

Seminários de Pesquisa Econômica I (2ª parte)

" INFRAESTRUTURA DE TELECOMUNICAÇÕES E DIFUSÃO DE TECNOLOGIAS DA INFORMAÇÃO NO BRASIL "

RENATA LÈBRE LA ROVERE

U F R J

LOCAL:	Fundação Getúlio Vargas Praia de Botafogo, 190 - 10º andar Auditório
DATA:	08/06/95 (5ª feira)
HORÁRIO:	16:00h

UPGRADING TELECOMMUNICATIONS INFRASTRUCTURE FOR FAST IT DIFFUSION: BRAZIL'S CHALLENGES

Renata Lèbre La Rovere
Instituto de Economia Industrial
Universidade Federal do Rio de Janeiro
Av. Pasteur 250, 22290 Rio de Janeiro, Brazil

Abstract

Brazil's erratic economic growth in the 80's has taken its toll on telecommunications infrastructure. Although investment in telecommunications infrastructure has recently recovered, quality of data and voice transmission is below user's expectations. Therefore, upgrading the Brazilian telecommunications infrastructure in order to meet increased demand from IT users requires new ways of interaction between the public and the private sector.

1. BRAZIL'S TELECOMMUNICATIONS SECTOR AND ITS CHALLENGES

Brazil's telecommunications sector today is controlled by the Telebrás system, created during the seventies. This system consists of a holding company, 26 state carriers and Embratel, a company in charge of interstate and international calls. Telebrás employs about 100.000 people and has an yearly turnover of US\$ 7.8 billion, and it has grown since its creation at medium yearly rates of 11 % (Wajnberg 1992).

- 1 The Telebrás system raised the telephone density rate (lines per 100 habitants) from 1.75 in 1962 to 5.9 in 1986 and 8.4 in 1993. The present rate is similar to those of Mexico (6.9 in 1990) and South Africa (9.3 in 1990). Public telephones have a significant rate (1.60), comparable to some developed countries. In spite of this increase, the way the carriers were created - acquisition of other companies - led to large discrepancies in the quality of services provided that still exist today. An index built by Telebrás, based on congestion of interstate lines, velocity to repair phones, quality of phone repairs and waiting time to complete a call shows a difference of 42% between the best and the worst carrier (Patury 1994). There are also large differences in each carrier operational results: in 1992, only 9 out of the 28 Telebrás' companies had profits and only one third had positive returns on sales. State telephone density rates reflect the differences existing between the poor North-east region and the richer regions (see table I). Telephone density rate in large cities like Rio de Janeiro and São Paulo is around 16.1, while for the Maranhão state it is 1.92. Finally, distribution of lines follows the concentrated pattern of revenue distribution. While 95% of homes with monthly revenue superior to US\$ 1.000 have a telephone, for poorer homes this ratio is only 15 %.

So, the first challenge Brazil faces concerning its telecommunication sector is: how to reduce discrepancies inside the system and increase overall quality?

Table I: Brazil's Telephone Density Rate (lines per 100 habitants)

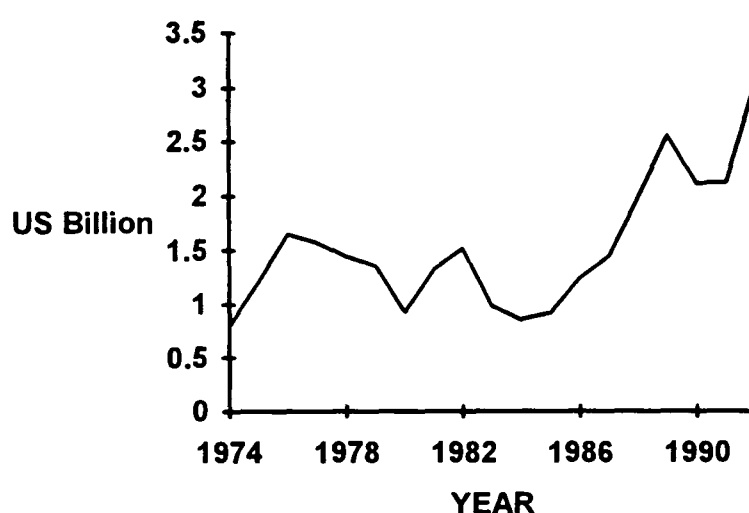
State	Telephone Density Rate
Distrito Federal (Brasília)	21.00
South-east	9.27
South	7.11
North	5.76
North-east	5.59

