Brazil: Internet Development for Whom?

"Nowadays telecommunications are, doubtless, the most attractive and profitable business for private international investors. Telecommunications are coming to be the key factor of economic expansion, which is being transformed into the so called third industrial revolution. Certainly there are many investors interested in increasing such activity worldwide, and particularly in Brazil due its potential and dimensions...Information technology has become the fundamental factor for economic growth and social development. It means that the relative restraint in our country will necessarily be surpassed in order to boost the development process. It is not only a means to expand existing services because of questions of justice and equality. We need to invest heavily in communications to build a strong infrastructure, which is essential to generate wealth for investment in the social area."

President Fernando Henrique Cardoso's telecommunications program

Brazil:

(CDI)

Final Presentation

Interesting Links

Send us a message

Last modified Dec.6, 1999

Return to Home Page

Who We Are

Internet Adoption Process

Labor Markets

Education

Nature and Opportunity of Access

Telecommunications Infrastructure

Presentation I

Government Policies and their Effects

Financing and the Private Sector

Presentation II

Case study: Universo Online (UOL)

Case study: The Committee to Democratize Information Technology

Brazil: Internet Development for Whom?

Who We Are

As part of a Stanford University class, The Internet Revolution in Latin America, we four students came together to undertake the analysis of the state of the Internet development in Brazil. The goal of the class was to assess the potential of and barriers to further Internet growth in the Latin America region. While we focused our efforts on Brazil, the other groups in the class have compiled together an impressive amount of research and analysis on other Latin American countries.

Our research led us to our final conclusion on the current status of the Internet adoption process in Brazil. In reaching our conclusion, we analyzed the contributorary factors of the labor market and education situation along with the nature and opportunity of computer/Internet access and the telecommunications infrastructure. We then examined the effects of government policies and sources of financing in our second leg of research. To apply our research in practical business cases, we looked at the development and current status of a commercial enterprise Universo Online and a non-profit organization The Committe to Democratize Information Technology. The summary of each leg of research are found in the presentations (unfortunately, due to the practices of Microsoft, presentationII and the final presentation seem to only work in IE Explorer).

Thad Dunning *a Latin American studies masters student*

Christian Gebara *a Graduate School of Business student*

Karen Han *a computer science major*

Antonio Varas *a Graduate School of Business student*

(CDI)

Final Presentation

Interesting Links

Send us a message

Last modified Dec.6, 1999

Return to Home Page

Who We Are

Internet Adoption Process

Labor Markets

Education

Nature and Opportunity of Access

Telecommunications Infrastructure

Presentation I

Government Policies and their Effects

Financing and the Private Sector

Presentation II

Case study: Universo Online (UOL)

Case study: The Committee to Democratize Information Technology

Brazil: Internet Development for Whom?

The Nature of the Internet Adoption Process in Brazil

The purpose of this website is to analyze the adoption process of the Internet as the main force driving the transition towards the Information Society in Brazil. In these paper we first present a general discussion of the adoption process of a technology which, like the Internet, presents strong network externalities. Then we discuss how this framework applies to the nature of the adoption process in Brazil. Frequent references are made to other sections of our website, which provide extensive research on specific aspects. Finally, we present the implications that are derived from the current Brazilian adoption model and the alternatives potentially available to extend the adoption of the Internet beyond the point that will be reached should Brazil rely on the forces of the process itself.

While most sections in our website are mainly descriptive, this paper is fundamentally analytical, and was written at the end of our research project. Readers interested in facts only can safely skip this section.

1. The Technology Adoption Process in the Presence of Network Externalities

Network externalities (also referred by some scholars as demand-side economies of scale or network effects) associated to a technology or a product occur when the benefits to any user from the technology or the product is greater the more others there are using "related" technologies or products. Consumer preferences and thus the adoption process of technologies or products with this characteristic are very different from those associated with more "conventional" ones. While for many products or services a user is worse off if everyone else wants the same product of service (congestion, share with other consumers, competition for available supply), in technologies or products with network

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Final Presentation

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externalities the utility that the user extracts increases the more people use them.

