion in urban as well as rural areas. They need to be addressed urgently to facilitate expansion of broadband services in urban as well.

The recent report of Organization for Economic Cooperation and Development (OECD) lists India at the bottom of 34 countries in which countries have been ranked based on the broadband penetration. India is not only below developed countries such as the US and the UK but also far below even smaller countries such as Denmark and Iceland. China adds 3.32 million broadband connections in a quarter whereas India adds just 0.08 million.

TRAI said that it has been suggesting measures to boost broadband growth in India but the Government has not taken any action on the same. DoT had set a target of 9 million subscribers by 2007. This has not been met by far as there are just about 3.87 million broadband users at present. The telecom regulator issued another set of recommendations recently reiterating the suggestions made earlier. It said that the last mile local loop owned by the State owned BSNL and MTNL should be opened up for franchisees to offer broadband services. BSNL and MTNL were supposed to provide 1.5 million broadband connections by the end of 2005 whereas actually they could provide only 0.5 million by 2005.

The number of Broadband subscribers (with a download speed of 256 Kbps or more) was 3.87 million at the end of March 2008 as compared to 3.13 million at the end of December

2007. The growth rate of broadband subscribers in the last quarter is 23.64%. However, this is not an impressive performance. According to TRAI, even at the end of March 2008, BSNL and MTNL together have provided just 2.57 million broadband connections using DSL technology. As such the available copper loop to provide broadband connections have not been effectively utilized. The regulator also urged DoT to expedite decision regarding mechanism and pricing of spectrum for 3G and Broadband Wireless Access. “Spectrum for 3G and WiMAX should be made available at the earliest to boost the deployment of broadband using these technologies,” the regulator said. Moreover, TRAI has urged that the Government should expedite the action on allowing resellers for international bandwidth as it will reduce Internet cost.

Figure 13: Internet and Broadband subscribers

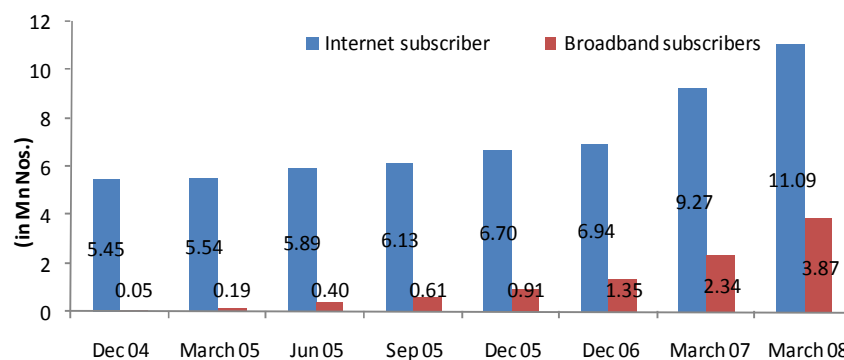
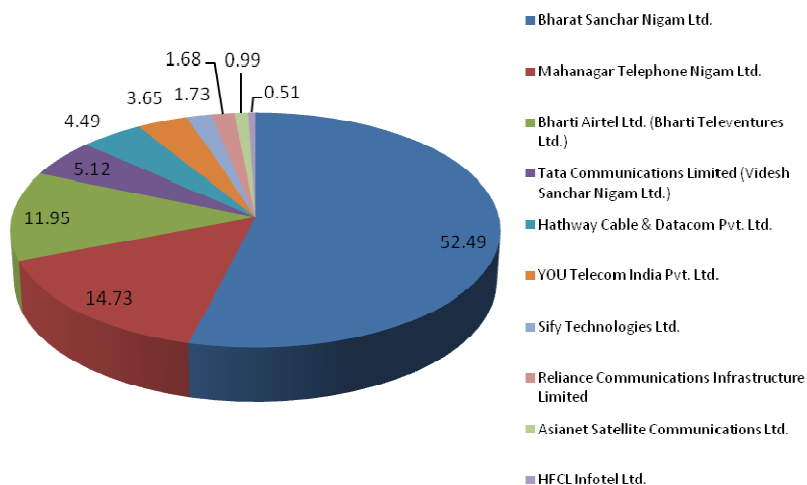


Figure 14: Broad band market share of companies



4. Market Entry

When private service provision was first contemplated in July 1992, the policy-maker’s goal was not to allow competition in basic services, but instead to supplement basic services by allowing private providers to offer premium services at higher prices (such as mobile services). Telecom licences were auctioned for basic and cellular services by the Department of Telecom (DoT), the incumbent government policy-maker, regulator and service provider until January 1995. The same tired old Indian *Telegraph Act of 1885*, which governed

telecommunications services under the colonial PTT model, was left in place to cope with the competitive era. Thus, DOT along with the Ministry of Communications, became responsible for issuing licences to its own competitors.

In the first round of bidding of basic service licence the response was poor and nine circles remained without any service providers. Finally, only six providers signed the licence agreement for the provision of basic services.

In cellular services, duopoly was introduced through a bidding process in circles and forty-two licences were awarded. Despite fewer problems with the award of cellular licences, services were slow to take off due to high bids, slow frequency allocation and the lack of a suitable framework for managing interconnection arrangements (Jain, 2001).

The revenue earned by the state through licence fees and other charges on private providers was to be used to fulfil the state-owned incumbent's investment and rollout targets. Licences were issued to those who bid the highest up-front fees. The intention was to create at least two viable service providers in each circle of operation (each circle being contiguous with individual states, in addition to the four metros). However, the concept of private service provision suffered a serious setback when none of the mobile service licensees, as well as private basic service licensees, were able to pay the fees that they had bid, due to overbidding. Both cellular and basic service operators had committed to unrealistic licence fees and were struggling to survive in the market. They owed almost \$873 million to the government towards their outstanding licence fees.

A key aspect of NTP-99 was the development of a migration package, according to which, all fixed service providers would pay their licence dues as of 31 July 1999 as a one-time entry fee, as well as a stipulated percentage of their revenue as licence fee over the period of their licence.

Both cellular and basic service operators were required to pay a licence fee at 12% of adjusted gross revenues (AGR) in metropolitan areas and category A circles, 10% in category B circles and 8% in category C circles¹⁰. So under NTP-99, they were allowed to migrate from the earlier fixed licence-fee regime to revenue-sharing of licensee revenues, while duopoly rights were discontinued. As a result of this policy, the government decided to reduce mobile operators' licence fees from USD 59 billion to USD 1.5 billion and converted the regime to one of revenue-sharing.

