India's Universal Service Obligation for Rural Telecommunications: Issues of Design and Implementation

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For presentation at the 35th Research Conference on Communication, Information and Internet Policy, the National Center for Technology & Law, George Mason University School of Law.

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This work was carried out with the aid of a grant from the International Development Research Centre, Ottawa, Canada

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Abstract

In this policy paper we critically analyze the design and implementation of the subsidy mechanism for the expansion of rural telephony in India. The main focus of the paper is the Indian Universal Service Obligation (USO) for telecom. We present the anomalies of the USO regulatory and policy regime since its inception in 2002 and discuss the subsequent Telecom Regulatory Authority's (TRAI) proposals to ameliorate these flaws. It is important to debate (1) whether the USO scheme created the least possible distortion to an otherwise well-functioning market, and (2) whether it provided a level playing field for operators bidding in an auction to receive the USO subsidy. This is a major consideration in evaluating a subsidy mechanism, as the Indian economy is replete with examples of misdirected and market distortionary subsidies Given development linkages of Information Communication Technology (ICT), India cannot afford to repeat these mistakes.

Key words: Competition, ICT, Subsidy and Universal Service Obligation.

JEL classification: H2, H54, L51, L96, and L98.

1.0 Introduction

This paper critically analyzes the design and implementation of the Indian Universal Service Obligation (USO) program for telecom. The objective of this paper is to discuss the anomalies of the USO regulatory and policy regime since its inception in 2002 and discuss the subsequent proposals of the Telecom Regulatory Authority (TRAI) to ameliorate these flaws. Following some of the recommendations of the TRAI the USO mechanism was re-evaluated and some corrective mechanisms were put in place in recent years. The main findings of the paper are that the initial mechanism of providing USO support only to fixed line was flawed, as it was anti-competitive and technologically non-neutral. 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 it 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.

We argue that greater rural connectivity is possible because of new technologies like mobile and Voice over Internet Protocol (VoIP) telephony, but only if there is a regulatory regime that mandates open access to backhaul infrastructure. This regulatory measure is a precondition for effective use of subsidies in the absence of which entry into the rural telecom markets will be constrained. Constraining entry will make universal service unattainable. It will become no more than a tool used by the incumbent to serve its narrow interests.

It is important to assess whether the USO scheme created the least possible distortion to an otherwise well-functioning market, and whether it provided a level playing field for operators bidding in an auction to receive the USO subsidy. This is a major consideration in evaluating a subsidy mechanism, as the Indian economy is replete with examples of misdirected and market distorting subsidies. India cannot afford to repeat these mistakes with ICTs as well.

The paper is organized as follows. Part 2.0 briefly documents the Indian telecom growth story after the liberalization of the sector including the key policy and regulatory developments. Part 3.0 surveys the theoretical literature on USOs including

the issues of financing and disbursement. Following documentation of the design and implementation of the Indian USO scheme including the auction design, policy and related issues in Part 4.0, the key issues of India's universal service program are analyzed in Part 5.0. In this section some of the recommendations of TRAI on *Growth of Telecom Services in Rural India*[i] and *Infrastructure sharing* are also discussed. How far have these proposals been implemented and what is the way forward to bring telephony to the masses of India is also discussed in this section. We analyse the recent initiative of the USO policy and evaluate it in the context of our research questions.

Some proposals for an effective USO policy are described in the concluding Part 6.0. They address the market efficiency gaps so that maximum benefits from competition and the new technologies may be exploited to achieve connectivity targets and make the subsidy mechanism less distortionary.

2.0 Performance of Indian Telecom Sector

The telecom sector's growth has become a benchmark for other infrastructure sectors in India, which are attempting to replicate the telecom 'success' story (Figure 1 provides a snapshot of the Regulatory and Policy Developments in the sector that facilitated this growth). Despite the overall achievements, many rural areas in India remain unserved by any telecom network, fixed or mobile. This is evident in the wide disparities in the rural and urban direct exchange lines (DELs). As of March 31, 2007, the total urban DELs were 28.19 million and rural DELs including Village Public Telephones (VPTs) were 12.56 million. Moreover, the overall penetration of 18.23 telephones per hundred inhabitants at the end of March 2007 does not reveal the huge gap between the urban and rural penetration rates of 47 and 6 telephones per hundred inhabitants, respectively.

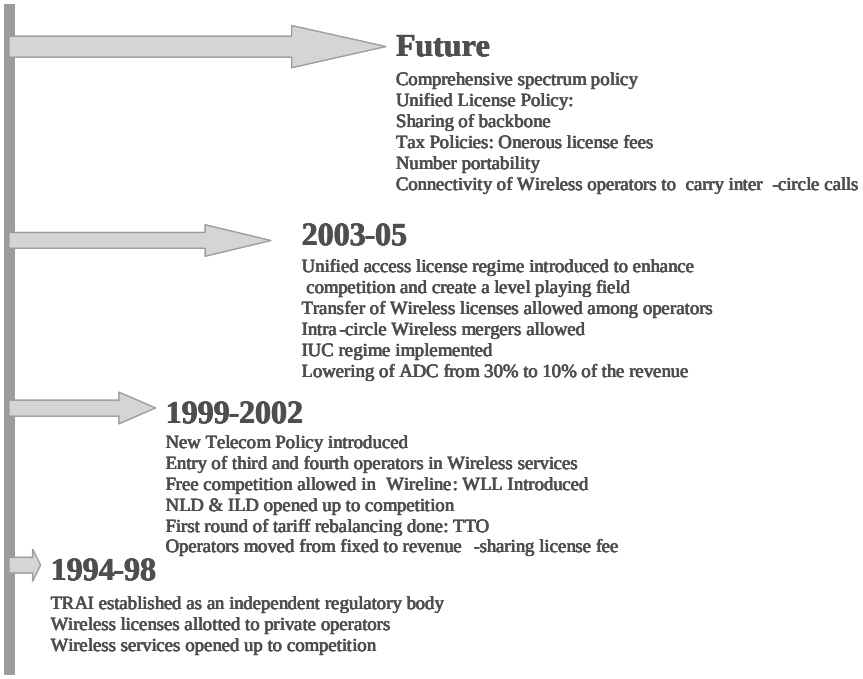
Most of the rural DELs installed by Bharat Sanchar Nigam Limited (BSNL), the public sector incumbent, have been funded by the government through license fee relief. Other licensees did have contractual obligations for the installation of DELs and a certain number of public phones in the villages. However, not a single operator has met its commitment. As against their commitment of establishing public phones in about 98,000 villages; they have in fact covered only about 12,000 villages. They

opted instead to pay the penalty amount of INR 530 million[ii] (USD11.8 million) as specified in their contracts.