There are many examples of network externalities. For example, language is perhaps the most paradigmatic illustration of the increasing utility associated with an increasing users base due to compatibility issues. Network effects is the other major source of network externalities. Within this category, perhaps the clearest is the case of a physical network, such as a telephone network or the Internet. The utility of the telephone is based on having other people to call, and its value increases enormously as the size of the network of telephone users grows. The Internet as a whole is a technology with even more rapidly increasing network externalities than most network structures in the past. If we assume that the main source of utility from the Internet is access to information (defined in very broad terms), each new web site, or the addition of information to an existing site, increases the value of the Internet to every existing user (again the definition of user comprising both individuals and corporations). But also since each user can access each web site, as the user base grows, so too does the value of content that is available. Thus the overall social value of the Internet is increasing both in the amount of content on it and the number of people who surf it. Moreover, it can be argued that the Internet user is a source of content in itself: e-mail is the killer application on the Web, user's comments and referral systems are a key part of many sites, virtual communities of every kind proliferate, and e-commerce can be viewed as the interaction between several users (corporations and/or individuals). Therefore we must conclude that the Internet is a technology with very strong associated network externalities. And this has dramatic implications for the adoption process, particularly in developing countries like Brazil.

In examining classic adoption pattern of a new technology with network externalities, the question is how many of the potential users will adopt the new technology. To answer this question, we start by looking at the intercept of the adoption curve with the y-axis: this represents the early adopters, those people who are willing to adopt the new technology even if no one else does. Thus everyone ought to expect that at least this number of people will adopt the technology, so using the 45º line we can transpose this initial number of adopters onto the x-axis. The fact that there are some people willing to adopt means that another set of potential adopters, less eager than the first, will now willing to adopt because the positive externality that they derive from the initial early adopters. That in turn increases again the expected number of total adoptions, which drives up again the number of people willing to adopt. This logic leads to the conclusion that the adoption process should reach at least point A in the figure above.

However, the logic stalls at point A. The potential users to the right of point A are only willing to adopt if they believe that an even greater number will adopt. This does not necessarily mean that the process will end at A: if the process somehow got to point B, all the users between A and B would be quite happy, since they could benefit from a higher utility derived from a larger user base. Moreover, if the process does get to point B, the prior logic that led to A would kick in again and take the adoption process to point C.

The problem then is the users between A and B, who are unwilling to adopt the technology themselves unless they believe that others who are less willing than they are will also adopt. They face a coordination problem, as if they could all somehow agree to adopt, they would all be happy to do it.

Expectations and momentum are the two key factors that can lead the process either to stay in A or to C. First, potential adopters all want to be doing what others are doing. So if everyone believes everyone will adopt, many people will in fact adopt and the outcome C will emerge. On the contrary, if people are pessimistic about the number of people who will adopt, the process will get stuck at A. The second consideration is that bandwagons may emerge. If the adoption of the technology gains momentum, adopters will gain confidence that the adoption will be widespread. As this realization dawns on the mass of potential adopters they abandon their fears and jump on the bandwagon. This in turn makes other even more confident, strengthening the bandwagon effect.

2. The Internet Adoption Process in Brazil

Once the fundamental concepts of the adoption of a technology with associated network externalities have been reviewed, we are now going to focus on examining how this conceptual framework can be applied to analyze the adoption process of the Internet in Brazil. We will make frequent references to some other sections of our work that can also be found in this website.

First, the early adoption phase in Brazil has been fostered by the intrinsic characteristics of the Internet and, to a certain extent, by the socioeconomic structure of the Brazilian society. In general terms, the Internet can be regarded as a global technology in scope. Like the telephone, the Internet facilitates exchange of information between users on a worldwide scale. On the institutional side, there were Research Centers located at some Brazilian Universities since as early as 1988. However, the mainstream adoption of the Internet by individual users started only in 1995. The Brazilian early adopters (i.e. those who installed its connections in 1995-1996, once the first commercial ISPs started to operate after the deregulation in 1995) did not find themselves