Although the licensing process has been a mechanism for liberalising markets, it has also been a key mechanism for controlling and restricting entry and raising large amounts of money through licence fees

On 13 August 2000, the government announced the opening up of domestic long distance to the private sector, ending the monopoly of the DoT. Under NTP-99, the private sector was allowed to provide NLD and international long distance ILD voice services, with no limits placed on the number of participants. Wireless-in-local-loop (WLL)-based limited mobility was allowed for private basic service providers. Data services were fully opened to the private sector. Cellular service providers were permitted to carry their own long distance

¹⁰ Further concessions were provided in 2003 at the time of the introduction of the UASL (Unified Access Service Licence), which included a reduction of revenue shares by 2 per cent for all players and a further concession of 2 per cent for those cellular players which had entered the field in the first round of bidding for higher licence fees.

traffic within their service area (earlier operators had to pay charges for carrying calls on the DoT network within the same circle too). The duopoly in cellular service was broken to allow for unlimited competition and public sector entities entered as third cellular operator in their respective circles

In January 2001, the Government announced guidelines for the fourth cellular operator to provide cellular services in the country and the licences were issued in September 2001 through a revised three-round open bidding system, instead of the earlier sealed bid system. Thus, while the initial auctions resulted in perverse outcomes with respect to market entry, the design of the fourth cellular licence was extremely efficient.

The regulatory environment prior to NTP-99 with regards to market entry was ad-hoc and non conducive for the operators to roll out their investment plans. In early 1999, Indian telecommunications reform was on the verge of a disaster. The independent regulator had been declared to have no authority over the prices and entry decisions of the public sector¹¹ and DoT had made a series of decisions that were bankrupting the private entrants and thereby re-monopolizing the industry. The TRAI Act of 1997 had in principle given clear powers to TRAI to give directions to operators and adjudicate disputes between them. DoT had contested these powers in the court on many occasions and in most of the cases, it won decisions in its favour. All this made initial investors wary, as DoT, with the help of legal intervention, escaped regulatory oversight.

TRAI was not given the responsibility to issue and revoke licences, but only to recommend them. However, under the NTP-99 framework, assurances were given that TRAI should be consulted on issues of number of competitors and the timing of their entry. The DoT surrendered its regulatory role in principle, although it still retained policy-making, licensing, and operative powers within the same organisational boundaries.

In 1999, a disagreement between the TRAI and the government led to the reconstitution of TRAI. On the initiative of an interministerial GoT-IT and in the interests of convergence, the government issued an ordinance in January 2000, to amend the TRAI Act. It made it obligatory for the government to consult TRAI on the issue of new licences.

Some analysts (Desai, 2004) argue that this amendment removed the cause of conflicts between DoT and TRAI. DoT was now under the directive power of TRAI and it could no longer seek the protection of the Delhi High Court in any matter not decided in its favour. The legal recourse taken by DoT had in many instances undermined the TRAI authority. Despite this rationale, there were suspicions about the government and some loss of credibility. Telecom reforms, however, continued with private entry into domestic long distance (freed in 2000-01) and into international long distance (freed in 2002-03).

Licensing affects the nature of competition and the resulting market structure. This was demonstrated in the WLL (Wireless in Local Loop) and cellular licence standoff. Ignoring the technological capability of WLL, it was licenced to provide local mobility. A situation emerged where two types of service providers, licenced under very different licensing regimes, started to compete with each other in the mobile wireless market.

¹¹ The November 1997 MTNL decision to start CDMA-based cellular services, without the government seeking recommendation from TRAI on issuing new licence. This led to legal battles that seriously undermined the power of the regulator and in October 1999, MTNL went ahead with the cellular service, without even seeking TRAI's approval on tariffs.

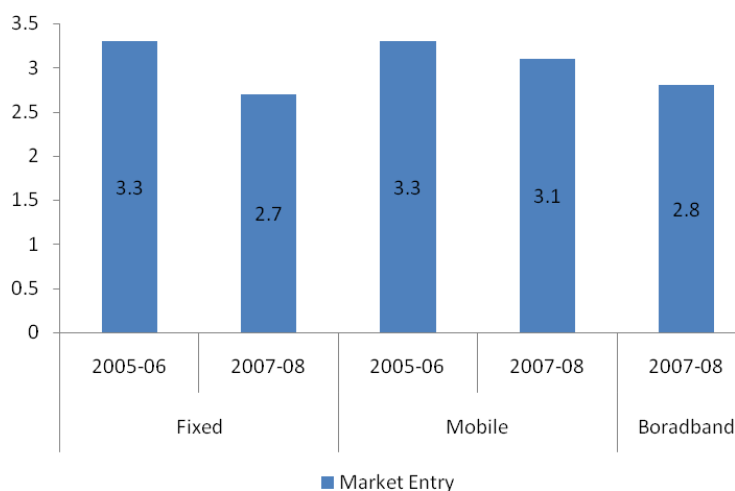
This led to an obvious need for convergence – since two types of service providers competed in the same market, but had very different licence conditions, TRAI facilitated the Unified access regime. Therefore, the licensing regime did not get in the way of technological developments. TRAI provided its recommendations to the Government on 27th October 2003, which were accepted on 11th November 2003. The objective of the Unified Licensing/Authorisation Regime was to be achieved in a two-stage process with the Unified Access Regime for Basic and Cellular Services being implemented in the first phase. This was to be followed up with a process to define the guidelines and rules for a fully Unified Licence/Authorization Regime.

However, DoT did not follow the TRAI recommendations on Unified Licensing. Instead, it liberalized the market entry process by reducing the entry fee into the NLD and the ILD from the existing level of USD 21 million (USD 5.5 million for ILD) to USD 0.5. Likewise, the Annual licence fee for NLD licences is to be reduced from the existing level of 15 percent to 6 percent of AGR w.e.f. 1.1.2006.

Moreover, according to the new guidelines, NLD service providers can access the subscribers directly for provision of leased circuits/closed user groups, i.e., they can provide last mile connectivity. Access service providers can provide Internet telephony, Internet services and Broadband services. If required, access service providers can also use the network of NLD/ILD service licensee.

A host of service licences still exist within the liberalized of the ILD and NLD sector. The unification process will be completed only when DoT removes all service-based licences and brings them under a single umbrella of a unified licence. The current market entry procedure ignores the technological possibilities opened up due to convergence. More recently, the TRAI recommended to the DoT that there was no need to cap the number of access providers to be permitted to operate in a particular service area and leave it for market forces to decide. On its recommendations on Mergers and Acquisitions the TRAI has imposed a caps such that no mergers and acquisitions should be allowed if the number of operators fall below the minimum threshold of four. Broadband Regulations came into force with effect from January 1, 2007. Total number of the Broadband Service providers was 72 in quarter ending December, 2007.

Analysis of TRE Score



The highlights of the market entry process in the past one year are that despite removing a cap on the licences by TRAI that had been proposed by DoT, the whole process of awarding licences was tardy. This could have resulted in a lower score than the previous scores for this parameter. Moreover, the government prolonged the declaration of explicit guidelines for the entry of MVNOs, in order to protect the investments of the incumbent

The application procedure and the manner in which it was implemented with litigation delays by the incumbent firms may have lowered the score this year in comparison to the previous TRE. Moreover, the government's approval of the use of dual technology, under which operators can offer services on both GSM and CDMA technology platforms was under a lot of criticism as this was perceived as according some undue favours to current firms. Free entry with the government awarding LoIs to 9 companies, which had submitted their applications before the September 25, was a good development but most of the operators could not begin their operations due to non-availability of the spectrum.

