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# India's Response to the Changing International Telecommunications Environment

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There are fundamental changes taking place in the international telecommunications environment. Most important is the technological revolution of "converged networks" brought about by the development of the internet. Simultaneously, most countries have adopted market liberalization in varying degrees and the General Agreement on Trade in Services (GATS) is opening up domestic markets to international competition. This paper by Sidharth Sinha discusses the implication of these changes for India and suggests that VSNL should be given complete autonomy, subject to regulation by the Telecom Regulatory Authority of India (TRAI), for determining the technology and tariffs for international telecommunication as well as negotiating settlement rates with foreign carriers and interconnection charges with the Department of Telecommunications (DoT).

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There are fundamental changes taking place in the international telecommunications environment. The driving force is, of course, technology. According to a recent *Business Week* article, "The newcomers are bringing the low-cost, high-tech converged networks of the computer industry into the lumbering world of telecom. In most cases, these companies are using what's shaping up to be the communications standard of the future: Internet Protocol (IP). The same standard used on the Internet, IP chops data into small bits so more pieces can zip along the network at the same time. This enables it to carry voice, data, fax, and even video traffic for as much as 50 per cent to 75 per cent less than traditional networks."<sup>1</sup> This heralds the replacement of the traditional "circuit switched" networks by the converged "packet switched" networks. This march of technology is proceeding in step with market liberalization in varying degrees in almost all countries. This has included privatizations; introduction of competition mainly in cellular and value added services and also in basic services; and regulatory reform with the appointment of independent regulators. Along with technology and market liberalization, the third important factor shaping the international telecommunications environment is the inclusion of basic telecommunications within the framework of the General Agreement on Trade in Services (GATS) on February 15, 1997 when 69 countries, accounting for approximately 92 per cent of the global telecommunications services market, reached an agreement to liberalize their markets. The World Trade Organization (WTO) agreement establishes a framework for multilateral trade, market opening, foreign investment, and competition.

The most direct and immediate impact of these developments is on international tele communications. The traditional international telecommunications system consists of sovereign international carriers interconnecting among each other for the purpose of exchanging international telecommunications traffic. Some are government departments while others may

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<sup>1</sup>*Business Week*, Asian edition, April 6, 1998, Special Report on Telecom.

be statutory bodies or even private companies. Bilateral or multilateral agreement between or among international operators, referred to as 'correspondents,' on the provisioning, operation, and maintenance of international facilities and services and their remuneration is facilitated by the broad framework of internationally agreed rules and guidelines developed by all countries under the auspices of the International Telecommunications Union (ITU). Under the usual arrangement, for every minute of a call, the originating carrier pays the terminating carrier the negotiated per minute settlement rate to compensate the latter for completing the call. Payments are made only on imbalance minutes of traffic. Traditionally, countries have been negotiating "accounting rates" and settlement rates are usually half the accounting rates.

Even though it has been generally accepted that the settlement rate has exceeded the cost of terminating traffic, the actual magnitude of the settlement rate was not of much concern so long as the traffic imbalance was not significant. However, during the mid-80s, significant traffic imbalances began to emerge, especially on the US routes. The US net settlement payments to the rest of the world have increased from US\$ 347 million in 1980 to close to US\$ 5 billion in 1995.<sup>2</sup> India is one of the leading recipients of the settlement payment by the US. During this period, net settlement payment by the US to India increased from US\$ 4.6 million to US\$ 203 million in 1995. Only China and Mexico had higher net settlement payments from the US in 1995. The problem of traffic imbalance has been exacerbated by the "call reversal" phenomenon in some of the developed countries due to increasing competition in these markets.

Given this situation, the US has been at the forefront of demands to reduce settlement rates. In November 1996, the Federal Communications Commission (FCC) issued an Order requiring US carriers to negotiate benchmark rates with foreign carriers which are significantly below current settlement rates.<sup>3</sup> This Order, and the authority of the FCC to take such a unilateral action, has been challenged by several foreign operators in US courts. Simultaneously, the ITU has been trying to arrive at a multilateral solution to the settlement rate problem, for example, during the Second World Telecommunication Policy Forum

<sup>2</sup>Trends in the US International Telecommunications Industry, Federal Communications Commission, USA, June 1997.

<sup>3</sup>In the Matter of International Settlement Rates, Report and Order, Federal Communications Commission, USA, Released August 18, 1997.

in March 1998. Developing countries, which happen to be the major recipients of settlement payments, concede that settlement rates are above cost but argue that these payments are critical for their network development — a form of international cross subsidy.

Along with the pressure on settlement rates, with the liberalization of the US and European telecom markets, some of the basic assumptions underlying the traditional correspondent relationships are becoming invalid. As operators are able to own and operate facilities in other countries, the need to rely on correspondents for terminating calls is likely to be reduced or eliminated. They may only need to interconnect with certain operators in a competitive market place. In the limit if the foreign operator has its own facilities all the way to the customer's premises at both ends, it may not even require to interconnect. Such arrangements, which are likely to become more common with international alliance of operators, will increasingly move traffic out of the traditional arrangements based on settlement rates.

This paper examines the implications of changes in the international telecommunications environment for India. Section 1 outlines the two major changes taking place in the international telecommunications environment — the WTO agreement on basic telecommunication services and the emergence of new modes of operation. The immediate implication of these changes is the pressure for settlement rate reforms as discussed in Section 2. Section 3 presents a framework for analysing the impact of changes in settlement rates. Section 4 gives the status of international telecommunications in India and Section 5 discusses the implications of the changing international telecommunications environment for India and for Videsh Sanchar Nigam Limited (VSNL) in particular. The paper concludes with suggestions for responding to the pressures for settlement rate reform and for strengthening the international competitiveness of VSNL.