in a total vacuum from which very little utility could be extracted, but immediately gained access to a vast amount of content that was already there. Such content was almost exclusively in English, yet it was relevant to those users. In fact, foreign sites (predominantly US sites) accounted for 90% of the Brazilian Internet traffic in 1996. Those individual users belonged to the high class of the Brazilian society, a group that maintains frequent interaction with the US (college education, holidays in Disneyworld, Miami or New York) and thus the language barrier is less significant for them. In a way, these first Internet users in Brazil should not be regarded as "true early adopters", but in fact as late adopters when viewed from a global perspective. By the time these Brazilians discovered it, the Internet has already taken off in the US, so the associated network externalities could be generated and captured by those Brazilian users (for whom the English language did not represent a major obstacle).

As explained in the previous section, the presence of strong network externalities favored the adoption of the Internet on a more widespread basis. Some local services started to be provided as a response to the growing user base. Obviously, the first service in the Internet value chain is connectivity: the first private ISPs -Mandic (1995), Itanet (2/96)- were founded at this early stage by "early adopters" on the supply side. Such early suppliers, like Itanet's founder, Marcos de Moraes contemplated the explosion of the Internet in the US and pioneered the exploration of the emerging local market. Early suppliers brought in wider availability of connectivity and local service, in Portuguese. The use of a local language allowed the introduction of the Internet into a broader user base, which had the economic resources to afford the still high connection costs. New, stronger players with wider reach like Universo On Line (UOL), launched in 4/96, entered the ISP market. The following step was the provision of local content, which gave birth to the first local portals, news sites and some retailers. Local content attracted more users to the Internet.

The virtuous circle generated by the strong network externalities associated to the Internet has driven up the number of users from approximately 160,000 in 1995 to 2,700,000 in 1998, according to IDC. Our section on the current state of the Internet in Brazil provides a detailed overview of the nature of the adoption process over the period 1995-1999.

The question then should be: where does Brazil stand in the adoption curve? Brazil is the largest Internet market in Latin America, accounting for 45% of users and 60-90% of e-commerce revenues. Current evidence shows that Brazil seems to have already left behind the A point and is moving fast towards the C point. Brazil has already built the critical mass

that sparks the mainstream adoption process of the Internet:

- Number of users growing at a high, sustained rate (although penetration still remains low -2% of total population in 1999- In fact, only 11% of Internet users own both a computer and a fixed line at home):
  - According to IBOPE, there were 3.3 millions of users in June 1999, and IDC estimates 3.8 millions by the end of the year.
  - IDC forecasts 9.0 millions of users by the year 2003
  - 40% of users with unlimited access contracts, 49% connecting everyday
- International research firms rank Brazil as a very attractive Internet market:
  - Forrester (6/99): "Urban centers provide telecom, ISP and e-commerce companies with ripe, dense markets of wealthy, well-educated citizens"
  - Lehman Brothers (8/99): Brazil has already reached a point of "critical mass", it is the most developed e-commerce country in the Latin American region and its market is already large enough to support a domestic e-commerce market
- Fast developing e-commerce market, expected to explode as penetration of credit card increases
- Rapid growth of local content on the Web. Brazil ranks 14th worldwide by number of hosts (+300,000 in June 1999 vs. 100,000 in January 1998)
- Most major portals (Yahoo!, AOL, MSN, Lycos) recently announced moves into Brazil

The facts above support the prediction that the Internet in Brazil will reach point C as a result of the dynamics of the Internet adoption process itself. No external forces (e.g. free service, strategic marketing campaigns, large scale education programs) are needed, no Government direct action beyond the creation of a relatively stable business environment and the monitoring of the process of basic infrastructure development. ISPs, portals, e-tailers and Internet suppliers in general embrace the Internet because they can derive utility in the form of revenue streams. Users embrace the Internet because they derive utility, too, in the form of lower prices, better service, entertainment, communication… Or, to be more precise, users embrace the Internet because the utility that they derive from its adoption is higher than the utility that they could obtain from alternative uses of their financial resources and time. In plain English, this means that to be able to enjoy the benefits from the Internet, a user first has to be able to afford the cost.