As in many developing countries, telecom growth in India has been fuelled by wireless growth. The subscriber base of 165.11 million wireless service users (as on March 31, 2007) has far outstripped the subscriber base of 40.75 million fixed service users. Only 33 .14 million of the total wireless subscribers are rural, accounting for only 20 percent of the total subscribers, but 70 percent of the total Indian population is rural. In the absence of empirical data on the percentage of all wireless subscribers that do not have fixed access (either at home or at work), higher subscriber base and hence the number of telephones per hundred inhabitants does not necessarily translate into higher access. There is no reliable data to ascertain the extent to which mobile networks are actually reaching the households that do not have any access to telecommunications or are simply expanding access opportunities to households that are already part of the network. It may not be wrong to conjecture that the early mobile network expansion mostly served the already connected.[iii]

While a conducive regulatory and policy environment can improve network expansion, it is recognized that rural telephony and extending telephony to the poor are subject to some forms of market failure. If the market fails on account of network externalities then there is a case to intervene in the market to serve these specific groups of people who have a low ability to pay. Provision of rural telephones and their maintenance may be expensive in many cases. The terrain is tough, demand and ability to pay is perceived to be low, consequently, the service has to be subsidized to some extent, though demand surveys are beginning to qualify this conclusion.

Figure 1: Regulatory and Policy Development of the Indian Telecom Sector



Source: Malik and de Silva, 2005

This paper reviews the current subsidy mechanism for expansion of rural telephony in India which is the Universal Service Obligation Fund (USOF), a non lapsable fund created through statute to finance network expansion in high-cost rural areas. Disbursements from this fund are made through competitive least-cost subsidies.

3.0 Literature on USO

There are several rationales for imposing universal service obligations. It is argued that electricity, water and telecommunications services are necessities and hence purely on equity grounds these services should be readily available to all. This argument can be supplemented with the idea that poor communications is one of the principal impediments in the path, not only of rapid economic growth, but also of development in its broader sense, including poverty alleviation. Under such circumstances USO can be seen as a special case of redistributive pricing. USO is a tool used by policymakers to redistribute these essential services through subsidized prices instead of using other redistributive fiscal measures such as taxation and direct transfers.

In that sense it is quite akin to policies of public provisioning of private goods or policies that use direct transfers to achieve redistributive goals. The basic rationale for these policies is that some essentially private goods like education, child and health care are too important on equity grounds to be left to market allocation alone. Markets will exclude people with low ability to pay, hence these services have to be provided either free of charge or at subsidized prices (Cremer, Gasmi, Grimaud and Laffont, 1998).

Second and perhaps more importantly, in addition to the equity objective, there may be significant positive network externalities associated with communication and an unregulated market would fail to incorporate these externalities leading to under coverage of the network. USO is then justified to correct for market failures. USO policies are, however, second-best solutions; in the absence of necessary information to implement more efficient policies like direct transfers policymakers opt for these policies.

Even if such market failures exist, however, government should intervene only when the expected benefits of doing so outweigh the potential costs. That is, government should try to correct a market failure only when the risks of 'government failure' are low. (Crandall, Hahn, Litan, and Wallsten, 2004). Moreover, it is possible that the operators will internalize these externalities and expand their network s*uo moto.*

Whether USO is justified on grounds of equity or efficiency, good subsidy design will ensure that subsidies are at the margin. It is, for instance, not necessary to subsidize the majority of infra-marginal customers that would join the network without any inducement. In this respect, targeted programs are much better than uniform subsidies. Moreover, USOs are blunt instruments, for instance in the Indian context, USOs are aimed at the rural customers and a USO to cover high-cost rural areas might benefit high-income rural consumers at the expense of low-income urban consumers.

Policymakers and regulators have to be careful with USOs since they tend to be used by market players to extract too many concessions. Ironically, the existence and scope of USO could also be an outcome of regulatory capture (Cremer, Gasmi, Grimaud and Laffont, 2001).

There can be situations where the incumbent operator may pressure the policymaker to maintain a stringent USO as this may allow the incumbent operator, as the largest provider of universal service, to treat it as an instrument to seek privileges and as an anti-competitive tool. If the implementation of the USO leads to market inefficiencies the whole purpose is undermined.

The last point is important as recent research has shown that USOs have important strategic implications and affect the way firms compete against each other. The design of the USO and its financing mechanism may alter the very nature of competition in the sector. It can affect the viability of the existing operators as well as affect entry to the industry. Thus it is important that countries should distinguish clearly between universal availability and universal service guarantees. The former is promoted by encouraging investments and removing entry barriers. Only universal service should be explicitly linked to possible costing and financing requirements. The European Commission in its 1999 review recognized that universal service, and in particular universal service funds, are a real cost and a form of cross-subsidization, and therefore should not be used unless necessary. Other than France no other EU member state has an explicit universal service fund. The 1999 review mentioned the possibility of abolishing the authorization of universal service funds, or conversely establishing 'pay or play' schemes for universal service support. It also stated that the approach towards universal service should be technologically neutral, enabling any technology to be used to provide services. It is important to maintain incentives for competing networks and/or technologies to provide universal service (Hoernig and Valletti 2002).

Competition and universal service requirements based on cross-subsidies are contradictory. Under these circumstances universal-service policies gain new dimensions. First, they must be redefined to pursue the previous goals of guaranteeing a basic service in the new environment. Second, their design must explicitly address their impact on competition. One aim of the policy maker should be to devise policies that are 'competitively neutral', i.e., that do not influence competition and let the market determine the efficient allocation of services.

One of the commonly used methods of granting subventions is placing companies in competition through a system of reverse bids, allowing considerable savings to be made as the bidder requiring the lowest subvention is the winner. However, as this

paper shows this seemingly competitive mechanism of disbursement of the subsidy may unduly favour some operators and the auction can be design can be flawed.