Source: Jornal do Brasil

Resources destined to the telecommunications sector began to fall after 1976, when Government gave priority to other strategic sectors. Telebrás' funding situation deteriorated further between 1982 and 1986, when tariffs were controlled to fight inflation, and taxes on state enterprises were raised (see graph I). As a result, while traffic grew 1512% between 1973 and 1992, Telebrás' revenues grew only 1080%.

After 1986, Telebrás managed to raise investment by increasing the share of own resources in investment, from 13% in 1974 to 64% in 1992 (Dieese 1994). This was possible because Telebrás charges a large fee for new users: instead of leasing the lines as in other countries, in Brazil users buy the lines, at a cost of 2.000 dollars. On the other hand, the telephone charge per month is among the lowest of the world. However, this does not mean that Brazilian users always pay less for monthly use, since Telebrás has a cross-subsidy practice that overcharges interstate and international calls in favor of local calls.

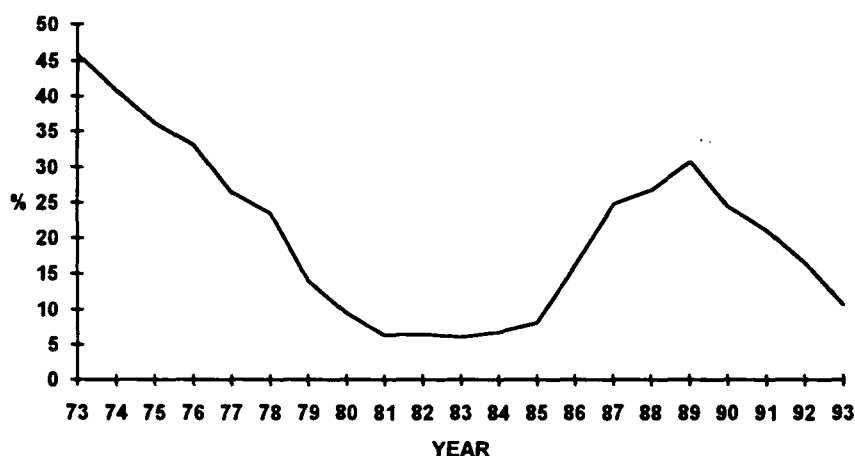
Graph I: Yearly Investment of Telebrás (US\$ Billion)



Source: Telebrás

The decline of investment between 1982 and 1986, coupled with a growing demand for telecommunications services, impaired the quality of lines (see graph II). In addition, the high cost of buying a line leaves Telebrás' revenues more sensitive to recession, since it is easier for the user not to buy a new line than reducing the use of telephone. Low monthly charges also leave Telebrás with 95% of monthly revenue dependent on use, while in other countries this ratio is 65%.

Graph II: Ratio of interstate calls not completed (%)



Ratio for developed countries: 6%

Source: Telebrás

Telebrás' capacity to keep up with demand is thus questionable. According to Wajnberg (1992), the present level of investment -- US\$ 3 billion per year -- is sufficient to provide 700.000 voice terminals per year. Since Brazil has already 11 million terminals and demand by the year 2000 is estimated to be 28 million, there will be a deficit of terminals in case investment continues in the present level. It is difficult to assess investment provision in telecommunications since technology is evolving fast and there are many choices involved. Embratel's technicians, for instance, argue that the present level of investment is sufficient if provision of telephones changes its aims. If the aim is to provide one line per home, present investment is insufficient. Instead, if the aim was to provide one line per building or per group of homes coupled with modern switching stations, investment would be sufficient.

Therefore, the second challenge Brazil's telecommunication sector faces is: how to keep up with the demand of services?