The other key observation that results from the above facts and our analysis of the current state of the Internet industry in Brazil is that the Brazilian adoption model is essentially similar to the US model (driven by private connections of individual users and e-commerce). In fact, 90% of the registered Brazilian domain names as of May 1999 were "dotcoms". Of course there are some local issues, but they have more to do with how the model is implemented (i.e. existing infrastructure and sources of funding) than with the essence of the model itself.

After the previous analysis it is tempting to say that the prospects for the Internet in Brazil are bright. In fact, this is the message that reports from research firms and investment banks convey. However, so far we have not analyzed what point C represents in the context of the Brazilian society. Similarly, we have not addressed the problem of pushing the adoption process beyond point C.

First let us address the question: what does point C represent? While the Internet presents enormous network externalities, there are clearly diminishing returns to network externalities. This is true for any kind of network. For example, the utility added to the whole system by an additional adopter of a telephone network once there are already 50 million users is negligible. Therefore the curve of the adoption process will tend to flatten out, and in the absence of network externalities it will take incremental external action to push the adoption process further.

In the specific case of the Internet in Brazil, we argue that those diminishing returns to network externalities will arrive after only a relatively low fraction of the whole society has adopted the Internet. As the graph shows, in June 1999 according to the IBOPE survey 84% of Brazilian Internet users belonged to the highest income groups (Classes A and B), and only 4% to the Classes D and E. In its previous March 1998 survey those percentages were approximately the same, but there were approximately 1 million fewer users. What these figures show is that the adoption is taking place primarily among the high income groups. This is not surprising, given the existing inequalities in the distribution of national income and the barriers to access the Internet in terms of cost, level of education required and relevance of the content available. What is more important for our discussion, though, is what those figures imply for the adoption process.

Number of users is not the relevant variable in the US-like adoption model. Utility for the existing users (both suppliers and consumers) is what matters. The potential utility added by to the total utility that the previous Brazilian users extract from the Internet is probably minimal.

First, these groups lack the purchasing power to actively engage in e-commerce. So if the US model of adoption prevails, these users are completely irrelevant for Internet suppliers. ISPs, e-tailers, portals and other services, for whom the key success factors is traffic ("eyeballs") are not interested in low income groups. Their eyeballs have no value that can be translated into transaction or advertising revenues. Moreover, the Brazilian market is big enough to provide Internet suppliers with the critical mass they require even if a significant percentage of the total potential users remains excluded. After all, if the value of a user is measured in terms of its capacity to generate revenues on the Internet, the richest 20% of the population control 80% of the national wealth.

From the other users' perspective, it is highly likely that low income users do not add more either. The social boundaries that separate both groups in the offline world would become even higher in the Internet. While the Internet eliminates the geographical barriers, it fosters the grouping of individuals with the same interests into tightly-coupled "communities". This does not mean that lower income group cannot interact on the Internet. What it really means is that those groups will likely interact with individuals from similar groups in other countries or, at most, with individuals from other groups who have a specific interest in that kind of interaction (e.g. NGOs). Brazilian high income individuals will continue interacting among themselves, but now on a countrywide basis rather than just at a local level. The Internet will bring together high income individuals from Sao Paulo with those in Rio, Brasilia or Salvador. It will also open that interaction to other high income individuals in neighboring countries, or even worldwide, with whom they share interests, hobbies and concerns. Low income groups have little value to contribute to the Internet experience of the Brazilian users that have previously adopted the Internet. The network externalities are negligible once the adoption process reaches the low income groups. In other words, low income individuals are precisely those situated to the right of point C in the adoption curve.

Moreover, since at least at the current state of technology the Internet user experience is severely constrained by bandwidth, the addition of new users after a certain point is not neutral for the other users. As a result of the saturation of the existing bandwidth, the addition of low income groups will likely have a negative impact on the other users' utility.

Therefore we must conclude that the forces driving the Internet adoption process in Brazil will likely leave apart low income groups. Low income or education are obstacles that could be overcome if the utility added by those individuals was relevant for the users that had adopted the technology before. However, the network externalities derived for the existing users are negligible, or even negative: the large population in

Brazil offers already the required critical mass for adoption even without those low income groups, and the global reach of the Internet offers the opportunity to capture those network externalities through interaction with users outside of the Brazilian boundaries. Thus when speaking about the development of the Internet in Brazil, we must clarify for whom: chances are that a significant portion of the Brazilian population remains completely outside of that development.