In the light of the above discussion the universal service strategy then can be envisaged as focusing on two separate 'gaps', addressed with quite different mechanisms (Navas-Sabater, Dymond, and Juntunen, 2002):

- The market efficiency gap: is the difference between what markets actually achieve under current conditions, and what they can achieve if market barriers are removed. This gap can be bridged through effective competition, private provision of service, and market-oriented policies and regulations that create a level playing field for new entrants.
- The access gap – refers to the people and places which remain beyond the limits of the market unless additional investments are mobilized through intervention, in the form of subsidies to encourage service providers to enter.

3.1 Issues in the finance and disbursement of universal service funds

In the past, monopoly operators were expected to assume the costs of meeting a country's universal access objectives. These operators had to finance the delivery of essential telephone services in uneconomic regions through cross subsidies, which were transferred from profitable market segments (e.g., international, long-distance, business users, urban) to less profitable market segments (e.g., domestic, local, residential users, rural). Cross-subsidies were seldom successful even under monopoly in serving universal service objectives. Their continuation in newly competitive environments created serious problems. After reforms, most countries undertook tariff rebalancing, the main component of which was the elimination of the cross-subsidies to introduce competition in potentially competitive markets such as long distance. In the absence of traditional funding sources to finance their access objectives an increasing number of countries have turned to universal service funds to be administered in a competitively neutral and transparent manner.

Financing these funds causes distortions and regulators should try to minimize losses of allocative efficiency. The least distortionary way to finance the costs of universal service is from general taxation. The second best method, in the presence of budget constraints, is raising revenues through universal service taxes. The taxes are

recovered from within the sector. Ideally the tax should be raised from the broadest possible base, in order to minimize the impact of the financial burden falling on end-users. Universal service taxes of this kind are more transparent in comparison to access surcharges as the financing of universal service is clearly separated from the issues such as (marginal) cost of access, the financing of network's fixed costs, which may affect the determination of access charges (Hoernig and Valletti 2002).

The choice between funding from central budgets as opposed to universal-service tax also depends to a great extent on the efficiency of the tax system. Once introduced, these obligations become permanent because of the political difficulties in eliminating them; therefore, they should be small and funded out of general revenues — not through a tax on telecom services — to minimize the cost to the economy. However, tax-generated funds have competing claims and communications may not be a priority of the national governments.

There are large information asymmetries relating to the real costs and benefits of implementing rural public access telecommunications projects between the USF administrators and the telecom operators. Therefore, competitive bidding approaches have been used to determine the actual subsidy amount to be disbursed for each project. Competitive bidding has the advantage of reducing the total funding required to meet universal-access objectives. The actual winning bid amounts awarded in Latin American programs were generally well below the maximum subsidy amounts calculated by USF administrators. In Chile, over the 1995-1999 period, the average winning subsidy was about 50 percent of the maximum subsidy offered. Similarly, in Peru, in 1999-2000, the average winning subsidy has been about 25 percent of the maximum subsidy offered. In the first set of projects auctioned in Colombia in 2000 the average winning subsidy was 45 percent of the maximum subsidy offered.

One benefit of using auctions to assign USOs is that the regulator need not calculate net costing. It also provides a means of testing whether or not a net universal service cost of serving uneconomic areas exists. However, it may be difficult to have sufficient participants bidding against the incumbent (in many cases entrants would need to use alternative infrastructure or access to the incumbent's infrastructure assets), in particular if serving the areas is considered to be uneconomical (Hoernig

and Valletti 2002). In practice, only operators with the wherewithal and willingness to invest in costly infrastructure in the area in question are likely to participate in the auction.

A critical pre-condition of the success of auctions, that they should be genuinely competitive, may be violated in practice. Another problem may be the asymmetry of information between the incumbents and new entrants, for example, concerning the costs and benefits of serving specific groups of customers. Under such circumstances an important regulatory issue is whether or not the incumbent is under any obligation to lease its infrastructure to potential universal service providers. An important precondition for these auctions to be truly competitive is that the regulator should put in place effective access regime in place prior to the auctions. Even if it is legally and practically feasible to do so, it may still put the incumbent in an advantageous position when bidding against operators relying on transfer or lease of assets from their competitor (Cremer et al., 2001).

4.0 Universal Service Obligation in India

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. In many instances the policy maker, i.e., the DoT, has ignored or not fully incorporated the recommendations of the TRAI. For instance, the TRAI recommendations on broadband licensing and unified licensing have not been operationalized.

TRAI defines USO in the Indian context using the following three parameters:

- *Availability*: provision of telephone services whenever and wherever required even in remote and rural areas.
- *Accessibility*: Non-discriminatory tariff in the service area regardless of the geographic location. Non-discrimination in terms of service quality, price (imposing a uniform pricing constraint).

- *Affordability*: Telephone service to be priced so that it is affordable to most users.

Based on the recommendations, the Universal Service Support 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 thereunder. On January 9, 2004, the USOF was granted a statutory non-lapsable status with the passing of the Indian Telegraph (Amendment) Act, 2004.

Universal service/access funds can differ in their management. While some funds are administered by government ministries (e.g., Colombia), others are administered by regulators (e.g., Peru) or by special agencies (e.g., South Africa). The common perception is that funds administered by independent regulators and agencies are less likely to be influenced by government or political interests. In India, the USOF is administered as a separate administrative organization set up as an attached office of the DoT even though options of an Independent Authority/Regulator were considered for administering the fund. The universal service fund is based on an assumption that competition among private providers will not generate service in rural areas without subsidies.

The resources for meeting the USO are generated through a Universal Service Levy (USL), which is a percentage of the revenue earned by the operators under various licenses. The USL presently is 5 percent of the Adjusted Gross Revenue earned by all the operators except pure value added service providers like internet service providers, voice mail, e-mail etc. In addition to this, grants and loans from the Central Government from time to time may also be used to fund USOs. However, all transfers to the USOF, even of the funds raised through the USL, are through appropriation by Parliament.

Previously, the collections from USL went to the Consolidated Fund of India. Despite operators having contributed towards the fulfillment of the universal service obligations, network expansion was slow because the funds were not released. Giving

a statutory status to the USOF has expedited the disbursements, thereby effectuating the universal service policy.

However, there are still concerns that despite the high rate of revenue share towards the universal service fund and the huge amount of money lying unused in the USO Fund, India still has low telephone penetration. While the Government in India has set a USO Fund levy of 5 per cent of the operator's revenues, most other countries such as Venezuela, Peru, Brazil, Argentina and South Africa charge only one per cent of the annual revenues from the operators. High duties and regulatory charges in India combined with low tariffs meant low cash flows for operators, which are holding back expansion in rural areas.