Finally, Brazil faces another challenge concerning regulation of telecommunication services. The Government created new laws whenever new individual services were created. In addition, the new Constitution of 1988 led to different interpretations concerning its telecommunications section. Consequently, the line that divides public from private services is not clearly defined at present.

As a result, private companies in Brazil today can provide only a limited range of telecommunication products and services, such as :

- switchboards for buildings
- maintenance of public lines
- paging systems
- engineering services
- satellite channels (only if authorized by Embratel)
- operation of data networks and satellite systems (with lines or channels leased from Embratel)
- value-added services (with lines leased from Embratel)

Therefore, the third challenge Brazil faces is: how to define public and private provision of services in a sector where regulation is not clear¹?

These challenges represent today a serious obstacle to IT diffusion, as will be shown in the next section.

2. TELECOMMUNICATIONS INFRASTRUCTURE AND IT DIFFUSION

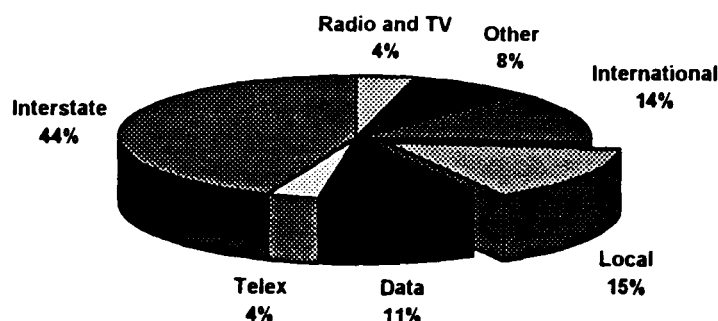
The technological convergence between telecommunications and informatics, on one side, and telecommunications and radio diffusion, on the other, has two main implications. The first is that telecommunications infrastructure is increasingly important for IT diffusion through data networks (WAN's and LAN's), which are growing at a fast rate in large firms (Bar 1990). The second is that the technological trajectory of information technologies has a growing range of possibilities, so the definition of a policy for IT diffusion is complex.

In Brazil the diffusion of data networks is also led by large firms of the services sector and the industrial sector (La Rovere 1994, Tauile and Fagundes 1994). The main users of telecommunication services are firms of the services sector, which have activities with high information content. Data transmission is already an important source of income to Telebrás (see graph III), and its importance is growing.

Although the use of radio diffusion techniques in provision of networks is possible and already adopted by some Brazilian private firms, deficiencies in the telecommunications infrastructure are regarded by firms as a serious hindrance. The obstacles to network diffusion also hamper diffusion of value-added services because firms tend increasingly to rely on few providers to attend all its informational needs.

¹ This is not due to absence of laws. Between 1988 and 1992 a total of 105 laws concerning telecommunications were created.

Graph III: Composition of Telebrás' Revenues



Source: Dieese

Besides, IT diffusion depend strongly on organizational culture, which in most Brazilian firms is poor due to the difficulties involved in setting up a network.

According to a recent research on obstacles to IT diffusion in Brazil (La Rovere 1994) the major obstacles identified by firms were:

- * inadequate telecommunications infrastructure
- * lack of resources for investment
- * high cost of transmission channels
- * high cost of equipment
- * inadequate technical assistance
- * lack of organizational culture

By "inadequate telecommunications infrastructure" users mean congested lines, which are common in urban centers, and the inefficiency that results from the division of attributions inside the Telebrás system. For instance, to set up a data network a firm has to deal with Embratel and the carriers of the states that will be covered by the network. Embratel claims that about 70% of the pending contracts in 1992 were in this situation because of local carriers. As a result, the waiting time for having a new service can be superior to 180 days. High cost of transmission lines results from the cross-subsidy policy mentioned above. Telebrás is at present reviewing this policy as large users of Embratel complain about its costs. High cost of equipment stems from producer concentration, while inadequate technical assistance is linked to deficiencies in technical training in Brazil.