The problem of non-universal adoption of the Internet in Brazil is even worsened by the existing regional differences. As shown in table1 and table2, the southern regions (where Sao Paulo and Rio are located) are much more developed than the rest of the country. Given that the Internet is a technology that requires intensive investments in infrastructure and education, a large fraction of the population in the northern regions is likely to be excluded from the benefits that the Internet may bring.

3. Extending the Adoption Process Beyond Point C in Brazil

The discussion in the previous section has led to the conclusion that Brazil is on its way to become the most important Internet country in Latin America. In fact, the Brazilian model has proved to work well: as of June of 1999 Brazil shows a 33% Internet penetration in Upper and Middle Classes vs. only 14% in Mexico and 12% in Argentina and Chile. However, we have also concluded that this adoption model, essentially driven by advertising and commerce, will inevitably stop the penetration of the Internet in Brazil at point C. The immediate consequence will be that the social gap between income groups and regions will inevitably be widened. Therefore, we believe it is worth to briefly examine some potential strategies to extend the adoption of the Internet to low income groups.

1. Rely on the economic development

The first possible strategy is to leave the market forces drive the adoption process and rely on the current general economic policies to bring a wave of prosperity. Economic development would increase welfare and educational opportunities for low income groups. Eventually, as these groups see their purchasing power grow, they will be able to afford the costs (monetary and non-monetary such as time). In parallel, their "eyeballs" will become more valuable for portals and Internet suppliers. These suppliers will then be willing to invest in bringing those individuals into the Internet (e.g. building the infrastructure, lowering down the connection costs, providing training programs in elementary computing…).

There are two clear risks in this strategy. The first and more obvious is that economic policies actually succeed in creating the required wave of prosperity. Brazil, like many other developing countries, has a long track

record of failures in implementing effective socioeconomic policies. Moreover, the envisioned wave of prosperity must also succeed in reducing the social gap. Generating high GDP growth rates should be accompanied by a more equitable distribution of national income. The second risk is that considering the fast pace of development of new technologies, the lag turns out to be irreversible. Those groups who fall behind today will be unable to catch up later, as the technology will have already evolved dramatically.

2. Government action

Government's role in the development and adoption of the Internet in Brazil can take various forms, with very different scope and degrees of involvement.

2.1. Subsidiary role

The Government's primary role is to guarantee a regulatory framework that allows market forces to operate. It also provides the basic infrastructure and education. However, unlike in the previous section, the Government acts proactively to foster the adoption of the Internet among those groups that are left apart by the dynamics of the development process driven by market forces. In other words, the Government acts where the market forces do not reach. For instance, under this approach, the Government should provide Internet access services where there is no incentives for commercial ISPs to enter: low income groups or remote communities from which access requires major investments with unsatisfactory returns.

2.2. Incentives and subsidies

The Government does not act directly, but deploys the right set of incentives to lead to desired actions by private agents. An example of this approach is the so-called "Web zone" adoption model, which has been successfully implemented in some Asian countries such as Singapore or Malaysia. This model has also been advocated by research firms such as Forrester as the most suitable for the mainstream adoption of the Internet in Latin America. First the Government should designate a number of cities or areas as "Web zones". Then the Government offers companies in the selected "Web zones" a business friendly climate, with preferential tax rates for investors in key telecom and internet infrastructure and a trained workforce (which requires that the right education and labor policies had already put into place). Simultaneously, telcos like Worldcom or Telefonica invest the amounts committed in the privatization of Telebras. Government incentives will create islands rich in bandwidth within these well-defined geographic areas. Businesses in

these areas will also drive Internet demand by connecting to remote tax-free manufacturing regions created by global manufacturers. Telcos in these regions will support a model based on advertising revenue, free Internet access and cheap PCs, expecting to reap rich rewards when hypergrowth-driven prosperity punches up the economy. The problems associated with this model concern the definition of the incentives required to attract the private companies to the least favored areas. Presumably, the cost associated to those incentives is quite high. However, creative solutions can be designed. For instance, the Government could require the vendor who supplies the PCs and hardware used by Government agencies and public institutions to commit to donating a number of no-last-generation equipment (even those which are collected after replacement campaigns in large corporate customers) to improve PC penetration in deprived areas.