By April 30 2007, INR 150 billion (almost USD 3.75 billion) had been contributed to the USOF. Table 1 documents the disbursement schedule till April 30, 2007. Only 33 percent of the amount collected has been expended and an additional INR 18 billion has been pledged for 2007-2008 (41 percent has been deployed or pledged). The USOF has been only partially successful in speedy implementation of projects from the date of its inception. TRAI has recommended a speedier disbursement of funds as USO disbursements and the ADC requirements are linked. With smooth and early disbursement of USO funds, the amount of ADC funding required will keep going down, because under the TRAI methodology the ADC funding requirement decreases as USO funding increases.

Ironically, India accounts for nearly 50 per cent of the money lying unused in various Universal Services Obligations funds across 15 developing countries. India has almost INR 100 billion (USD 2.5 billion) unused from its USF collections. In spite of this Communication and IT Minister, has rejected telecom industry's plea to reduce the collection for Universal Services Obligation fund. Telecom operators had urged the Ministry to reduce the USO levy from the current 5 per cent of their annual revenues to 2.5 per cent. This clearly shows that the government is not willing to reduce the impact of market distortions caused on account of the Universal Service thereby compromising the ability of the market and competitive forces to expand network to the rural areas.

Table 1: Disbursement Schedule for the USO funds in India

Year	**Amount Collected**	**Amount Allocated and Disbursed**
2002-2003	INR 16.53 billion (USD 367 million)	INR 3.00 billion (USD66 million)
2003-2004	INR 21.43 billion (USD 476 million)	INR 2.00 billion (USD million)
2004-2005	INR 34.58 billion (USD 768 million)	INR 13.14 billion (USD 266 million)
2005-2006	INR 35.33 billion (USD 785 million)	INR 17.67 billion (USD 392 million)
2006-07	INR 42.11 billion (USD 935 million)	INR 15 billion (USD 333 million)
Total	INR 150 billion (USD 3.3 billion)	INR 50.91 billion (USD 1.13 billion)
2005-2010	INR 375.41 billion* (USD 8 billion)	INR 179.36 billion (Almost USD 4 billion)
* estimated		

In order to disburse the collected funds, a least-cost subsidy auction mechanism has been adopted. The bidding process for the provision of rural household direct exchange lines (RDELs) in 1,685 net high cost specified short distance charging areas (SDCAs) is summarized in Appendix 3 The USOF Administrator has estimated that an additional 6.6 million rural DELs will be installed in these 1,685 SDCAs by the year 2007, which will be eligible for support from the USOF. As per the present agreement, the amount of support from USOF for the new rural DELs beyond March 31 2005 will be around INR 110 billion (USD 2.4 billion) for the period of commitment. An additional amount of around INR 26 billion (USD 577 million) is likely to be required for the additional DELs which were installed in these SDCAs from April 2002 to March 2005. Table 2 provides the results of the various USO projects.

Table 2: Status of various USO Projects in India

Project	Implementation Dates	Comments
Operation and Maintenance of VPTs in the revenue villages identified as per Census 1991. Approximately 520,000 villages	March, 2003	This includes support for 9,171 VPTs installed by the Six Private basic service operators (BSOs) and remaining 509,775 VPTs installed by BSNL. This provides coverage of more than 90 percent of the villages where VPTs. are to be provided. Firms participating in this auction bid exactly the benchmark.
Replacement of Multi Access Radio Relay (MARR) Technology VPTs installed before 1st April 2002. 180,000 MARR VPTs	September, 2003	Since the VPTs were mainly BSNL's, the subsidy went to BSNL with a zero cost reduction, bid exactly the benchmark
Provision of additional rural community phones (RCPs) in areas after achieving the target of one VPT in every revenue village (2nd VPT). 46,253 RCPs.	September 30, 2004	Out of 300 Secondary Switching Areas (SSAs), BSNL was the successful bidder in 184, Reliance Infocom won 97. Competition between two service providers in only 115 SSAs. The competitive bidding has resulted in bringing down the cost of the project by about 17 percent from the reserve price
Provision of VPTs in revenue villages as per Census 1991 without any public telephone facility. No. of villages covered: 66,822	November, 10, 2004	BSNL emerged successful for 12 service areas where six companies participated, BSNL had one-to-one competition with Bharti Cellular Ltd (BCL) in three service areas –Andhra Pradesh, Orissa and UP (West), comprising 6,221 VPTs, As a result of the competition in these three service areas, there was a reduction of 15-20 percent in the overall subsidy to be given for VPTs. in the nine service areas BSNL was the sole bidder. Hence, BSNL emerged the winner in all the Service Areas
Provision of RDELS in specified short distance charging areas	March 15, 2005	The project covers 274 SSAs, competitive bidding in 215 SSAs, BSNL emerged the most successful bidder winning in 171 SSAs across 19 States, Reliance Infocomm emerged the winner in 61 SSAs spread across 15 States while Tata Teleservices got the project in 42 SSAs across 9 States, competitive bids have brought down the

		cost of the project by 60-75 percent
Creation of passive infrastructure for mobile telephone service in specified rural and remote areas. Passive infrastructure so created shall be shared by three service providers selected by USOF administrator as per part B of the scheme.	Auctions held in March 2007	Multi layered bidding to get one successful bidder, Reliance Communications and Bharat Sanchar Nigam Ltd (BSNL) won a majority of the auctions. A majority of this infrastructure will be set up by BSNL, which won a total of 80% of the tenders, winning contracts to set up 6,125 mobile towers out of the total 7,871 passive cell sites envisaged by the Government.
Provision of mobile services in specified rural and remote areas by sharing the infrastructure created as per part A of the scheme. open only to licensed service providers	Auctions held in March 2007	Based on the operators' bids, the Government will get about US$ 23,000 a year. Most bids were for negative amounts. While the amount the government will receive may be insignificant, it is interesting that the Government was willing to give away up to US$ 187 million annually to the winning operators.

Source: Collated from economic press and interviews with USOF officials

In addition, rural DELs, which had been installed prior to 1 April 2002, are being supported by the USOF. The support is the difference in TRAI prescribed rental and the actual rental and is for the period since the ADC became effective. The amount of support from the USOF for projects other than rural DELs will be around INR 33 billion (USD 733 million) for the commitment period ranging from five years for Rural Community Phones (RCPs) and VPTs in uncovered villages to seven years for existing VPTs including Multi-Access Radio Relay (MARR) replacements. The present commitments end in 2010–2011. Besides the 6.6 million DELs in 1,685 SDCAs, additional rural DELs will be installed in the remaining SDCAs (which presently do not qualify for USOF support but will be eligible at the time of merger of ADC & USO regimes in 2008.