Expressing dissatisfaction with the entry procedure, TRAI said that the decision to give Letters of Intent to new players was not totally in line with the recommendations of the regulator. TRAI said that while it had not suggested any cap on the number of operators, it had suggested that the Government make sure that there is adequate spectrum before allowing new players in. What has irked the telecom regulator is the DoT trying to justify its decisions on grounds that they were based on TRAI recommendations.

Market entry in the broadband is constrained on account of two factors. First, a lot of potential can be exploited if the Local Loop Unbundling recommendations are accepted. It is estimated that initially around 25-30% of the 26 million-cooper loops in urban area (Approx. 8 million) could be leveraged for providing broadband services by both the incumbents i.e. BSNL and MTNL. 2.4 BSNL and MTNL were supposed to provide 1.5 million broadband connections by the end of year 2005 (50% of overall target) whereas actually they could provide only 0.5 million by 2005 i.e. only 33% of the target fixed for them. Even at the end of March 2007 BSNL and MTNL together have provided just 1.45 million broadband connections using DSL technology. As such available copper loop to provide broadband connections have not been effectively utilised. At present BSNL and MTNL are having almost 60% market share but they are significantly behind overall targets as stipulated in the Broadband Policy (TRAI, 2008). Second, broadband access through wireless requires the government to release 3G spectrum through a well designed auction.¹²

5. Access to Scarce Resources

As mentioned in the section on market entry, cellular mobile services started with a duopoly in 1994-95. The technology at that time was specified as GSM and the licences included a spectrum commitment of 4.5 + 4.5 MHz (later amended in 2001 to 4.4 + 4.4) with a possibility of increase to 6.2 + 6.2. Keeping in view the development of technology, all the licences were made technology-neutral in 1999. The third cellular mobile licence was granted to the incumbent in 1999. In 2001, the Government auctioned the fourth cellular licence in the 1800 MHz band. In the 4th Cellular licence, the committed spectrum was 4.4 + 4.4 MHz and a possibility of increasing it to 6.2+ 6.2 MHz was mentioned. The spectrum charges were earlier based on the number of mobile terminals and allocated spectrum. Since August 1999, the spectrum charges were converted to a percentage of Adjusted Gross Revenue (AGR).

¹² The DoT has announced its decision to auction 3G by the end of January 2009

This varies from 2% to 6%, based on the amount of spectrum allocated. The amount of revenue share increases with the increased allocation, i.e. 3% up to 6.2 + 6.2 MHz, 4% up to 10 + 10 MHz, 5% up to 12.5 + 12.5 MHz and 6% up to 15 + 15 MHz. In the basic services segment, competition was introduced in 1997-98 with the introduction of duopoly in the country. For these service providers also, spectrum was allocated to offer telecom services through wireless access.

Post NTP-99, open competition was introduced in basic services in 2001 and these licences were available on a first-come-first serve basis. In order to add value to their services, BSOs were permitted to provide 'limited mobility' services. The frequency bands for providing their WLL (M) services included 824-844 MHz paired with 869-889 MHz (FDD) & 1880 – 1900 MHz (Micro-cellular technology based on TDD). Service providers were given an initial 2.5 + 2.5 MHz to start service. The amount of spectrum could be increased to 5 + 5 MHz on meeting certain criteria (largely relating to subscriber base and roll-out), in increments of 1.25 MHz.

Thus, the allocation of the electromagnetic spectrum was carried out through fiat allocation. Under this purely administrative mechanism of allocation of spectrum, the government (the government set up the Spectrum Management Committee of the DoT and the Wireless Planning Commission on Spectrum Pricing in May 1999) assessed the relative merits of plans proposed by various competing firms and granted a share of the spectrum accordingly.

Thus, the regulatory set-up for allocation of a scarce resource such as spectrum has until now ignored the issues of efficient utilisation of spectrum, spectrum allocation procedure, and spectrum pricing. The present spectrum assignment policy is riddled with other anomalies as well. At present, spectrum allocation is linked to subscriber numbers and not usage. There is no policy for spectrum beyond 10 MHz. There is also no provision of a guard band, which results in interference in the signals of contiguous operators. Further, while the licence auction process did not allow companies to bid for a group of contiguous circles, subsequent changes in the ownership patterns show that cellular operators may have preferred to bid for contiguous circles. Several representations have been made to the government in recent times by mobile operators, as well as some others, about the limited amount of spectrum available for services. The delays in frequency allocation are subject to frequent criticism.

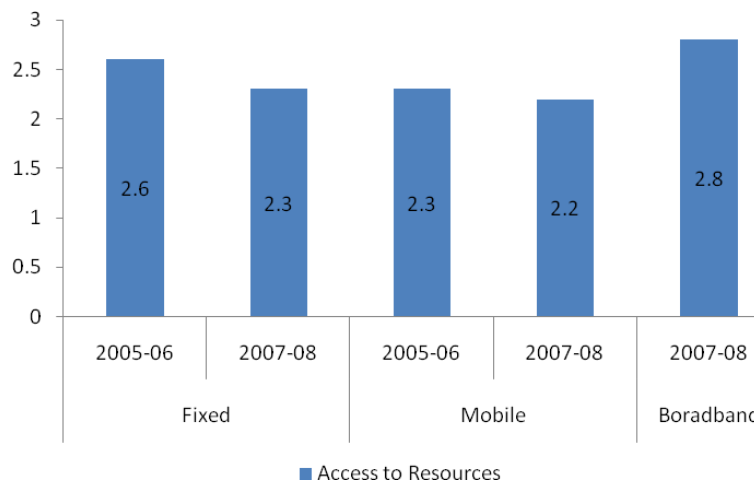
Spectrum is a scarce resource. Experience to date suggests that India has used it wastefully. The spectrum management is beset with several shortcomings, as a result of which, spectrum availability is rapidly emerging as a major constraint. First, the defence services use the non-NATO band which is also used for commercial purposes. Due to global interconnectivity considerations and the fact that most telecom equipment is manufactured in NATO countries, both defence and private users in India end up competing for the same spectrum bands. Due to this, the average frequency allotted to an Indian cellular operator is 6.2 MHz, compared to the world average of 17.18 MHz. The International Telecommunication Union (ITU) recognises a total of 110 MHz in 2G and 2.5G Global System for Mobile Communications (GSM). As against this, an average 35 MHz (a range of 25-50 MHz) is used currently by operators across circles in India. Another 31 MHz will be required to provide spectrum to the new licensees. This leaves about 34 MHz of spectrum for growth in 2G and 2.5G services. The Ministry of Defence is yet to clear about 20 MHz of this 34 MHz.

Growth in cellular mobile has exerted pressure on spectrum. In cities such as Delhi and Mumbai, where operators have been allocated upto 10 MHz, there is already demand for

more. With the 900 MHz GSM band completely occupied, allocation beyond 8 MHz to each operator is possible only in the 1800 MHz band. In the 800 MHz CDMA band, some licences have been allotted up to 3 carriers, out of a total of 4. With the growth of data, there is likely to be demand for more spectrum here too. Internationally, the next band for expansion of GSM and CDMA systems is 1800 MHz / 1900 MHz. Other government users are presently occupying a large part of these bands and refarming of this spectrum is a long-drawn process.