2.3. Direct intervention

Either through specific regulation or direct action, in this approach the Government takes the reins of the adoption process and makes the crucial decisions about where, when and how the Internet is going to be adopted. For instance, the Government may decide to heavily regulate the commercial ISP space, creating "ISP zones" that would be auctioned to private ISP companies. ISP zones would be operated under a monopoly regime, for a pre-determined number of years, and prices would be also heavily regulated (i.e. the Government sets the maximum prices). Obviously, the attractive and unattractive areas will be grouped to form the "ISP zones", and service targets will also be imposed to the winning ISPs. The Government will also have mechanisms to enforces those service targets (e.g. strong penalties, recall of the concession agreement) and ensure that universal coverage is reached.

These 3 different approaches are by no means mutually exclusive, yet they can be combined in parallel or across time. In fact, the Brazilian Government has evolved from direct intervention to the incentives and subsidies policies. As the section on the Internet industry in Brazil shows, in the early days (1988-1995) the backbone network was built by the Brazilian Government. Similarly, the privatization of Telebras followed the principles of direct intervention, since the acquirers had to commit to the service universalization targets determined by the Government. In parallel, the Government is making use of incentives and subsidies to drive the Internet adoption process. Some examples are:

- Discount rate (50%) on leased, dedicated lines for non-profit, educational institutions established by Decree.
- Tax incentives for companies that invest 5% of gross sales in R&D

A more extensive discussion of the IT-related policies in Brazil can be found in the section on legal environment in this website.

3. NGO action

The best possible explanation for this option is the case study on CDI, one of the most notorious NGO experiences in Latin America and also worldwide within the Internet industry, posted in this website.

What's the best alternative for Brazil to achieve universal adoption of the Internet? There is no clear answer for this question. However, we believe that more decisive Government action is essential. For instance, in 1997 President Clinton launched the Internet II program, with the strategic goal of increasing the competitive advantage of US companies. In this same line of thought, we strongly believe that the Internet is too crucial for a country to leave it entirely to the market forces to decide. In the case of Brazil, it is even more crucial after having lost the last two decades for economic development. With the advent of the Internet, the world moves also at Internet time. Another lost decade cannot be afforded if Brazil is to achieve substantial improvements in its degree of development and national welfare. There is no time for hesitation. Internet represents a break through of the existing paradigm, and thus poses both an opportunity and a threat for a country like Brazil: an opportunity to set the basis for a new sustaible development model, and the threat of missing it, which would leave Brazil completely apart in the new world economic order. Since a few months are an eternity in Internet time, we believe that the Government should get more involved in the adoption process. In particular, the advent of broadband is the next key milestone in the Internet development, as it will bring enormous possibilities in information sharing and social development such as remote training, virtual research groups, electronic libraries... The Brazilian Government should have already put the basis to guarantee that the whole country will timely embrace broadband, rather than wait for the market to do it.

Last modified Dec.6, 1999

Return to Home Page

Who We Are

Internet Adoption Process

Labor Markets

Education

Nature and Opportunity of Access

Telecommunications Infrastructure

Presentation I

Government Policies and their Effects

Financing and the Private Sector

Presentation II

Case study: Universo Online (UOL)

Case study: The Committee to Democratize Information Technology

Brazil: Internet Development for Whom?

Labor

Social Condition

Brazil is a nation of contrasts. Development is incredibly uneven. Production techniques from colonial times dominate parts of the Northeast and Amazônia, while São Paulo's massive, high-tech, chemical and steel industries compete on the world market. Until 1994, the only certainty in the economy was its uncertainty. The Plano Real stabilized the currency, ended inflation, and provoked a rise in consumption. Out of the seven economic plans introduced in the last eight years, the Real was the first without shocks or broken contracts.