Thus, including the existing 13.6 million rural DELs, the sector may not even reach the targeted 4 rural telephones per hundred inhabitants by the year 2010, after providing a subsidy (including VPTs) of around INR 170 billion (USD 3.7 billion). In

fact, if all rural DELs installed after 31 March 2002 are to be provided USOF support so as to reach the above target by 2010, then the total support amount including support for VPTs, etc. will be around INR 250 billion (USD 5.5 billion).

5.0 Key issues in India's universal service program

5.1 Eligibility for support

An issue which requires attention in the Indian context is whether the USOF should support individual/private rural telephones or should support be restricted to payphones. The USO policy had identified the implementation of USO into two clearly identifiable streams:

- *Stream-I*: Provision of Public Telecom and Information services; and
- *Stream-II*: Provision of household telephones in identified Net High Cost Areas (rural/remote)

While universal service is a realistic policy objective in many industrialized countries, universal access is the more practical goal in most developing countries. Universal access policies seek to increase access to telecommunications services on a shared basis, such as at the community or village level. Universal-access programs typically promote the installation of public payphones or public call offices in rural or remote villages or low-income urban areas with the aim of providing a basic and initial connection to the public telecom network. The Indian universal service policy has gone beyond access and has incorporated some elements of universal service by taking on the onus of providing household telephones. Rakesh Mohan, a part-time member of TRAI at the time, in a dissent, favored restricting USO to public telephones as he feared that private rural connections may go to well-off families, which did not deserve the subsidy. As discussed above, universal-service levies are distortionary as they tax current consumers. It also has strategic implications in that the overextending of the universal support is detrimental to competition and hampers market-based solutions to problems of network extension.

5.2 Setting the benchmark

The USF determined the benchmark for the least-cost subsidy by obtaining capital-costs data mostly from BSNL. They were the costs for bulk procurement of latest

technology-based equipment in purchases currently under finalization and in that sense were 'forward looking'. These costs were not linked to optimal network designs based on geocoded data specific to each service area but were based on the incumbent's norms of network design. This was quite different from what the regulator had recommended. TRAI had pointed out:

'To ensure that BSOs [basic service operators] do not over estimate the cost figures of providing an optimal VPT connection, the USF Administrator should quickly develop proxy cost model(s) to assess the most optimal cost of providing VPTs based on their location, technology employed, and distance from the nearest exchange'.

5.3 Scope of USO

According to the eligibility requirements for participation in the first round of auctions restricted only to fixed lines, operators were required to bid either for all the eligible SDCAs in a service area or for all the eligible SDCAs in one or more Secondary Switching Areas (SSAs) in the circles for which they held a license for running basic / cellular / unified access services. Thus, only those operators who had the infrastructure to carry the traffic to all the SDCAs in a given SSA could participate in auctions. This policy, consciously or inadvertently, stimulated entry by only large companies by mandating a circle-wide license. This impeded the entry of small and medium entrepreneurs who might have exploited available technologies to evolve creative solutions for rural connectivity. A superior alternative policy for enhancing telecom penetration in rural areas is a 'niche operator'[iv] license, which would be allocated to operators providing service only in rural areas. These operators would be allowed to connect to the nearest exchange of BSNL or of another existing BSO. They may be allowed to offer other communication services, such as cable television and Internet access.

Until recently only fixed wire line and wireless in local loop (fixed WLL) connections qualified for support from the USOF. Restricting the subsidy support to these technologies meant that bidding was not technology neutral.

Absent ex-ante competition (caused by a tight licensing regime), discovery of the appropriate subsidy amount through the auction may have been imperfect. The narrow technology-centric approach followed so far has not fully exploited the advantages of a well designed auction which would reveal carriers' valuations of the USO and determine the number of USO providers endogenously.

In most Latin American cases mandatory services were defined in a manner that allowed many different technologies to be used. Satellite, radio, cellular and wire line technologies, sometimes in combination, have been employed successfully to provide services.

Restricting participation in the auction to operators already present in the SSAs favored the incumbent that was omnipresent. This condition excluded many potential bidders and thereby attenuated competition for the market. The provision of the below-cost service by the incumbent, enabled by the subsidy, will discourage new firms from entering and preclude competition in the market. The Chilean model – which has become the blueprint for subsidy auctions –allowed existing as well as new operators, subject only to minimal legal requirements, to bid.

The importance of ensuring incentives for competing networks and/or technologies to provide universal service has been overlooked in the current framework. Wireless communications are extending the limits of the market place and reaching out into areas unserved by the fixed network, often at lower cost. The DoT till about recently had maintained that in order to extend the USOF support to cellular mobile services (both GSM and CDMA) the Indian Telegraph Act had to be amended[v]. Thus an ordinance was promulgated as an amendment to the Act to allow for the subsidy to go to mobile telephony in the rural areas. These delays basically meant a postponement of the benefits of wireless technology percolating to the rural areas.

The government until March 2007 was giving USOF support to only fixed line operators that offer services in rural areas. Over-specification in law is inadvisable in a rapidly evolving technology environment. Although this correction has been proposed, the previous auctions have yielded large rents for the incumbent.

In an industry characterized by rapid technological change and innovation, economic analysis of a problem should not focus too narrowly or exclusively on the best use of society's resources from the standpoint of today's technology and resource availability, i.e., static economic efficiency, but should be viewed from a dynamic perspective. The government should, at the most, set basic minimum standards of service that any claimant of the fund should meet.

The arguments which defend this sequential approach to USOF disbursement are that the private operators by and large had reneged from their rollout obligations by paying the contractual indemnities. Only five basic operators were functional in mid 2002. They were not yet equipped to take up a scheme of this dimension covering the whole country as it would have tied up too much of their resources. Even though the private operators had built some backbone facilities their networks were not as widespread as that of the incumbent. Funds had started accruing in the USOF; if they remained unspent, there would be understandable criticism of the whole scheme. The target to connect every village in the country had already been pushed back several times from 1999 to March 2002 and the politically acceptable revision of the target could not go beyond March 2003.