TRAI has recently come out with its recommendations on the allocation of spectrum for 3G and Broadband Services. These recommendations support the economic mechanism of allocation of spectrum through a well-designed auction, moving away from the previously adopted “beauty contest”. In their recommendations, TRAI pointed out that spectrum identified for 3G should be treated as a stand-alone allocation and not as an extension of earlier spectrum allocation of 2G. Their recommendations are based on the following principles: Maximization of consumer interest (including affordability); responsible and efficient use of spectrum; aiding growth of the sector, particularly in rural areas; ensuring technology- and service-neutrality/convergence; recovery of costs and pricing of spectrum; orienting spectrum policy to support future competition; keeping a level playing field; and sharing of infrastructure. The DoT has ruled out any auction mechanism for the allocation of 2G spectrum. The subscriber linked formula has taken a long time to decide but even now there is no spectrum available to distribute it either to the current operators or new entrants.

Analysis of TRE Score



This dimension of TRE is the lowest performer and it is not surprising as the allocation of spectrum is the biggest imponderable that has plagued the sector in the last one year. The Minister of Communications Mr. A. Raja in a letter to the Prime Minister’s office has ruled out auctions as a mechanism for allocation of spectrum. According to him, auctions are “unfair, discriminatory, arbitrary and capricious”. By ruling out auctions he has implicitly endorsed the existing spectrum allocation policy that bundles spectrum with telecom service licence. Because of its inherent arbitrariness of this mechanism during the period of survey there were many operators who were disgruntled.

Moreover, the TRAI and the DoT were in disagreement for most part of the year in question of what is the appropriate subscriber linked formula. The arbitrariness of the process was demonstrated when the Telecom Engineering Centre tightened the norms of the subscriber

based allocation by raising the threshold for such allocation by 800 percent, while the TRAI had recommended raising the subscriber based criterion by up five times.

With the DoT allowing for dual technology last year to the existing CDMA operators they too became contenders for GSM spectrum and this led to endless litigations. Finally, some sort of consensus was reached with DoT accepting the recommendations of TRAI almost two years after the initial recommendations were made. However, there has been no provision of additional spectrum to either the incumbents that want more or the new entrants. With as many as seven new operators waiting to get telecom licences, the Government is now finding it difficult to make available adequate spectrum for all of them. The WPC report categorically says that there is no more spectrum in the 900 Mhz band. In the 1800 Mhz band it is being suggested to keep aside 45 Mhz to meet the demands of the existing operators and therefore new operators may get spectrum only in those circles where there is more available radio frequency. The 3G spectrum allocation policy has been announced but some anomalies seem to be favouring the current occupants.

For the expansion of broadband through wireless TRAI has been urging the government to expedite the implementation of its recommendations on spectrum allocation for 3G and WIMAX. In the case of the broadband Rights of Way is a major issue for deployment. TRAI has recommended that the Central Government may consider mandating the state governments to adopt uniform RoW procedures and streamline/ rationalise RoW cost, which may primarily be limited to cost of reinstatement only. RoW costs should be non-discriminatory, reasonable. RoW procedures should be transparent and publicly available. Tardy response of the government has resulted in low scores for the sector.

6. Interconnection

Refusal by the incumbent to provide access to the network calls for active regulation. The regulator may be required to fix access charges and other interconnection conditions. If the new entrant's coverage is small, the incumbent has an incentive to refuse interconnection since, in the absence of interconnection, it can corner the market. The licence agreement route to setting interconnection terms meant that newcomers were saved most, although not all, of the delays and negotiation to connect to the incumbent's network when they need to get their services off the ground.

In an asymmetric situation, the incumbent could use interconnection charges to handicap new entrants. This is what DoT did. In January 1997, after most of the cellular operators had made their minimum investment and started service, DoT raised the interconnection charge for mobile services to Rs 10 (about US\$.22) per minute from Rs. 1.25. This action made cellular calls that interconnected with the fixed wire-line network extremely expensive for carriers, especially compared to the ceiling prices that they were allowed to charge for service. Moreover, DoT decreed that all calls from one wireless carrier to another had to be interconnected through the state-owned incumbent's network, so only calls within the same network could avoid the interconnection charge.

The successful challenge to the CPP regime was also a sign that TRAI lacked powers to enforce technically adequate and fairly-priced interconnection on all players in the market; arguably, the most important function regulators carry out in telecom market. The regulatory environment with regard to interconnection was highly unsatisfactory during this period.

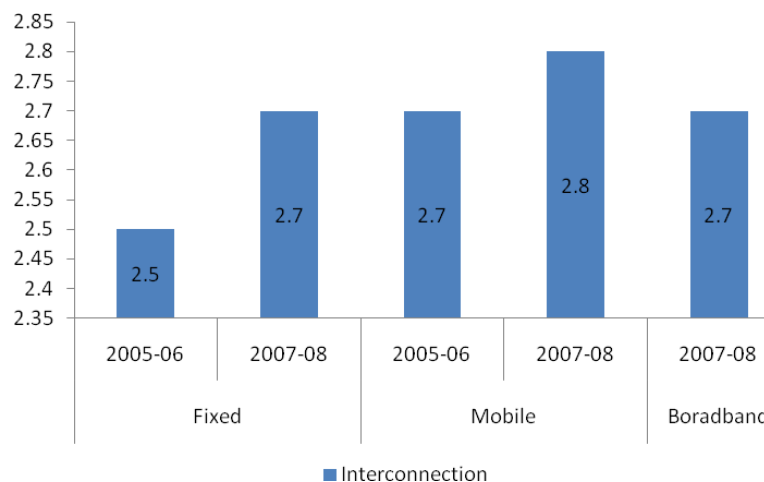
High interconnection charges constituted barriers to entry and quite possibly induced inefficient bypass.

The amendment ordinance of 2000 restored TRAI's powers relating to tariffs and interconnection, which had earlier been deemed by the courts to be limited. Even the government would have no right to overrule the TRAI in these two areas. Other thorny issues regarding interconnection were partly addressed in the NTP-99.

Thus, there was certainty of jurisdiction in matters relating to interconnection and a more level playing field had been created. On 12 July 2002, TRAI issued the Telecommunication Interconnection (Reference Interconnect Offer) Regulation, 2002 (2 of 2002). The regulation required service providers with significant market power to publish an RIO "stipulating the various technical and commercial conditions including a basis for Interconnect Usage Charges for Origination, Transit and Termination. Following these, the new entrants can seek Interconnection and agree upon specific usage based charges." All RIOs are to be approved by the regulator. The Telecommunication Interconnection Usage Charges (IUC) Regulation of January 29, 2003 was a comprehensive review of interconnection charges. It provided estimates of the costs of network elements involved in interconnection.

Although the final interconnection rules¹³ were not adopted until late 2003 (TRAI 2003), their general form was known by early 2002 and they explain the subsequent boom in wireless networks. The current regulatory environment with regard to interconnection is fairly stable and the system eliminates much of the previous unnecessary complexity and unfairness. However, interconnection prices were still far above cost due to the "universal service" plan i.e. the access deficit charges (ADCs), which are incorporated into interconnection charges and are paid directly to the incumbent state-owned enterprise (BSNL) in order to compensate it for providing below-cost service in rural areas. After much litigation and several iterations, TRAI finally resolved the ADC issue in March 2008.