## **Changes in the International Telecommunications Environment**

There are two fundamental and inter-related changes taking place in the international telecommunications environment. The first is the 1997 WTO Basic Telecommunications Agreement and the application of the basic GATS disciplines to the global telecommunication market through that Agreement. The second factor is the rapid introduction of new technologies and new modes of operation.

### **WTO Agreement on Basic Telecommunications<sup>4</sup>**

The Uruguay Round trade negotiations, which began in 1986 and ended in 1994, were the first to cover services in addition to goods. At their conclusion in April 1994, 125 countries signed the Final Acts of the Uruguay Round in Marrakech, establishing the WTO, to which the GATS is annexed. There are now 132 WTO members. The GATS covers trade in all commercial services and applies to all measures taken by a WTO member including laws, rules, procedures, administrative guidelines, regulations, decisions and actions, or in any other form, at all levels in a country's administrative structure. The GATS consists of the framework agreement (a basic set of 29 articles to which all signatories attest), its eight annexes (including the Telecommunications Annex), the 130 schedules of commitments and lists of exemptions assumed by members.

Of the 125 countries which signed the GATS in 1994, about half made specific commitments to open their markets for enhanced telecommunication services, but only a handful were prepared to allow entry into their basic telecommunication service markets, that is, the provision of voice telephone, telex, telegraph, data transmission, and private leased circuits. Because of this, it was decided to extend the negotiations in the specific area of basic telecommunications. The agreement reached on 15 February 1997 was significant because 69 countries made commitments to open their markets to competition and foreign investment in basic telecommunication services, some immediately on entry into force of the agreement on 5 February 1998, and others progressively over the next few years. These 69 countries collectively provide some 93 per cent, by value, of global telecommunication services. Three other countries made basic telecommunication commitments before the entry into force of the agreement, and others are planning to do so in the future.

The GATS, together with each country's schedule of commitments, specifies in considerable detail the regulatory framework that each WTO member country has to put into place, depending on its level of commitment. WTO members who made commitments in basic telecommunications will need to put in place the structures and procedures to allow new service suppliers to enter those segments of their telecommunication markets which they are committed to open on the date indicated in their commitments and under

the conditions indicated. In the specific field of international telecommunications, this may involve permitting foreign-owned telecommunication service suppliers to establish commercial presence for purposes of interconnection with the network of the major supplier at any technically feasible point. It may also involve permitting foreign telecommunications service suppliers to offer telecommunications services to customers located in the country without establishing an actual presence in the country, i.e., cross-border provision.

In summary, the WTO agreement will mean, for countries representing 93 per cent of global telecommunication revenues, the introduction of competition into a sector which has traditionally not been subject to multiple suppliers. It will also mean private sector entry (both domestic and foreign). What is certain is that this liberalization process will grow as more and more countries are encouraged to commit to opening their telecommunication service markets and as WTO members improve their market-opening commitments. It is significant that the number of countries making such commitments in the area of basic telecommunications increased from eight at the end of the Uruguay Round in 1994 to 48 in 1996, 69 in 1997, and 72 at the start of 1998.

In the negotiations leading to the WTO basic telecommunications agreement, it was specified that the system of international accounting rates and settlements, as defined in the International Telecommunication Regulations and expanded upon in the ITU-TD-Series Recommendations, would not give rise to dispute settlement action. This decision may be reviewed in future rounds of GATS negotiations, the next of which is due to begin in the year 2000.

### **Emergence of Call-back and New Modes of Operation<sup>5</sup>**

One of the most significant developments in international telecommunications in recent years has been the emergence of "call-back" services. Call-back services are considered to be one of the factors contributing to the pattern of traffic flow and the resulting traffic imbalance. Call-back services are aimed at taking advantage of the difference in collection rates, the rates that customers pay their operators. In a call-back service, a call is placed from India to, say, the US call-back operator, signalling the operator to set up a call

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<sup>4</sup>This section is based on the Secretary General's Report to the Second World Telecommunication Policy Forum, International Telecommunication Union, Geneva, 16-18 March, 1998.

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This section is based on the Report of the Seventh Regulatory Colloquium on Transforming Economic Relationships in International Telecommunications, International Telecommunications Union, Geneva, 3-5 December, 1997.

in the reverse direction and connect the caller to the requested destination, either in the US or some other third country. For settlement purposes, such a call counts as an inbound call to India.

While call-back services are basically intended to arbitrage differences in "collection rates," they may also be the result of competition at one end and monopoly at the other end of a bilateral telecommunication relation. The power wielded by a monopoly carrier has required regulators in some competitive markets, eg, the US, to place limits on the competitive process in their own markets. This has been undertaken to prevent the monopolists from using dominant position to obtain special treatment from competitive carriers in other countries by playing one against the other, a process referred to as "whipsawing." Regulators have, therefore, required uniform accounting rates and proportionate return requirements.