So here was a stark choice between waiting for the market to mature, so as to discover the prices through competition and going ahead with the current USO scheme, howsoever imperfect it was, so that the population in the most backward regions (equivalent of the entire population of the US) would have one slender link of connectivity to the outside world. This haphazard implementation of the USO policy did not lead to greater connectivity other than transferring the funds to the incumbent and delaying the rural connectivity.

Department of Telecommunications (DoT) has recently initiated a process to promote the growth of Telecommunication Services, especially in rural and remote areas using USO fund support to create passive infrastructure for mobile services. The proposed project of USO fund administrator envisages covering only those rural and remote areas where fixed wireless and mobile services are not being provided currently.

The scheme is proposed to be implemented in two concomitant parts – Part A sharable component and part B non-sharable components. Part A relates to setting up of passive infrastructure sites comprising of land, tower, Power connection, power

backup and associated civil and electrical works. Part B relates to provisioning of mobile services by access service providers by installation of BTS equipment with associated antenna and backhaul. While initially the infrastructure created will be used primarily for voice telephony, the same infrastructure can also be used subsequently to provide broadband services.

One of the bidders for part A (Short listed Infrastructure provider category I or Service provider) seeking least subsidy shall be selected per cluster basis to set up the passive infrastructure. The subsidy sought shall be provided for five years from USOF. After five years no subsidy will be provided by USO fund. Service providers using the infrastructure shall pay rental to the infrastructure provider. For this purpose the passive infrastructure provider before end of five years, shall execute commercial agreements with selected service providers (limited to three) for sharing of the site on mutual basis starting from sixth year onward.

TRAI has already expressed its apprehensions about he success of this USO design too. Ironically the authority has raised concern about this scheme on the grounds of it being anti-competitive:

"*Restricting the number of service providers to a maximum of three under USO scheme for subsidy for infrastructure sharing in rural areas is anti-competitive and therefore discriminatory."*(TRAI 2007)

According to TRAI's most recent observations on the USO, the successful bidder in the tender for passive infrastructure has full control over the implementation of the scheme. If the works are not executed in a prescribed duration the entire scheme could be delayed. The tender process for part 'A' i.e., shareable passive infrastructure and part 'B' i.e., non-sharable components (mainly active) have been structured separately. This could lead to a coordination problem both in terms of timing and activation of the facility particularly where detailed modalities for sharing of the towers with telecom service providers is an open ended agenda depending on negotiated terms and conditions of sharing

Moreover, even if USOF scheme shall get implemented as per schedule and mobile services are rolled out in rural and far flung villages as per the envisaged plan by three selected service providers, it will be asymmetric treatment for the remaining/left-out service providers (who are not the beneficiary of USOF support) to provide

competitive services in those areas considering that they have to develop their own passive infrastructure.

Stakeholders have raised the issue of non level playing field as one set of service providers will get almost free passive infrastructure for five years with USOF support and other set of service providers will require huge expenditure to set up and maintain passive infrastructure without any financial support.

Thus TRAI recommends that financial incentive in some form will also be required by all service providers not beneficiary of USOF support to set up passive infrastructure. This will ensure fair play, generate competition and discourage any form of cartelization. This will also be effective to counter any move to delay roll out of mobile services in these identified areas either by manipulative tactics or procedural delays in creation of passive infrastructure using USOF support. Maintaining level playing field is necessary for creation of passive infrastructure to develop robust structure in rural areas. Hence financial incentives are necessary to service providers not beneficiary of USO Fund support.

TRAI further notes that a major hurdle faced by the service providers in expanding their network in rural and remote areas is absence of backhaul connectivity. Setting up of backhaul connectivity from the towers (BTSs) to the BSCs apart from being a time consuming process is a high cost exercise, as the returns on the capital are initially quite low. The proposed scheme of USOF Administrator has taken into consideration only part of the backhaul (as per the information available from USOF, only a single wireless hop is being considered in the proposed scheme). Since the cost of installing backbone infrastructure in semi-urban and rural areas for a service provider can be substantial, this may act as a deterrent to the service providers to go into remote rural areas.

Currently, there are around 30,000 rural exchanges in the country and most of these exchanges are connected through optical fibre cable. Being used for connecting the rural exchanges, it can be safely presumed that this fibre is heavily underutilized and by investing some incremental amount this national resource can be gainfully used for providing the backhaul connectivity from the BTSs to BSCs in the proposed scheme. This, apart from being cost effective measure will also save unnecessary duplication of infrastructure by the service providers. The service provider owning the optical

fibre (in most of the cases, it is BSNL) can be provided an incentive to lease the fibre and also to charge a discounted price from the service providers seeking the connectivity. The expenditure incurred on providing this incentive to the optical fibre owner can be funded from the USOF.

5.4 Issues related to Infrastructure Sharing

The commercial, legal and regulatory implications of the fact that the incumbent had a massive network already in place were not taken into account while designing and implementing the auctions. TRAI in its recommendations on rural telephony as well on infrastructure sharing acknowledged the existence of a widespread fiber-optic network within the country, amounting to 670,000 route kilometers. However, the critical questions are whether the geographical coverage is adequate, whether all of this fiber is lit and in use, and whether there is an effective, non-discriminatory and cost-based access regime for the use of this capacity by all operators, especially the new entrants. In contradiction to this, the eligibility requirements for participating in the auction specified that the sole responsibility to set up infrastructure for providing rural household DELs in the identified SDCAs was solely that of the bidders.

Unless such a regime is in place, it is extremely difficult for operators without large subscriber bases in the rural areas to enter those markets in a cost-effective way. Indeed, if such an access regime does not exist, it may even be possible to conclude that it constitutes an anticompetitive barrier in the rural markets. Unless the fiber is actually used, this merely amounts to vanity investments by the incumbent (LIRNEasia, 2004).

As mentioned earlier, TRAI also notes that BSNL already has 30,000 exchanges, which are connected by fiber. This implies that an average of 4-5 exchanges per block[vi] is connected by fiber. In addition, private operators like Tata, Reliance and Bharti have laid their own new networks. Leased-line providers like Railways, Power-Grid and GAIL have also laid large optic fiber networks. Most of this capacity has not been lit. It is evident that by using the existing infrastructure, it would be possible to connect the entire country without sizeable incremental investment. Lighting a fiber optical network is only 20 percent of the costs of laying down the

network. For extending backhaul to each village, wireless connectivity including Wi-Fi/WiMAX or, in some cases, just tapping existing fiber could be considered.