Analysis of TRE Score



¹³ Termination charge for calls to basic (Fixed, WLL (Fixed), and WLL with limited mobility) and Cellular networks would be uniform @ Rs. 0.30 per minute. The same termination charge would be applicable for all types of calls viz. Local, National Long Distance and International Long Distance.

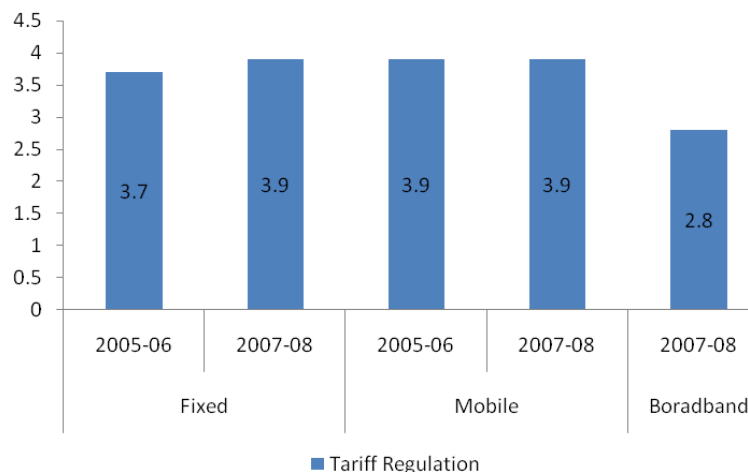
The TRE scores for interconnection were low but have improved this year. The major factor contributing to the improvement in the score can be attributed to the telecom operators welcoming the phasing out of ADC. The low scores for this parameter can also be attributed to the fact that TRAI has expressed its inability to force any operator to honour the interconnection agreement.

7. Tariff Regulation

The Telecommunication Tariff Order (TTO) 1999 issued by the regulator began the process of tariff rebalancing with an increase in monthly rental and decrease in National Long Distance (NLD) and International Long Distance (ILD) tariffs. This rebalancing exercise was implemented by TTO 1999 in three steps, the first in May 1999 and the third in March 2002. This resulted in a reduction of NLD tariffs by about 56 percent and ISD tariffs by about 47 percent. Under the 24th amendment of TTO of 1999, issued on 24th January 2003, the regulator brought down the tariff for domestic long distance calls by imposing a ceiling of Rs. 8.40 a minute for calls beyond 50km. It has been left to the operator's discretion to bring down tariffs further. Some companies have further slashed their rates.

The TRAI issued Telecommunication Tariff (Twenty Third Amendment) Order, 2002 (7 of 2002), which forbore from prescribing cellular tariffs and required only integrated operators to seek prior approval for their tariffs from TRAI. In this order, TRAI stated that, in light of emerging market conditions, market forces could effectively regulate cellular tariffs and the regulator could step aside, except for a broad supervision in the interests of consumers. More recently TRAI noted that despite intense competition in voice telephony in the cellular mobile services, competition was not adequate in the roaming services market. The Authority also found that there are justifiable grounds for a review of the tariff structure applicable for roaming services which had been fixed five years back, i.e. in the year 2002.

Analysis of TRE Score



The summary results show that the Indian TRE was the best vis-à-vis tariff regulation. The TRAI did not adopt RPI-X methodology for tariff rebalancing but a slow downward reduction. Despite not having support from the government, the incumbent, or the courts, TRAI proved pro-competitive and was successful to a certain extent in rebalancing telecom rates. This was no small achievement, as tariff restructuring had to be carried out despite the

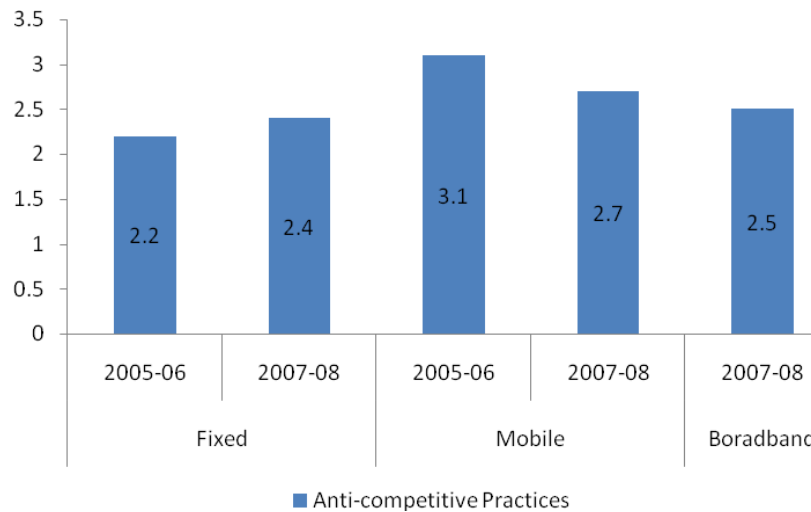
non-transparent and complicated accounting practices of the incumbent, which was the major source of information of the unbundled cost components.

Though the tariffs may not be the lowest in the region the respondents have given the highest score to this parameter for the second year in succession. This does point out the success of the regulator. Though the regulator has forborne from tariff setting, various regulations have been passed in the recent times to address the tariff concerns, the most important being the regulator slashing the roaming rates as the operators seemed to be exploiting some market power.

8. Anti-Competitive Practices

Due to the unequal entry decisions made by the DoT as a licensor, with the state-owned incumbent being given a pan-Indian licence, while the competitors of the private telecom companies had service-specific and circle-wise licences, the monopoly power of the incumbent was bound to be retained. Thus, from the outset of the reform process, India's telecom market structure was highly skewed toward the state-owned incumbent. Given this initial condition, TRAI (old as well as new) has been unable to create parity between the state-owned incumbent and the private telecom operators. The attempt to regulate the incumbent asymmetrically has not been very successful. The regulator has accepted the market structure as given, even though this structure carries a huge risk for anti-competitive by the incumbent. The crucial missing link is the insufficient regulatory attention devoted to the design of appropriate market structures. Moreover, the ease with which policy, TRAI membership, and judicial oversight of TRAI decisions were shifted because the government wanted to change policies in its own favour shows the fragility of TRAI's independence (Uppal, 2003).