Uniform accounting rates require competing carriers to negotiate the same accounting rate and settlement rate with a corresponding carrier in another market. Proportionate return requires that operators in competitive markets must receive traffic from monopoly carriers in the same proportion in which they send traffic to the monopoly carrier. Uniform accounting rates limit the ability of a competitor in a country to gain an advantage over its rivals. On the other hand, proportionate return provides an incentive for an operator in a competitive market to reduce collection charges in order to increase traffic growth and obtain return traffic from monopoly operators in foreign markets. It is even possible to envisage an operator in a competitive market making a loss on outgoing traffic if the margin on the increased incoming traffic exceeds this loss. If settlement rates were cost based, there would be no incentive to make a loss since the settlement rate would cover the costs of termination and a normal profit margin.

Call-back service operators allow competing operators to indirectly compete in monopoly markets. Operators essentially use call-back companies as retailers to collect customers in foreign countries, and channel their business indirectly to the operator. The incentive of return traffic through the proportionate return requirement induces operators to provide IDD services to call-back operators at cheap wholesale rates. This practice has probably been facilitated by the steadily declining cost of international transmission and the availability of significant unutilized capacity. According to ITU reports, the cost per minute of an international call over INTELSAT is probably less than 2 cents per minute and capacity utilization

of submarine fibre-optics cables was less than 20 per cent in 1994 and is projected to decrease in the near future with technological innovations.<sup>6</sup>

Unlike call-back services which only reverse the direction of traffic, there are new modes of operation emerging in international telecommunication which remove traffic from the settlement systems totally or partially. These modes of operation have also been referred to as "full circuit regime" since the foreign operators secure transmission all the way into the destination country, rather than only half-circuits as in the traditional correspondent arrangements. The new modes of operation are:

- ***International Simple Resale***

In this mode of operation, calls originate on the Public Switched Telephone Network (PSTN), move to the destination country via leased lines or similar bulk transmission arrangements, and then terminate in the destination country via the PSTN.

- ***Foreign Points of Presence (PoPs)tPoints of Inter connection (PoIs)***

In this case, a country A permits a foreign operator to extend its physical network infrastructure, including transmission links, to country A in order to terminate international calls. The locations where such interconnection takes place are known as PoPs or Pols. This arrangement is different from the traditional arrangement where the foreign operator owns only "half circuits" to a notional mid-point between the two countries. This mode of operation is also called "self termination." With the WTO agreements on basic telecommunications, PoPs and Pols are likely to become more widespread.

- ***Refile, Hubbing or Reorigination***

An operator takes his international traffic to a country where low charges apply for forwarding traffic to its ultimate destination in a third country. The traffic may get to the country where the refile occurs either via a conventional correspondent arrangement, via a leased line or via a foreign PoP. The purpose of refile is to arbitrage differences in settlement rates.

- ***International Alliance of Operators***

Operators decide to combine their activities in certain lines of business internationally in order to

<sup>6</sup> The Cost of International Telephone Calls," Chapter 2 in *Direction of Traffic 1996, ITU and Telegeography*, November 1996.

provide large multinational business customers end to end service. The alliance purchases and pools transmission capacity and builds a global network for transmitting data and, increasingly, voice services as well. The circuits may be interconnected at one or both ends to domestic networks via local PoPs. In this arrangement, the traditional settlement rate system is not followed.

- **Internet Telephony**

Recent technological developments, together with the beginnings of gateway arrangements allowing telephone calls to flow between the internet and the PSTN, make internet telephony a realistic possibility. Internet telephony is likely to operate outside the traditional settlement system.

The alternative modes of operation are likely to become more common with the WTO agreements on basic telecommunications. Both call-back and the new modes of operation have increased the pressure for reform of the traditional settlement rate system.

## **Initiatives for International Settlement Rate Reforms**

The increasing imbalance of traffic, especially from the US, and the resulting settlement payments has led to questions about the lack of cost orientation of settlement rates. The US which makes the largest net settlement payments has been in the forefront of demands to reduce settlement rates to cost-based levels. According to the FCC, to the extent that the settlement payments exceed actual costs, at least three-quarters of the net settlement payments is a subsidy to foreign carriers.

While there is general consensus that settlement rates are above cost, there is very little agreement among countries on the magnitude of these costs, especially for developing countries. In most developing countries, the incumbent operator is a government department or has been only recently corporatized and/or privatized. Most of them lack the accounting and information system necessary to provide the data for making meaningful cost estimates. This is, therefore, likely to remain a contentious issue.

### **ITU Recommendations**

The ITU recommends that "accounting rates for international telephone services should be cost-oriented and should take into account relevant cost trends."<sup>7</sup>

<sup>7</sup>ITU-T Recommendation D140: "Charging and Accounting in International Telecommunication Services: Accounting Principles for International Telephone Services."

It also provides certain guidelines for determining the cost of originating and terminating international traffic.

An international telephone call flows over various types of infrastructure. When an international call is made, it is generally routed over a subscriber's telephone line to a local exchange (the "local loop") and is then passed on to an "international gateway" for transmission to its destination. The gateway consists of international switching centres and their associated transmission and signalling equipment. Up to this point, the telephone call remains within the national network of the country from which the call was placed. The call is then routed over an "international link" — typically satellite or undersea cable, but perhaps terrestrial cable or radio (eg, microwave) for traffic to adjacent countries — to its destination. When the call reaches the destination country, the process is reversed: it goes from the international gateway to the local exchange and on to the telephone line of the person for whom it is intended. The call flows over three distinct types of infrastructure: the international transmission link, the international gateway, and the local loop. The costs of each of these components form the basis for the price of an international call.