Thus there are enough existing resources in India to launch wide-spread major internet, broadband, telephone connectivity and e-Governance projects. However, this has to be done in the most economically viable and efficient manner. It is essential under these circumstances to have regulatory certainty on how the incumbent will be asked to share its infrastructure and the efficient way of doing the same. This is very important, as there are significant costs to consumer welfare that a subsidy-laden universal service program can cause.[vii]

The auction would have led to minimal distortions in the market only if all the bidders had non-discriminatory open access to the essential facility, i.e., the backhaul infrastructure. This kind of access regime is a precondition for the existence of competitive markets across infrastructure sectors, including telecom. However, BSNL was the only operator with infrastructure in place; it foreclosed fair participation by refusing to lease out its infrastructure on cost-oriented and non-discriminatory terms. Not surprisingly, the incumbent won 75 percent of the auctions.

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. However, passive infrastructure sharing will allow operators to defer their tower-related capex investments into opex lease rental payments over an extended period of time. Not surprisingly, therefore the for the services part of the project, cellular operators have quoted zero amount which means they are willing to offer their services without any subsidy support from the Government. TRAI is apprehensive about the sharing arrangements and the crux of their argument is that passive infrastructure creation and sharing should be incentivised and not be restricted only to a few players in the industry.

Issues of infrastructure sharing do not lend themselves to 'cookie cutter' solutions and the regulator indeed has to tread carefully in these matters. Many tradeoffs are involved and the final solution has to keep in mind the incentive structure that

regulation will produce. Our view is that it all depends on the details and on the presence of alternative infrastructures (e.g., cable). In the US mandatory unbundling did not work as they did 'too much', so entrants could just sit on the incumbent's network. The European perspective is that some unbundling is necessary; otherwise it will never be possible to create competition. However at some stage entrants must build their own facilities. This is sometimes referred to as the 'ladder of investments.'

Unbundling is the first step up the ladder. Unbundling should be one of the several tools within a pro-entry policy that will hopefully lead to facilities-based infrastructure competition (on either a wholesale or vertically integrated basis). Once this demand is realized and facilities based competition emerges, mandatory asymmetrical unbundling should, in theory, no longer be necessary.[viii]

Precaution should be taken that unbundling should not be used to create a static incumbent-centric perpetual resale model, where everybody purchases their primary input from a single monopoly provider. Unbundling can be viewed as a two-stage process. In the first stage unbundling should be used to stimulate new alternative non-incumbent demand. In the second stage new facilities-based entry should be encouraged to serve this demand.

However, a LIRNEasia study shows that in many areas, especially in rural and underserved areas, demand and supply are not in line with the threshold demand essential for cost-effective new facilities. In such scenarios, different forms of policy and regulatory intervention become necessary. The study points out that even for a well-endowed entrant like Reliance, the demand in unserved areas may not justify the roll out of backbone. The appropriate policy tool for an efficient universal service program is to divert scarce subsidy funding to the creation of the new infrastructure and create reasonable access policies.

5.5 Market 'Efficiency' Gaps

The sustainability of universal service rests on removing regulatory barriers to competition, which in turn depend on a liberal and a minimalist licensing regime. Constrictive licensing creates artificial scarcity and allows the licensor to enjoy

monopoly rents. The solution, as has been pointed out by TRAI, is to convert most of the licenses to authorizations. The entry of more firms is the sine qua non of the universal service. Though the regulator has tried to address some of the restrictive licensing issues in its recommendations to the DoT on unified licensing, the policy maker is yet to announce its decisions.

Attempts have to be made to alter the structure of the industry in such a way to make entry profitable, and therefore, viable competition more likely. One way to make entry profitable is to change the industry structure so that there is a stand-alone infrastructure company, which sells loop and other network services to all the service providers on a non-discriminatory basis in direct competition with the incumbent local exchange carrier. This will create incentives for the incumbent to divest its backbone from its access-services marketing functions voluntarily, because it will find it more efficient. It is not unreasonable to conceive an industry structure where a new entrant is not a service provider but a provider of infrastructure network elements and would therefore act as a competitive and ubiquitous alternative wholesale distribution company. This will create incentives for the incumbent to put its own infrastructure for third party use when under competitive pressure rather than under regulatory fiat (Naftel and Spiwak 2000).

Another important regulatory barrier to entry is the endogenous costs of doing business on account of the onerous burden of various license fees and taxes. Ironically, a large portion of the license fee goes to fund the universal service fund (See Appendix 3, Table A3.1). Substantial portions of the gross revenue of private operators go to the universal service fund. Not only do these huge contributions impose a significant dead-weight efficiency loss on consumer welfare, but act as a major entry deterrent, especially to small players. This discourages initiatives for rural telephony from local cooperatives and small businesses that reflect a locally based private/public demand pull model of network development.

6.0 Conclusions

The WTO reference paper on telecommunications states that:

'*Any member of the WTO has the right to define the kind of universal service obligation it wishes to maintain. Such obligations will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the member*.'

Unfortunately, Indian universal service policy has been biased toward the incumbent. Though the approach followed in selecting the universal service provider was a transparent multi-layered reverse bidding process. The reserve or benchmark price was calculated using the cost data of the incumbent and the least quoted subsidy bidder below the reserve price became the successful universal provider of a particular service area. The competitive bid process has led to a significant lowering of the benchmark subsidy rates, bringing it down to 65 to 70 percent in the case of RDELs. However, there have been concerns that in the absence of network competition the incumbent has leveraged its vertically integrated status even in a transparent disbursement mechanism.

The incumbent had an edge over its competitors as it had a large amount of backhaul network in place and it has been able to make entry by the new entrants into rural markets unviable even with subsidy. As noted in this paper rural connectivity could have been seen as on opportunity and not as an obligation, if not for this structurally imbalanced situation. If the essential facility had been shared for extending access, the viability concerns of the new entrants would have been limited to access network costs. In the current design, the new entrant has to factor in the costs of laying the backbone when deciding whether or not to enter rural markets. Infrastructure sharing was not mandated in the early years despite excess capacity in the backbone infrastructure.

This research suggests that in future the universal service policy should address access to the backhaul and other passive infrastructure in a open non-discriminatory fashion. The advantages are twofold:

(a) The costs of universal service will be lowered yielding greater coverage for the same costs; and

(b) Universal service will be competitively more neutral avoiding market abuse by the incumbent.