The richest 10% of Brazilians control a whopping 54% of the nation's wealth; the poorest 10% have just 0.6%—and the gap is widening. Sixty million live in squalor without proper sanitation, clean water or decent housing. Over 60% of the people who work make less than twice the minimum wage (about $100). Unemployment and underemployment are rampant.

Wealthy Brazilians live closed, First World existences in luxurious houses behind high walls protected by armed guards and guard dogs. In this developing country of almost 155 million people, 40 million people are malnourished; 25 million live in *favelas*(shantytowns); 12 million children are abandoned and more than seven million between the ages of seven and 14 don't attend school. Brazil, with its dreams of greatness, has misery that compares with the poorest countries in Africa and Asia.

As always, these ills hit some groups much harder than others. If you are a woman, a black, an Indian or from the North or Northeast the odds against escaping poverty are high. One third of the women employed in Brazil work as maids and nannies, and most earn less than the minimum wage. Of Brazil's 21 million illiterates, 13 million are black. Life

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expectancy in the Northeast is 56 years, compared to 66 in the rest of the country.

The Indians are fighting for survival; less than 200,000 remain from an estimated five million when the Portuguese arrived. They still suffer violent attacks from ranchers and gold prospectors laying claim to their land. The killing of peasant leaders, trade unionists and church workers involved in land disputes and strikes continues.

Even though torture has been outlawed by the constitution, reports of death in custody after its use as a means of obtaining a confession continue, although there are very few eyewitnesses. The killing of criminal suspects by uniformed and off-duty police in "death-squad" operations, especially in Baixada Fluminense, on the outskirts of Rio de Janeiro, is widely reported.

The federal government is aware of the scale of human-rights violations and the chronic failure to administer justice at state and local levels, but will not accept responsibility for matters it deems beyond its jurisdiction. All these facts illustrate the obvious: for the majority, Brazil is, as it has always been, a country of poverty and inequality, where reforms are as elusive as the wind.

Building a Better Land

Since WW II, Brazil has seen tremendous growth and modernization, albeit in fits and starts. Today, Brazil's economy is the 10th largest in the world. It's called a developing country. The military dictators had visions of Brazil joining the ranks of the advanced, industrialized nations by the year 2000. No one believes that is possible now, but no one denies that tremendous development has occurred.

Brazil is a land of fantastic economic contrasts. Travelling through the country, you will witness incredibly uneven development. Production techniques that have barely changed from the colonial era dominate many parts of the Northeast and Amazônia, while São Paulo's massive, high-tech automobile, steel, arms and chemical industries successfully compete on the world market.
Brazil's rulers, at least since President Kubitschek invented Brasília, have had a penchant for building things big and they have, of course, been encouraged to do so by the IMF and the World Bank. The government borrowed heavily to finance Brasília's construction. The country's external debt began to take off exponentially and a couple of years later inflation followed.

Economic development is slow, but there always seem to be some highly visible megaprojects under way. Many of these are economically

ill-advised and some never get completed. The funding dries up, is pocketed by corrupt bureaucrats, or the politician who started it leaves office and the political enemy who takes over decides to abandon the project. Whatever the reason, huge amounts of money are wasted. The megaprojects which do get finished may produce wealth, but they don't create many jobs, at least once they are built. Utilizing the latest technology, much of Brazil's new development is capital intensive. Few jobs are created—not nearly enough to employ the millions of urban poor who have come from the countryside.

Brazil now has an estimated 64 million working people and a third are women; 17% of people work in agriculture, most as landless peasants, and 12% work in industry. The majority of the rest cannot find decent work and are forced to sell their labor dirt cheap in jobs that are economically unproductive for Society and a dead end for the individual.

Cheap labor and underemployment abound in Brazil. Middle-class families commonly hire two or more live-in maids. This contrasts with five-year-old kids, who will never go to school, selling chewing gum or shining shoes. People are hired just to walk dogs, to watch cars or to deliver groceries. Large crews of street cleaners work with home-made brooms. Hawkers on the beaches sell everything and earn almost nothing. Restaurants seem to have more waiters than customers.