### **FCC Order on Settlement Rates**

The FCC, as a part of its efforts to reduce settlement rates, issued a Report and Order on August 18, 1997 establishing "benchmarks that will govern the international settlement rates that US carriers may pay foreign carriers to terminate international traffic originating in the United States." The FCC Order is based on a study that calculates the "price<sup>1</sup> for the three network elements. Given the difficulty of obtaining reliable cost information, the FCC benchmark rates are based not on costs but on tariffs charged by the foreign operator.

The international transmission element of cost has been estimated on the basis of the rates charged by telephone administration for dedicated private line service. The monthly private line rates have been converted to a charge per minute by assuming that 120 equivalent voice grade circuits can be derived from a 2.048 Mbps half-channel and each voice grade circuit has a usage level of 8,000 minutes per month. Different number of voice grade channels are assumed for circuits with different bandwidth. In the case of India, for a 2.048 Mbps half channel, the monthly tariff is taken as \$77,328. With the above assumptions, the cost works out to  $\$77,328 / (120 * 8,000) = 8.1$  cents per minute approximately. The corresponding figure for other

countries ranges from 2.4 cents (United Kingdom) to 25.5 cents (Kenya) per minute.

For the international switching component, the study uses the rates used by Tariff Group for Europe and the Mediterranean Basin (TEUREM) countries for telephone settlements among them as given in Table 1. The rates are based on the level of digitization capability. The accounting rate share declines as the digitization capability rises to reflect the greater efficiency of digital equipment. The FCC study assumes that telephone administrations providing service in developing countries are more likely to have telecommunications networks that are less technologically advanced and, therefore, have lower levels of digital equipment than those in developed countries. Accordingly, TEUREM's highest accounting rate share for the international exchange component is used for the least developed countries; the lowest figure for the most developed countries; and the middle figure for all other countries. Since India falls in the low income category, a cost of 4.8 cents is used for the international exchange component.

**Table 1: International Switching Costs by Category of Development**

<i>Digitization Category</i>	<i>Rate Share (Cents)</i>	<i>FCC Category</i>
0-30%	4.8	Low Income (India)
31-60%	3.4	Lower and Upper Middle Income
61-100%	1.9	High Income

Source: FCC NPRM 96-484, Released December 19, 1996.

The manner in which the cost of the national extension component is estimated is illustrated in the report with an example of India.

India has a complicated tariff rate schedule for service within the country and international service from the US is more widely distributed throughout the country than is the case with Argentina. ... In addition, there are four international gateway switches that serve the entire country. This last factor means that, in order to estimate India's national extension TCP, it is necessary to locate each city calling code in relation to the nearest gateway switch. The seven mileage rate bands for domestic service in India are plotted around each international gateway switch and the appropriate city calling code is assigned to the proper rate band based on the distance from the nearest gateway switch. The percentage of tariff in each rate band

is determined by combining the appropriate city code and international gateway switch. International traffic from the US is grouped by the seven mileage rate bands with time-of-day weighted prices. The results range from 2 cents per minute to 78.9 cents per minute. Finally, the weighted average rates for each mileage band are weighted by the percentage of US traffic terminating in the rate band. The result is an estimated national extension TCP for India of 18.3 cents.

The three component rates are then added to arrive at the Tariffed Component Prices (TCP) for a country. Table 2 gives the figures for India.

**Table 2 : Tariffed Component Prices (TCP) for India**

<i>Component</i>	<i>Rate (US Cents)</i>
International Transmission	8.1
International Switching	4.8
National Extension	18.3
Total	31.2

Source: FCC NPRM 96-484, Released December 19, 1996.

According to the FCC, the TCP will enable carriers to recover more than their incremental cost of terminating international traffic. This is because some of the tariffs used in the calculations are retail rates and include costs such as marketing and commercial expenses, allowances for overhead expenses and uncollectible revenues which are not required for operating and maintaining the facilities used for international service. Moreover, the tariffs are also affected by inefficiencies, monopoly positions, and cross-subsidies. Many countries have rate structures that use high international or domestic long distance charges to offset below cost local service fees. For this reason, the FCC categorizes countries by their level of economic development and calculates the average TCP for each category. This average, rather than the country specific TCP, is the benchmark for each category. These rates are shown in Table 3. The alternative of using the same benchmark range for countries in a particular category is preferred because, "Using the average of the TCP for an economic development category ... mitigates the effect of carrier's inefficient pricing structure on our benchmark calculations by averaging the most inefficient rates with those that are less inefficient."

For each category of countries, the FCC has provided for a transition period for moving to the benchmark rates. The logic behind the transition periods is to enable foreign carriers to adjust to the

**Table 3: Proposed Upper Range of Benchmark Settlement Rates and Transition Periods**

<i>Group (GNP Per Capita)</i>	<i>Benchmark Rate (Cents per min.)</i>	<i>Transition Period</i>
Teledensity Less than 1	23 Cents	5 Years
Low Income (\$726 or Less)	23 Cents	4 Years
Lower-Middle Income (\$726-\$2,895)	19 Cents	3 Years
Upper Middle-Income (\$2,896-\$8,955)	19 Cents	2 Years
High Income (\$8,956 and above)	15 Cents	1 Year

Source: FCC Report and Order, August 18, 1997.

new settlement rates through elimination of cross-subsidies and rebalancing of rates and development of alternate sources of funding for network development. Since the difference between current settlement rates and the proposed benchmarks is greater for lower income countries, they would, therefore, require a longer transition period than higher income countries. For countries with teledensity less than 1, a longer transition period of five years has been provided.

Since India is classified as a low income country, the relevant benchmark settlement rate for India is 23 cents with a transition period of four years. India's current settlement rate with the US is 71 cents.