In such a scenario universal service costs will be largely driven by the cost of access technology.

Moreover, if the access technology is not predefined, various technological options to minimize costs can be chosen. For example, it is irrational to build a circuit-switched infrastructure in India when VoIP is cheaper by at least 70 percent. Given the multifunctionality of this technology the costs can be spread over diverse voice and data services.

It is therefore important that universal service is accompanied by regulation which imposes special obligations on the dominant operator and enforces compliance, which in turn will counterbalance its market power. The premise of this open-access approach is that optimal operations of IP networks dictate the separation of the transport layers (physical and logical) from the higher layers (applications and content) to create maximum growth through competition in all other layers. In order to make it possible for small-scale 'plug and play' operators to interconnect with much larger operators, open access provision is a very important regulatory intervention. Only then can local networks co-exist as infrastructure providers alongside more traditional operators. The regulator or the policymaker in India cannot ignore this logic and premise, if it is to address the problem of the digital divide effectively.

Second, certain other steps like lowering the tax burden on the operators can reduce the endogenous costs of telecom business and make rural entry a viable business opportunity. This measure will also encourage other small private-sector operators, with not so deep pockets, to provide innovative and cheap solutions for access as long as they have access to the state-owned incumbents already-developed trunk fiber. If the state is serious about diversifying network participation then it should see that narrow ministerial considerations do not impede such regulations. Once these regulatory design elements are in place, the private sector and competition will ensure availability of affordable service.

TRAI has made progressive recommendations by shifting subsidy provisioning away from VPTs and individual phones to infrastructure. The most important recommendation is that, once this infrastructure is created, then all new and existing infrastructures would be mandated to be shared on reasonable terms, with adequate incentives for sharing. This will ensure that no single operator as an owner of a large network can exploit its monopoly position. This proposed regulatory intervention is mandated by standard economic doctrine, which teaches us that sunk costs should be irrelevant for allocational decisions at the margin. After all, bygones are bygones. Moreover, there are no private property rights issues involved as BSNL is a public entity and its infrastructure essentially belongs to all citizens.

According to the TRAI recommendations the scope of the subsidy should be expanded to include 'niche' players and not merely the large licensed players. Thus, small and medium service providers may also participate in the rural telephony market. The assumption is that once the huge sunk cost component of the infrastructure is shared the market will take over and the urban telephony model can be replicated. This is a step in the right direction of making universal subsidy support more transparent and less distortionary. South Korea has achieved extraordinary results through public funding of backbone networks. Increasing realization that the lack of cheap long-haul capacity was stifling the provision of connectivity, especially by new entrants, led to understanding that creation and availability of backhaul access was the *sine qua non* of an efficient universal service policy.

References

Carlos Salazar, L. 2006. 'Competition Drives Growth: The Liberalised Telecommunications Sector in the Philippines,' *Regional Outlook Southeast Asia 2006-2007*. Singapore: Institute of South East Asian Studies.

Crandall, R. W., R.W. Hahn, R.E. Litan, and S. Wallsten, 2004. Bandwidth for the People. *Policy Review*, No. 127.

Cremer,H., F. Gasmi, A. Grimaud, and J-J Laffont, 1998. The Economics of Universal Service: Theory. The Economic Development Institute of the World Bank.

Cremer,H., F. Gasmi, A. Grimaud, and J-J Laffont, 2001. Universal Service: An Economic Perspective. *Annals of Public and Cooperative Economics*, 72:1.

Hoernig, Steffen H. and T.M. Valletti, 2002. The interplay between regulation and competition: The case of universal service obligations. *CESifo Working Paper*, No. 682 (9).

LIRNE*asia*, 2004. Response to TRAI's consultation paper on growth of telecom services in India. At: http://www.lirneasia.net/2004/12/rapid-response-trai-october-2004/

Ministry of Communications & Information Technology, Department of Telecommunications, Office of Administrator (USOF), 2004. Tender document for support from USO fund towards provision of rural household direct exchange lines. Available at *www.dot.nic.in*.

Navas-Sabater J, A. Dymond and N. Juntunen. 2002. Telecommunications & Information Services for the Poor: towards a strategy for universal access. The World Bank Discussion Paper, No.432. Available at *www.wds.worldbank.org*.

Samarajiva, R. 2006. Preconditions for effective deployment of wireless technologies for development in the Asia-Pacific, *Information Technology and International Development*, 3(2): 57-71. . http://www.mitpressjournals.org/doi/pdf/10.1162/itid.2007.3.2.57

TRAI. 2004. Growth of telecom services in rural India: The way forward. *TRAI Consultation Paper*, No. 11/2004. *Available at www.trai.gov.in*

TRAI. 2005. Recommendations on Spectrum related issues. *Available at www.trai.gov.in*

TRAI. 2007. Recommendations on Infrastructure Sharing. Available at *www.trai.gov.in*

[i] *Recommendations on Growth of Telecom services in rural India: The Way Forward*. Available at www.trai.gov.in.

[ii] USD 1 = INR 45 in March 2006, or INR 1 = USD .022.

[iii] But recent studies have shown that mobiles are going into households as a first and only phone according to research from Philippines and Sri Lanka. See for example Carlos-Salazar (2006) and Samarajiva (2006)

[iv] The concept has been introduced by TRAI, in its recommendations to the MC&IT on Unified licenses, January 13, 2005. Available at www.trai.gov.in.

[v] However, TRAI has made a submission to DoT that based on the WTO definition of basic services and in the presence of Unified Access Service License (UASL) providers the Telegraph Act need not be amended to include cellular service providers as recipients of universal service subsidy.

[vi] A 'block' is a sub-division of a district. In the Indian federal set up for administrative purposes the nation is composed of states and each State is divided into administrative sub-units: District then Block; a block is further subdivided into towns for urban areas and villages for rural areas.

[vii] TRAI has recently recommended that Universal Service Fund disbursements be used for building infrastructure. In addition, it has made a very progressive recommendation that all newly constructed and already existing infrastructure be shared on open and non-discriminatory terms.

[viii] From a transaction cost perspective a more efficient alternative would be to impose mandatory divestiture of the incumbent's loop plant from its marketing arm, rather than imposing stringent price, conduct and structural regulation on the incumbent for infrastructure sharing. This option may however be politically difficult.