The regulator's attempts to dilute the inherent strength of the incumbent were resisted by DoT, on the issue of CPP and on the entry of MTNL/BSNL into the cellular business. Although the interconnection regime promoted by the regulator was pro-competitive, the regulator is not mandated to settle interconnection disputes and the incumbent blatantly refused to provide interconnection to the private entrants. This may have led to some inefficient bypass. The handling of the WLL controversy by the regulator (which was mainly on account of the alleged anti-competitive behaviour of a few basic service operators wanting to get a toehold in the cellular business) is another instance of a weak regulatory environment. Between 2001 and 2003, a series of litigation on this matter jeopardized the regulatory environment, especially in the context of fostering competition. India's new unified licensing regime for telecommunications is a step in the right direction, since it would reduce - as it already has done- the debilitating litigation and controversy in the sector. But it presents an increased challenge in regulating market power. With larger market size, the scope for anti-competitive subsidy by the integrated players, especially the incumbent, increases substantially. Until now, the general perception is that the regulator has only checked the incumbent's market power in a limited way. Moreover, by ignoring the recommendations of the regulator on infrastructure-sharing, the DoT is unable to dilute the restrictive and monopolistic practices of the incumbents and provide a level playing field to new entrants. It is ironical that even the private operators who were initially complaining of the anti-competitive practices are now themselves engaging in the same. This view has been put forward by the new players who seek entry in this sector.

Analysis of TRE Score

The score for regulation of anti-competitive practices for the mobile sector has deteriorated the most from 3.1 in the previous survey to an above average of 2.7 for the mobile sector and has marginally improved for the fixed sector. One should bear in mind that these scores are a consequence of the TRE on many other parameters such as market entry, universal service, interconnection etc. The existence of competing operators is not per se an indicator of competition. The test of competition must be contestability or ease of entry into the industry. Contestability naturally means that existing operators should not be able to preclude entry by other operators, but it also means that the government should not be able to stop it either. The Indian telecom competition is increasingly being threatened by the possibility of a cartelization. The sustainability of competition crucially depends upon the some ex-post measures to check anti-competitive practices for which the role of a Competition Authority cannot be underestimated. Other steps that can protect competition is the introduction of number portability, which has long been delayed in India.

9. Universal Service Obligation

Universal Service was one of the main objectives of the National Telecom Policy (NTP) '99. Keeping in line with NTP'99, the government sought the recommendations of TRAI on the issues relating to the Universal Service Obligation. It is important to point out here that the regulator has only recommendatory powers on the issue of USO that the Department of Telecom (DoT) may consider in formulating or implementing the relevant policy.

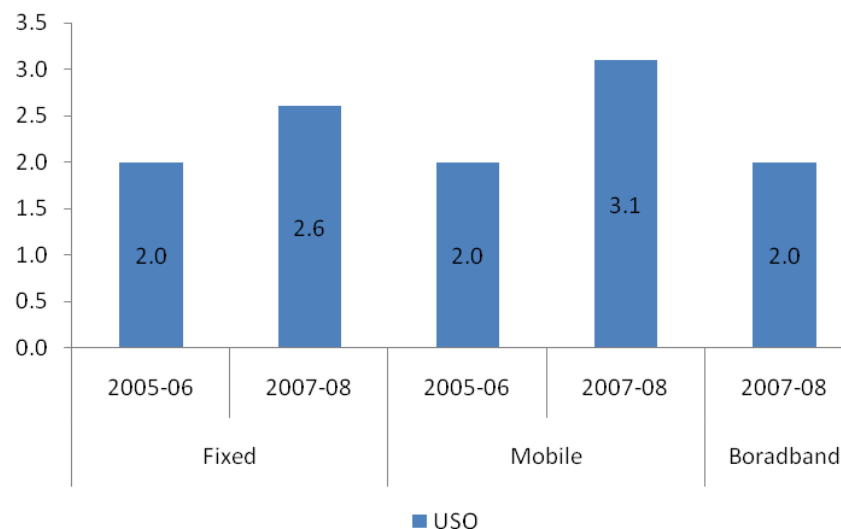
Based on recommendations, the Universal Service Policy was framed and came into force on April 1, 2002. The Policy is framed under the Indian Telegraph Act 1885 as amended by Indian Telegraph (Amendment) Act, 2004 (No. 8 of 2004) and the rules framed there under. On January 9, 2004, the USOF was granted a statutory non-lapsable status with the passing of the Indian Telegraph (Amendment) Act, 2004.

By April 30 2007, INR 150 billion (almost USD 3.75 billion) had been contributed to the USOF. Only 33 percent of the amount collected has been expended and an additional INR 18 billion is expected to be for 2007-2008. Ironically, India accounts for nearly 50 per cent of

the money lying unused in various Universal Services Obligations funds across 15 developing countries and has one of the highest levies as contributions toward the Universal Service.

The government until March 2007 gave USOF support to only fixed line operators that offer services in rural areas. But under this new policy the USO fund will be used for the creation of passive infrastructure for mobile services. Although this correction has been proposed, the previous auctions have yielded large rents for the incumbent. Even in the new USO scheme the active infrastructure including the backhaul is to be created by the service provider. The passive infrastructure to be created with the subsidy has to be shared with 3 other service providers. By capping the number of the service providers entry of new players has been restricted.

Analysis of TRE Score

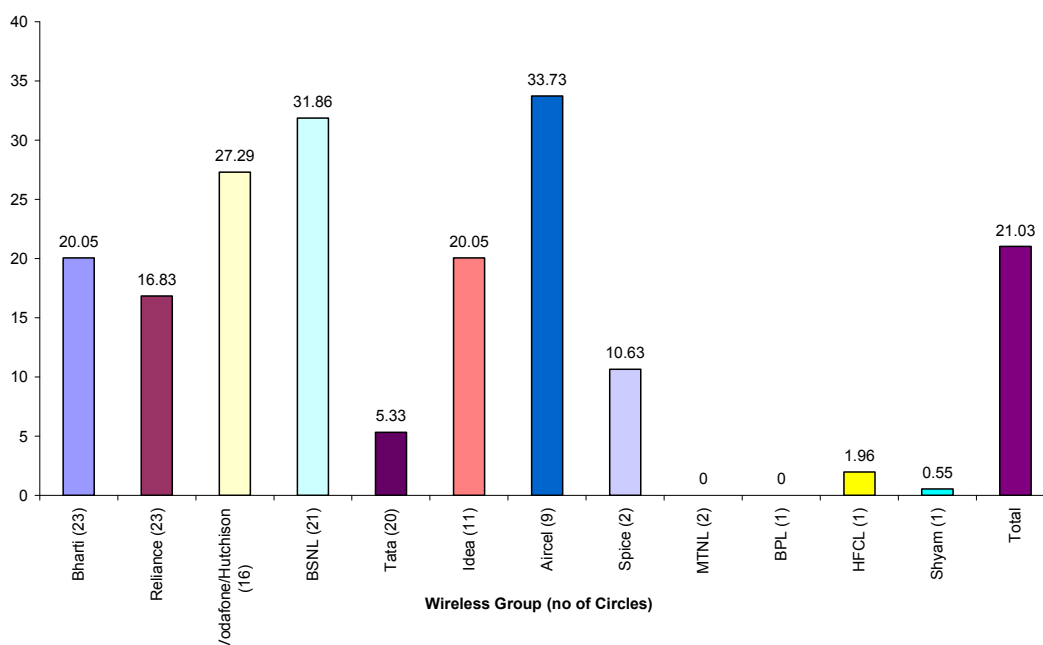


The remarkable improvement of the TRE score for this parameter especially in mobile can be attributed to a major change in the USO policy. The Indian USO policy as has been described in this section was not technology neutral but around March 2007 the government held least cost subsidy auctions for infrastructure companies for setting up infrastructure for mobile telephony. It also invited bids for the last mile connectivity from the mobile phone companies. This revised USO policy design seems to have been appreciated by the stakeholders participating in this survey.