### Problems with the FCC Methodology

There are several problems with the FCC methodology. It is important to recognize that the FCC method is not a costing method, especially for the international transmission and the national extension components, since these are based on tariffs rather than costs. In the case of the international transmission components, the main problem is with respect to the assumptions regarding the number of voice grade circuits per half channel and the number of minutes of usage for each voice grade circuit. These assumptions are not based on actual usage or cost data but on US carrier experience. For the cost of international switching facilities, questions have been raised with respect to the use of European data in TEUREM charges for developing countries.

The cost of national extension is perhaps the major source of problem. In this case, the main problem is the subsidization of local rates by long distance and international rates. In most developing countries,

international traffic tends to be concentrated in a few large cities where the international gateways are also likely to be located. In these cases, the FCC methodology would end up using the local rates as national extension cost for a large portion of the traffic. This would tend to underestimate the national extension component of the cost. The problem is exacerbated in the case of those countries which do not have a per minute charge for local or national calls. In the list of FCC countries, this is the case with Kuwait, Barbados, and Hong Kong which, therefore, end up with a zero cost of national extension. A similar problem also arises in the case of those countries which have per minute charges for national long-distance but not for local calls.

There are problems in using the average TCP in each development category as the benchmark for all countries in that country. Even if costs may be related to the level of development, it is unlikely that tariffs, which form the basis of the FCC estimates, will have any definite relationship with levels of development. This is borne out by the fact that the variation in TCPs among countries in the same development category is as large as the variation across all countries. If TCPs were in fact related to the level of development, one would expect to observe lower variation among countries in the same category as compared to the variation across all countries. As noted by the ITU, "The explanation for differing costs lays more in the operational cost structure — staff expenses, depreciation schedules and accounting systems — rather than external factors such as income level or network size."<sup>8</sup>

### Impact of Changes in Settlement Rates

The impact of changes in settlement rates for a country can be measured at three levels:

- net settlement payments
- revenue from international service
- contribution from international services.

Each level represents a broader measure than the one preceding it. Revenue from international services includes net settlement payments as well as billings from international outgoing calls. Contribution from international services will be the revenue from international services less the cost of originating and terminating international traffic.

The total contribution of international traffic can be expressed in the following form:

<sup>8</sup> The Cost of International Telephone Calls," Chapter 2 in *Direction of Traffic 1996, ITU and Telegeographijn*, November 1996.

$$IM * (SR_i - CT) + OM * (CR - SR_o - Co)$$

where

IM = incoming minutes

OM = outgoing minutes

SR<sub>i</sub> = settlement rate for incoming traffic

SR<sub>o</sub> = settlement rate for outgoing traffic

CR = collection rate

CT = cost for terminating traffic

Co = cost for originating traffic

The first term is the contribution of incoming minutes after taking account of the cost of terminating incoming traffic. The second term is the contribution from outgoing minutes after subtracting both the settlement rate and the cost of originating outgoing traffic. The cost of origination may be more than the cost of termination because of marketing costs and costs of bad debt which are relevant for origination of outgoing traffic but not for termination of incoming traffic. Different settlement rates have been shown for incoming and outgoing traffic. So far they have been equal given the normal practice of a 50:50 division of accounting rates.

#### Direct Impact of Change in Settlement Rates

Assuming the 50:50 division of accounting rates and equal cost of origination and termination, the total contribution can be expressed as:

$$SR * (IM - OM) + (CR * OM) - C * (IM + OM)$$

where

SR = settlement rate

C = common cost of origination and termination

The first term is the net settlement receipt; the second term is the billing for outgoing traffic and the third term is the cost of originating and terminating traffic. Therefore, net settlement payment is only one component of the total contribution of international traffic. If none of the other variables changes as a result of the change in settlement rates, then there would be a 1:1 impact in absolute terms of the change in settlement rates on the contribution from international traffic. In practice, changes in settlement rates are likely to change some of the other variables as well.

Decrease in settlement rates is likely to lead to a decline in collection rates in foreign countries with a corresponding increase in incoming minutes (IM). The greater the degree of competition for international traffic in the foreign country, the more likely is it that decreases in settlement rates will be passed on as lower

collection rates. The greater the elasticity of demand for international traffic, the greater will be the increase in international traffic for a given decrease in collection rates. Of course, what is relevant is the profitability of terminating this international traffic and this will depend upon the extent to which the settlement rate exceeds the cost of terminating international traffic.

#### Asymmetric Settlement Rates

Another important factor is the division of the accounting rates. So far, countries have normally negotiated a 50:50 division of the accounting rate but the ITU does provide for unequal division.<sup>9</sup> Originally, the accounting rate was supposed to provide compensation for the full cost of an international call from origin to completion. The settlement rate splits the cost of a call in two, with a virtual point of interconnection approximately in the middle of the international circuit, hence the term, 'half circuit.' However, a point of interconnection in the middle of the international circuit does not necessarily imply that costs will be the same in the two countries. Even the FCC cost estimates for terminating traffic are different for different countries. Therefore, movement to cost based rates is likely to be accompanied by an unequal division of accounting rates.