Users try to overcome these obstacles by different ways according to size. Large users are more concerned with quality and velocity than with costs. These firms then go to satellite use and they set up private networks. Medium-sized firms appeal to network sharing. Small users have few options, and complain that they are discriminated by Embratel and the carriers. In effect, our research found that for these users the waiting time for access to services was greater. The private networks

used by large firms are based on different systems, so the capacity of these firms to interact with other large firms is limited. Thus, Brazilian firms tend to a fragmented model of data communications that will impair their competitiveness on the long run. On a time when most countries are discussing information highways, Brazilian firms seem to be building several secondary roads.

3. CONCLUSION: THE NEED OF A NEW INTERACTION BETWEEN STATE AND PRIVATE SECTOR

First, Brazil's challenges make the need for a revision of the Telecommunications Code and of the laws regulating the sector urgent. This revision should define the role of the State and of private companies in the telecommunications sector, so that the offer of telecommunications services could increase. However, while a clear division of roles can meet users' demands, it still does not provide a solution for financing the Telebrás system. De-regulation or privatization of the telecommunications sector is being considered by the recently elected President, in order to raise funds. This process would have to be strongly controlled to guarantee reduction of regional disparities and to meet social demands. Considering the composition of the newly elected Congress, such a control will be very difficult to undertake.

A reform of state companies in the telecommunications sector is also needed. State companies today are bound by employees' stability, restrict procurement practices and tariff policies that go against their efficiency. A competitive environment in the provision of advanced telecommunication services would force Telebrás' companies to be more aggressive in providing services to new users. Telebrás should also consider how to best meet basic needs as telephone lines by examining alternative ways provided by technological advances in the telecommunications sector.

Overall, the scenario for IT diffusion among Brazilian firms is one where each firm will look for its specific network solutions, thus reducing its own possibilities of collaboration with other firms. This scenario goes against the requirements of production flexibility and subcontracting implicit in the present industrial organization paradigm (Bar, Borrus and Coriat 1987). So, the second step for stimulating IT diffusion would be the definition of standards so that fragmentation of networks would be reduced.

Finally, the third step to stimulate IT diffusion is to enhance training inside firms, so that lack of organizational culture and poor technical assistance cease to be problems. The measures discussed above presuppose that Government is strongly committed to reform its telecommunications sector, which will not be the case if the political coalition that supported the election of the new Government prevails. Instead, this group favors privatization of the telecommunications sector and little State intervention. Therefore, upgrading the telecommunications infrastructure for fast IT diffusion is one of today's momentous challenges faced by Brazil.

REFERENCES

BAR, F., "Configuring the Telecommunications Infrastructure for the Computer Age: the Economics of Network Control", Berkeley Roundtable on the International Economy (BRIE) Working Paper 43, 1990

BAR, F., BORRUS, M., and CORIAT, B., "Information Networks and Competitive Advantages: The Issues for Government Policy and Corporate Strategy", Final Report of the OECD-BRIE Telecommunications User Group Project, Seminar Information Networks and Business Strategies, Paris, 19 e 20 de Outubro de 1989

DEPARTAMENTO DE ESTUDOS INTER-SINDICAIS (DIEESE) "Monopólio das Telecomunicações", Rio de Janeiro, 1994

LA ROVERE, R.L. "Tecnologias da Informação no Brasil: o Caso do Setor de Serviços", Research Report to Conselho Nacional de Pesquisas (CNPq), 1994

PATURY, F., "Congresso deverá Mudar Telecomunicações", Jornal do Brasil, January 16, 1994

TAUILE, J. e FAGUNDES, J. "*Telecomunicações e Competitividade Industrial*" In TIGRE, P. et alli. Telecomunicações: Mudança Tecnológica e suas Implicações Econômicas, Sociais e Institucionais. Relatório Final da Pesquisa IEI/Embratel. Novembro de 1994, mimeo.

WAJNBERG, S., "Acesso ao Mercado, Barreiras e Expectativas: o Caso do Brasil" Private communication, Ministério das Comunicações, 1992



N.Cham. P/EPGE SPE L332i

Autor: La Rovere, Renata Lebre.

Título: Infraestrutura de telecomunicações e difusão de



086356

50122

FGV - BMHS

Nº Pat.:F3526/98

000086356