While a 57 percent urban teledensity and a 10 percent rural teledensity is an issue of concern, it must be pointed out that the recent growth in the rural teledensity especially in the last few years has been mainly due to market innovations of the operators. The success of liberalization seems to be finally being extended to the rural areas. This achievement through the process of the market is being perceived as universalization and perhaps also explains the elevation of the score in this survey. With subscriber growth saturating in urban areas, operators are rapidly expanding into semi-urban towns and rural areas. These markets hold significant promise of subscriber growth but ARPUs may decrease even further with incremental increases in subscriber base. The figure below shows that the operators are willing to serve the rural areas but will require some support from the universal service fund for capital expenditures for infrastructure expansion.

Thus, the recent shift in the USO policy is a step in the right direction. The corrective mechanism to support mobile infrastructure funding and its consequent sharing has addressed some of the problems of the initial design of the USO programme but its design still raises questions about the impact of the programme on competition for the provision of rural services. Moreover, there are concerns of wasteful duplication of backhaul infrastructure due to the incumbent refusing to share its already existing infrastructure putting undue burden on the service providers over and above the Universal service fund contribution that they have to make.

Figure 15: Operator wise rural subscribers (in percentage)



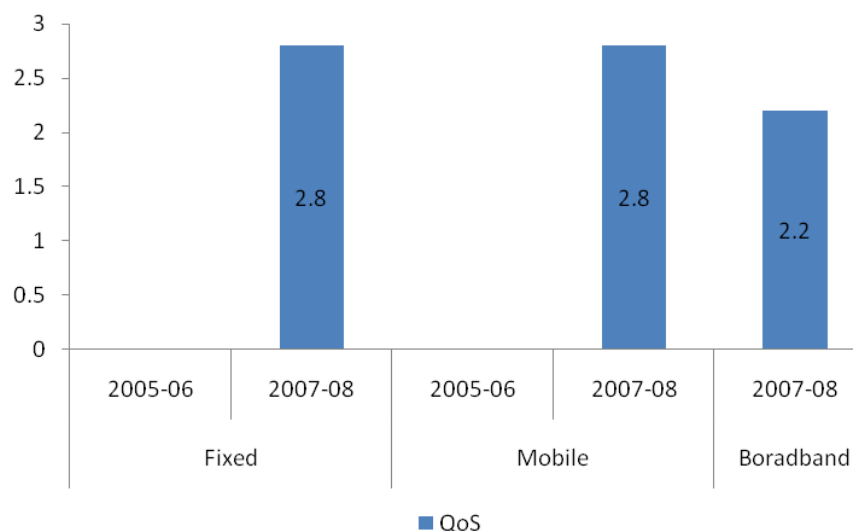
10. Quality of Service

Indian telecom sector has by all accounts experienced a 'revolution' of sorts but increasingly it is being pointed out that the low ARPU model is not sustainable as it is conjectured that the operators are cutting back on investments. Issues like frequent call drops, poor connectivity, unwarranted messages, telemarketing calls and absence of a consumer redressal cell still annoy the consumers in the world's fastest growing telecom market. This is despite five years of regulation and nearly 24 consumer advocacy groups continuously expressing displeasure over the QoS of telecom providers in India.

QoS, as defined by TRAI "is the main indicator of the performance of a telephone network, and of the degree to which the network conforms to the stipulated norms." The subscriber's perception of QoS is determined by a number of performance factors specified by the telecom regulator, particularly, network congestion.

The QoS regulations gained prominence in 2005 when TRAI sent a show cause notice to major telecom players like Bharti, Reliance Infocomm, Reliance Telecom, BPL Mobile and Spice Communication, demanding an explanation about high congestion at points of interconnection (PoI), which according to TRAI parameters, should be less than 0.5%. The network congestion report released by TRAI found that level of congestion at 404 PoIs was more than 0.5%

Analysis of TRE Score



TRE score for the mobile and the fixed sector for this parameter has been above the midpoint but still lower than for tariff regulation. TRAI came out with regulations for QoS for voice telephony in 2005 and for Broadband in 2007. However, telecom infrastructure is struggling to cope with the pace of subscriber growth. Besides congestion, a host of other QoS issues remain unresolved - mainly, mobile number portability, publication of mobile phone directory, office of ombudsman, consumer grievances cell, publication of name and details of nodal officer on the service provider's website. Though, these suggestions have been there for a longtime, the regulator seems to be incapable of tackling this problem according to many representatives of the consumer organizations. The QoS parameters that are reported by TRAI in its quarterly reports do not give a dismal picture of the performance of the mobile operators on the QoS parameters. According to the report all operators are meeting the call drop rate bench mark. However, the QoS of the broadband providers has been reported to be poor by TRAI in its latest performance indicator report, especially in regard to service activation time.

11. Conclusions and Recommendations

The Indian telecom sector's growth and its ability to serve the poor millions that inhabit the country is a classic example of the success of liberal policies. Market failures on account of monopolistic power of the incumbent or even due to the market entry deterrence practices followed by the new entrants are an issue of concern. These need to be addressed by proper regulatory instruments like encouraging more entry and infrastructure sharing. This has been partially addressed with the government coming out with guidelines for active infrastructure-sharing. Passive infrastructure-sharing was allowed earlier with the revamping of the

universal service policy in 2007. DoT has said that active infrastructure-sharing will be limited to antenna, feeder cable, node B, and radio access network and transmission system only, still precluding the sharing of the backhaul infrastructure owned by the incumbent.

Considering the importance of sharing backhaul for provision of mobile services in rural and far flung areas, TRAI has recently recommended that, licensing conditions should be amended to allow service providers to share their backhaul. Access to expensive backhaul infrastructure can lead to several technological solutions to the “last mile” problem of access once the active component cost has been lowered.

Recognising this as an important mechanism increasing rural connectivity policy-makers, regulators and operators are increasingly placing greater emphasis on alternatives to the traditional high-cost infrastructure development model by considering such measures as infrastructure sharing, and Mobile Virtual Network Operator (MVNO) agreements. These measures can help reduce the financial burden on operators, accelerate the introduction of new services and the deployment of new networks while lowering barriers to market entry. TRAI has also recommended that financial incentive in some form will also be required by all service providers not benefiting from USOF support to set up passive infrastructure. This will ensure fair play, generate competition and discourage cartelization. Thus, the sharing of essential facilities will further improve competition and allow the market to innovate

Finally, what broad conclusions emerge from this study? The TRE results do provide some important insights to guide the regulatory environment. First, the deterioration of the score on market entry and regulation of anti-competitive practices as pointed out by the survey results do suggest current institutional limitations to address these. The fact that the regulator has to work with a predefined market structure, is limiting its ability to foster competition *ex-ante*. Moreover, in the absence of an effective Competition Authority, an *ex-post* check on anticompetitive behaviour is also weak, so much so there is an increasing concern that the incumbent wireless service providers are creating barriers to entry. The existence of potential competition is negated when barriers to entry are erected by way of policy hence the licensing policy should be as liberal as possible.