This implies that the net settlement payments will no longer be

$$SR * (IM - OM)$$

but

$$SR_i * IM - SR_o * OM$$

If the settlement rate for incoming traffic is higher than that for outgoing traffic due to higher domestic costs, then there may be net settlement payments even if there is no traffic imbalance. Consider India's situation *vis-a-vis*, the US. With a net incoming traffic imbalance of 537 million minutes and an accounting rate of \$1.42 with equal division, the net settlement payment by the US to India is about \$381 million. Now suppose the accounting rate is reduced to \$1.00 but with a 2:1 India:US sharing. Assuming the traffic remains unchanged, the new net settlement payment will be \$375million, a marginal decrease.

#### Economics of Call-back

Some of the operators subject to call-back tend to have an ambiguous approach to call-back, even though it has been declared illegal officially, because of the extra settlement receipts that it generates by increasing the

<sup>9</sup> ITU-T Recommendation D150 : New System for Accounting in International Telephony.



imbalance of incoming minutes. However, this approach does not consider the contribution lost through the collection rate. At its simplest level, call-back can be seen as a mechanism which converts an outgoing minute to an incoming minute. This generates a net contribution from an incoming minute of (SRi - C) at the expense of lost contribution from an outgoing minute of (CR - SRo - C). Call-back is, therefore, not unambiguously beneficial for these countries. Of course, movement to cost based settlement rates will render call-back unambiguously undesirable by reducing the contribution from incoming minutes close to zero. This, in turn, increases the pressure to reduce collection rates so as to eliminate the arbitrage opportunity for call-back services.

### International Telecommunications in India

Videsh Sanchar Nigam Limited (VSNL) is India's international telecommunications service provider. The Government of India is the major shareholder, with 65 per cent of equity, and VSNL operates under the overall control of the Ministry of Communications. Recently, the company was granted the 'Navratna' status by the Government of India. This is intended to give the company substantial autonomy in decision making.

The company operates a network of earth stations, switches, submarine cable systems, and value added service nodes to provide a range of basic and value added services. VSNL's main gateway centres are located at Mumbai, New Delhi, Calcutta, and Chennai. The international telecommunications circuits are derived from communications satellite of Intelsat and Inmarsat and wide band submarine cable systems, eg, FLAG, SEA-ME-WE-2.

VSNL has a revenue sharing arrangement with the DoT which went into effect on April 1, 1997 and will remain effective until March 31, 2002. Under this arrangement, VSNL pays DoT a charge per minute equal to the "weighted average incoming settlement rate" minus Rs 10 on all incoming international calls,

and DoT in turn pays to VSNL a charge per minute equal to the "weighted average outgoing settlement rate" plus Rs 10 on all outgoing international calls. This arrangement is designed to result in average gross earnings to VSNL of Rs 10 per call minute in each financial year. In addition, VSNL is required to pay DoT an annual license fee of Rs 250,000 per commissioned circuit.

### Growing International Traffic Imbalance

During the period 1991-92 to 1997-98, starting from a position of balanced incoming-outgoing traffic, India has moved to a position of significant net incoming traffic. As shown in Table 4, the net imbalance has increased from 57 million minutes to 835 million minutes during this period. The share of outgoing traffic in the total traffic has declined steadily during the period from 44 per cent to 25 per cent pointing to a faster growth in incoming traffic compared to outgoing traffic.

**Table 4 : International Telephone Traffic to and from India**

<i>Million Minutes</i>	<i>1991-92</i>	<i>1994-95</i>	<i>1995-96</i>	<i>1996-97</i>	<i>1997-98</i>
Incoming	272	618	806	1000	1257
Outgoing	215	320	342	385	422
Total	487	938	1148	1385	1679
Difference	57	298	464	615	835
Outgoing/ Total (%)	44%	34%	34%	28%	25%

Source: VSNL GDR Offer Document and Annual Reports.

Of the net imbalance of 835 million minutes in 1997-98, the US alone accounts for 537 million minutes or 64 per cent of the total imbalance. Table 5 gives the major origin and destination of international traffic to and from India.

These four countries together account for approxi-

**Table 5 : Origin and Destination of International Traffic to and from India**

<i>Million Minutes</i>	<i>1996-97</i>			<i>2997-98</i>		
	<i>Incoming</i>	<i>Outgoing</i>	<i>Difference</i>	<i>Incoming</i>	<i>Outgoing</i>	<i>Difference</i>
USA	443	50	393	589	52	537
UAE	140	33	107	182	34	148
UK	75	38	37	72	36	36
Saudi Arabia	69	75	(6)	109	86	(23)

Source: VSNL.

mately 75 per cent of the total incoming and 50 per cent of the total outgoing traffic. Over the last 3 years, while the incoming traffic from the US has been increasing at an average rate of 40 per cent per year, outgoing traffic to the US has remained more or less constant at the current level. Given the relatively high collection rates in India, a significant proportion of the incoming traffic, especially from the US, is likely to be accounted for by call-back. According to an ITU estimate, the volume of call-turnaround traffic to India from the US was around 82 million minutes in 1995.<sup>10</sup> This constituted almost 30 per cent of the total outgoing traffic to the US.

### Declining Settlement Rates and Increasing Net Inflows

Under the existing arrangement for settling international calls, countries negotiate what is known as an accounting rate for international traffic. Half the accounting rate is the settlement rate. This is the rate applied to the traffic imbalance and payments made or received. The India-US accounting rates have been declining over the years from \$2.70 in 1985 to \$2.25 in 1990 and \$1.42 in 1998. The 1998 accounting rate implies a settlement rate of 71 cents.

The net incoming traffic has resulted in a net inflow from foreign carriers to the extent of Rs 15,329 million or approximately \$460 million in 1995-96 (Table 6).

**Table 6 : Settlement Receipts and Payments for India**

Rs Million	1993-94	1994-95	1995-96
Total Inflow	14,933	20,713	28,080
Average per Minute	Rs 32.68 \$1.04	Rs 33.52 \$1.07	Rs 34.84 \$1.04
Outflow	10,031	10,940	12,751
Average per Minute	Rs 34.71 \$1.11	Rs 34.19 \$1.09	Rs 37.28 \$1.12
Net Inflow	4,902	9,773	15,329

Source: VSNL.

Table 7 compares the net settlement inflows with the current account balance as well as the plan outlays in the telecom sector. The net settlement inflows constitute 5-7 per cent of the current account balance and less than 1.5 per cent of total exports. However, their contribution to the telecom plan outlay has almost doubled from 8 per cent to 17 per cent during the period 1993-96.

<sup>10</sup> Asia-Pacific Telecommunication Indicators: New Telecommunication Operators, June 1997, ITU, Geneva.

**Table 7 : Relative Magnitude of Net Settlement Receipts by India**

	1993-94	1994-95	1995-96
Net Settlement Inflow (Rs Million)	4,902	9,773	15,329
Net Settlement Inflow (US \$ Million)	156	312	458
% of Current Account Balance	6.5%	6.3%	5.1%
% of Exports	0.6%	1.2%	1.4%
% of Telecom Services Plan Outlay	8.3%	14.0%	16.6%

Source: Economic Survey and CMIE Survey on Infrastructure.

### Cost of International Telecommunications

The only cost elements for international telecommunications in India that can be estimated with some degree of accuracy are the costs of international transmission and international switching, the two functions of VSNL. Since VSNL is a separate entity, it is possible to work out an estimate of these costs using VSNL's published financial reports. It is not possible to work out the cost of the national extension with published financial information.

The cost to VSNL for international transmission and switching works out to approximately 20 cents per minute as shown in Table 8. The cost of capital has been assumed at 25 per cent on the total capital — equity plus debt — of VSNL. Not surprisingly, the cost to VSNL of Rs 6.50 is close to its net realization of Rs 10 per minute less the license fee to DoT. Of course, this is a rough estimate and a better estimate could be obtained with a closer examination of VSNL's costs. The FCC cost estimate for these two elements is about 13 cents.

### Implications for India and VSNL

Developments in the international telecommunication environment raise two major areas of concern for India. The first relates to the immediate problem of international settlement rates. The second is the longer term concern about the international competitiveness of VSNL.

### Reductions in Settlement Rates and Collection Rates

In recent months, there have been significant reductions in accounting rates in response to US pressures. According to the *VSNL Investor Update* of May 1998, accounting rates have been reduced from \$1.45 over

**Table 8: Cost Estimates for VSNL**

<i>Rs Million</i>	<i>1993-94</i>	<i>1994-95</i>	<i>1995-96</i>
<b>Rent</b>			
Land Lines	810	881	846
Satellite Channels	725	767	949
<b>Operating Costs</b>			
Depreciation	410	573	745
Staff Costs	300	384	470
Energy Costs	53	68	84
Maintenance, etc	392	392	840
Total	2690	3065	3934
<b>Cost of Capital</b>			
Equity Loans	3777	2250	1116
Total Capital	10967	11997	14062
Cost @25%	2742	2999	3516
Total Cost	5432	6064	7450
<b>Traffic</b>			
(Million Minutes)	746	938	1148
<b>Cost per Minute (Rs)</b>			
Rs/\$	7.28	6.47	6.49
Cost per Minute (\$)	31.33	31.36	33.43
	0.23	0.21	0.19

Source: Aggregate Cost Information from *VSNL Annual Report and GDR Offer Document*.

April to November 1997 to \$1.425 for December 97 to March 1998 and \$1.30 for the 12 months from April 1998. VSNL is also in the process of negotiating uniform accounting rates with all international carriers. Last year, the accounting rate was SDR 1.20 per minute (1 SDR = US\$ 1.34 ) which has been reduced by 10 per cent to SDR 1.08 per minute from April 1998. Most international carriers have agreed to this rate and VSNL is hopeful of extending it to all carriers. It is hoped that this will substantially reduce or even completely terminate the refile of calls from the US.

In contrast to the reduction in accounting rates, there has been no change in the "collection rates," i.e., the rates customers pay DoT in India for international calls since 1993, except for off-peak discounts introduced in 1995. The maximum rate to the US is Rs 84 per minute which at current exchange rates translates to US \$2. With an accounting rate of \$1.30, equivalent to a settlement rate of 65 US cents, call-back operators are likely to offer rates of 75-80 cents per minute resulting in a further increase in call-back traffic.

In the short run, VSNL does not stand to lose

from call-back traffic since it gets paid by the minute, irrespective of the direction of traffic. However, in the long run, both VSNL and, especially, DoT stand to lose out in the "competition for billing" in the "call origination" market.<sup>11</sup> On the other hand, lower collection rates can stimulate outgoing traffic. There is a possibility, therefore, of increasing the net contribution from outgoing international traffic depending upon the elasticity of demand. One piece of data relates to the reduction in ISD tariffs in June 1995 by an average of 20 per cent during off-peak hours. As can be seen from the data for outgoing minutes, the traffic elasticity to this differential tariff has been negligible. This may be because the decrease is limited to off-peak hours and in spite of the decrease, rates continue to be high.