Second, as the analysis above has pointed out market entry is meaning less unless the spectrum issue is resolved. At the time the survey was being carried out there were enough portents that TRE for this dimension is very poor. This was reflected in the worst score that the participants in the survey gave to this dimension. By the time of this report was finalized the mishandling of spectrum allocation by DoT has become a major issue of controversy so much so that there are pressures on the minister to resign on this issue. Politics apart the Indian growth story in telecom will be spoiled till the government comes out with efficient guidelines for the allocation of spectrum. Moreover, broadband delivery through wireless will require a speedy resolution to the spectrum allocation problem. With the liberalization of the telecom sector, regulation of scarce resources such as spectrum has shifted from it being purely an issue of planning and coordination to being an effective tool in the creation of a competitive environment. This fact can be ignored only at the peril of attenuating the unprecedented gains that have been made so far on account of technology induced competition.

Annex 1: Key Regulatory Events- April 2007-March 2008

2007	
11 April	<p>Recommendations on Infrastructure Sharing of Passive, Active and Backhaul Networks</p> <ul style="list-style-type: none"> Reiterated the urgency of passive infrastructure sharing. Sought amendment in the licence condition to allow active infrastructure sharing Recommended that all the licencees in any service areas should qualify for financial subvention schemes meant for rural areas though at reduced scale compared to the winner in the tender process of USOF Administration.
13 April	<p>Consultation Paper on “Access to Essential Facilities (Including Landing Facilities for Submarine Cables) at Cable Landing Stations”</p>
4 May	<p>Regulation on ‘Telecom Consumers Protection and Redressal of Grievances’.</p> <ul style="list-style-type: none"> mandatory for all telecom companies, providing basic, cellular, broadband or unified access services to establish call centres Appoint or designate Nodal Officers, for redressal of the grievances and also appoint one or more appellate authorities in each licenced service area. Mandates procedures and time limits for redressal of grievances. Publish a ‘manual of practice for handling consumer complaints’
4 May	<p>The DoT had imposed penalties on various operators for three different instances of violation of licence norms.</p>
5 June	<p>Regulation on ‘The Telecom Unsolicited Commercial Communications’ which placed a mechanism for curbing the unwanted telemarketing calls.</p>
5 June	<p>The Telecommunication Tariff (Forty- Fifth Amendment) Order, 2007.</p> <p>Tariff of Rs.500 is charged for each unsolicited commercial communication made from Basic Services (Other than ISDN) and from Cellular also.</p>
7 June	<p>Regulation on ‘International Telecommunication Access to Essential Facilities at Cable Landing Stations (CLS)’. Highlights</p> <ul style="list-style-type: none"> new service providers have access to the International bandwidth capacity in the same way as the consortium members; access facilitation is not unduly delayed by consortium members having control over CLS; transparent and non-discriminatory access at cable landing stations;
12 June	<p>Consultation Paper on ‘Review of Licence Terms and Conditions and Capping of Number of on Access Providers’. A major initiative by the Authority to update the licensing and regulatory framework in sync with technological change. The key issue raised in the consultation paper relate to desirability of limiting the number of access service providers in a service area and determining optimum number of service providers in a service area. It also examines the role of market forces instead of a priori capping of access providers.</p>
15 June	<p>Regulation on ‘Telecommunication Consumers Education And Protection Fund’ for educating consumers on the developments in the sector and check operators from charging excess rates from subscribers.</p>
21 August	<p>Second amendment in ‘The Regulation on Guidelines for Registration of Consumer Organization/Non-Government Organizations (NGOs) and their Interaction with TRAI’.</p> <ul style="list-style-type: none"> As against a minimum experience of three years in areas of representing views of consumers, the amended regulation prescribes an experience of one year in assisting the consumers in redressal of complaints regarding shortfall in the supplies and deficiencies in service.

14 September	<p>Regulation on ‘Domestic Leased Circuits (DLC) Regulations’.</p> <ul style="list-style-type: none"> ▪ Imposition of obligation on all service providers who have the capacity of copper, fiber or wireless, and who have been allowed under the licence to provide DLC, to share it with other service providers. ▪ Provide a framework to ensure transparency, predictability and reasonableness and allow provision of DLC/local lead in a non-discriminatory manner.
18 September	Consultation Paper on ‘ Issues Relating to Mobile Television Service ’.
1 November	DOT has opposed the recommendation to recognize the 450 MHz band for third generation mobile services. Its move was contrary to the suggestions made by the telecom regulator, the Defence forces and the National Working Group-8 (set up to formulate India’s views in this regard).
21 November	DoT and TRAI divided over key policy issues. The regulator had given its views on capping mobile operators, spectrum management, and mergers and acquisition among others. However, DoT had not accepted TRAI’s recommendations on mergers and acquisition and has also made changes on spectrum issues.
26 December	<p>Spectrum Allocation ruling by DoT:</p> <p>To end the ongoing controversy over spectrum allocation to GSM-based mobile operators, finally the Government accepted the spectrum review committee’s recommendation of allocating additional frequency to existing GSM operators based on the TRAI’s subscriber-linked formula and in multiples of 1 MHz.</p>
2008	
1 January	Study paper on ‘ Broadband speed ’. The status paper has analyzed broadband speed defined in various countries, the prevailing environment and impact of growth of broadband on the Indian economy.
21 January	<p>Consultation Paper on ‘Access Deficit Charge (ADC)’.</p> <ul style="list-style-type: none"> ▪ Recommended abolition of Access Deficit Charge (ADC), a levy paid by private telecom operators to the government to compensate state-run BSNL which offers services in non-lucrative rural areas, with effect from 1st April 2008.
24 January	<p>The Telecommunication Tariff (Forty-Sixth Amendment) Order, 2008.</p> <ul style="list-style-type: none"> ▪ Amendment made in Item 10 and 11 in Schedule I to the Telecommunication Tariff Order, 1999. ▪ No tariff for itemized bills in respect of long distance calls and for provision of hard copy of the bill or printed copy of the bill to the customers.
29 January	<p>Consultation Paper On ‘Issues arising out of Plethora of Tariff Offers in Access Service Provision’.</p> <ul style="list-style-type: none"> ▪ Inviting the views and suggestions of the stakeholders to protect the interests of the consumers without curtailing the flexibility of the operators in offering the tariffs.
17 March	<p>The Telecommunication Tariff (Forty- Seventh Amendment) Order, 2008.</p> <ul style="list-style-type: none"> ▪ Amendment made in Schedule XI to the Telecommunication Tariff Order 1999. ▪ Rs. 500 would be payable as tariff for every first unsolicited commercial communication and Rs. 1,000 for every subsequent unsolicited commercial communication.
27 March	<p>Ninth Amendment in ‘The Telecommunication Interconnection Usage Charges Regulation’.</p> <ul style="list-style-type: none"> ▪ Now, private telecom operators will not have to pay Access Deficit Charge (ADC) to BSNL to compensate it for carrying out rural operations..