The extent to which India can benefit from the increase in international traffic as a result of lower collection rates will depend upon the extent to which the domestic network can keep up with the increase in traffic. So far, inadequate capacity in the Indian long-distance transmission network has resulted in low call completion rates. This is measured by the answer-to-seizure ratio, i.e, the number of times a call is put through successfully as a percentage of the number of calls attempted. As shown in Table 9, during 1997-98, this was 53 per cent for outgoing calls but only 32 per cent for incoming calls.

**Table 9: Answer to Seizure Ratio for VSNL**

	<i>1995-96</i>	<i>1996-97</i>	<i>1997-98</i>
Outgoing Calls %	51	53	53
Incoming Calls %	30	37	32

Source: VSNL.

High collection rates will also increase the relative attractiveness of alternative modes of operations, especially internet telephony. According to the VSNL *Investor Update*, "We expect that, in five years time, the cost of an international internet telephone call will be similar to that of a normal international telephone call and it will then become a matter of preference and quality of service that decide which service customers will use." VSNL has suggested that it has plans to introduce internet telephony as early as possible.

This is discussed in "Asia Pacific Telecommunications Indicators 1997: New Telecommunication Operators," International Telecommunication Union, Geneva, 1997.

## **International Competitiveness of VSNL**

The second area of concern is the international competitiveness of VSNL. Even though India has only committed to review the subject of opening up of international service to competition in the year 2004, it is unlikely to be insulated from the rapid developments taking place in international telecommunications. There is, therefore, a need to strengthen the international competitiveness of VSNL. Currently, VSNL functions almost as an extension of DoT. It effectively only provides international switching and transmission services to the DoT for a fixed fee per minute. It has no independent decision making power with respect to settlement rates and collection rates are completely out of its preview. It, therefore, functions mainly as a technical rather than a commercial organization. Its performance is more the result of its monopoly position rather than inherent efficiency and customer responsiveness.

VSNL is making efforts to position itself for competition. A good case in point is the setting up of the regional hub. The regional hub project envisages setting up a sub-continental hub and terrestrial links for routing international telecom traffic from neighbouring countries through India. Initially, it was proposed that the joint venture would be allowed to set up a domestic long-distance network for carrying international traffic through it, though no such assurance was given to the bidders. Later, the Telecom Commission clarified that the traffic will have to be routed through the DoT network. As a result of this, two of the contenders dropped out leaving British Telecom (BT) as the sole candidate for the joint venture. The fact that BT remains the lone bidder is ironical since it had virtually finalized the deal about two years ago, before DoT realized that a project like this should not be decided without a bidding process.

During 1998, VSNL has also entered into alliances with Global One, Concert, and World Partners Association to offer global communication services to Indian companies. Global One, an alliance of international phone companies, is owned by Sprint Corporation, Deutsche Telekom, and France Telecom. Concert is a joint venture of BT and MCI. World Partners Association is owned by AT&T, KDD, Singapore Telecom, and AT&T-Unisource.

However, in the face of rapid technological and institutional developments in international telecommunications, VSNL does not appear to be well prepared to deal with the emerging environment. According to the offer document of the recent GDR issue, the company's information and reporting system is

inadequate for a company in a highly competitive and rapidly evolving business environment.

"Even though it is no longer 100 per cent government owned, it continues to be subject to various laws and government policies in respect to public sector enterprises and to follow procedures appropriate for a public sector entity. Consequently, the company's financial and management accounting and reporting systems are not as developed as those of certain comparable companies outside India. For example, the company's financial and traffic accounting systems are not sufficiently automated and are not internally integrated. While the company produces monthly management accounts and reports, these accounts and reports are prepared based on estimates of key data and are oriented to the reporting requirements of the Government of India, and consequently are of limited value to the company's management. These and other weaknesses in the company's financial and management accounting and reporting systems and procedures result in inaccurate accounting entries and in significant delays in preparing annual and semi-annual financial statements. In addition, the company's procedures for preparing budgets and appraising and monitoring capital expenditure projects historically have been less precise than those used by comparable private sector companies. The company believes that due to such weaknesses it has experienced in the past, it continues to experience difficulties in generating timely and accurate information in sufficient quantities to manage and control its business efficiently."

## **Conclusion**

The best way to respond to the changing international telecommunications environment would be to make VSNL entirely responsible for international traffic. Currently, VSNL has no involvement in the market for international traffic. It only provides the international switching and international transmission services to DoT for a fee. DoT decides on the collection rates as well as the settlement rates. Under the proposed arrangement, VSNL would be responsible for setting the collection rates and negotiating settlement rates. It would enter into interconnect agreements with DoT, MTNL or private basic operators for the national extension component. Such interconnect agreements would include a component for universal service obligations of the basic domestic operator. Both the collection rate and the interconnect rates would be subject to regulation by the TRA1 depending upon

the status of competition in the respective markets. Such an arrangement would enable VSNL to take a more comprehensive view of the international telecommunication market and be more responsive to the rapid pace of developments in this market. This is also the arrangement most likely to prevail in case competition is introduced in the market for international traffic. The competing private operator is likely to ask for interconnection with DoT and would like to decide the collection rate and the settlement rate that it negotiates with foreign operators. This arrangement has several implications for DoT. The cross-

subsidy between international and domestic services would become more transparent and tariffs might have to be rebalanced.

Such rebalancing may not necessarily imply a reduction in total revenue from international traffic, especially if it leads to reduction in call-back traffic. However, India can capture a larger share of the total traffic only if the domestic network is also developed in tandem with development of international transmission and switching. An imbalanced network will only result in unutilized capacity.