Unlike Mexico or Turkey, the poor in Brazil have no rich neighbors where they can go for jobs. With the exception of some minor agrarian reforms, there is no relief in sight. The *fazendeiros* (estate owners), with their massive land holdings, are very influential with the government. Apart from the occasional token gesture they are unlikely to be interested in parting with their land.

Instead of land reform, the government built roads into the Amazon, the road between Belém and Brasília in 1960 and the Transamazônica and the Cuiabá to Porto Velho roads in the '70s. The idea was to open up the Amazon to mineral and agricultural development, and also encourage settlement by the rural poor.

The mineral-poor Amazonian soil proved hard for the peasants to farm. After cutting down forest and opening up the land the peasants were forced off by the hired guns of big cattle ranchers. The settlement of the Amazon continues today, particularly along the strip between Cuiabá, Porto Velho and Rio Branco, where violent boom towns, deforestation and malaria follow in the wake of the settlers.

Over 50% of Brazil's industry is clustered in and around São Paulo city. Most important is the car industry. Labor relations with the workers at Volkswagen, General Motors and Ford were managed by a system modeled on fascist Italy: government-approved unions backed by the

power of the military state. From 1968 to 1978 the workers were silent and passive, until the day 100 workers at a bus factory went to work and sat down in front of their machines. Within two weeks 78,000 metalworkers were on strike in the São Paulo industrial belt.

Rapidly, the strikes spread to other industries. There were mass assemblies of workers in soccer stadiums, and the government sponsored unions were replaced. At the invitation of the Catholic Church, union offices were moved to the cathedral of São Bernardo. Caught by surprise, the corporations and military gave in to substantial wage increases. Both sides prepared for the next time.

In 1980, there were a new wave of strikes. They were better organized, with greater rank-and-file control. Demands were made to democratize the workplace, with shopfloor union representation and factory and safety committees. Many improvements were won, many have since been lost, but the industrial working class had flexed its muscles and no one has forgotten.

Brazilian economists call the '80s the Lost Decade. Wild boom-and-bust cycles decimated the economy. Record-breaking industrial growth fuelled by foreign capital was followed by negative growth and explosive hyperinflation. Until 1994, the only certainty in the economy was its uncertainty. Then came the Plano Real, that stabilized the currency, ended the inflation that had corroded the salaries of the lowest wage earners, and provoked a rise in consumption. Out of the seven economic plans introduced in the last eight years, the Real was the first without shocks or broken contracts. The death of the previous monetary unit, the cruzeiro real, was announced 52 days before the Plano Real introduced a new currency, the real. Backed by the record volume of international reserves (achieved after a healthy 4.2% increase in the gross national product in 1993), the real began on a one-for-one parity with the US dollar. Then the unthinkable happened: the Brazilian currency became worth more than the dollar.

What happened? Brazilians went shopping. In the first three months after the introduction of the plan, economic activity grew by 8%, and industrial sales rose by more than 12%. The gross national product for 1994 grew 5.7% in relation to 1993.

While the Plano Real has shown that the Brazilian economy has great potential, it may be still too soon to ascertain Brazil's economic stability. Financial problems prompted by the Asian economic crisis in 1998 have seemed to jeopardize the progress made by the Plano Real. In January 1999, the Central Bank responded to international pressure on the real by allowing the Brazilian currency to float within a broader band. This resulted in an effective devaluation of the real, which weakened

immediately then recovered slightly. At the start of December 1999 the exchange rated neared R$2 per US$1. Although the short-term effect of the devaluation has been to raise import costs in Brazil, macroeconomic indicators have since fared better than expected.

High Wage Policies

Brazil now has an estimated 64 million working people and a third are women; 17% of people work in agriculture, most as landless peasants, and 12% work in industry. The majority of the rest cannot find decent work and are forced to sell their labor dirt cheap in jobs that are economically unproductive for society and a dead end for the individual. Cheap labor and underemployment abound in Brazil. Middle-class families commonly hire two or more live-in maids. This contrasts with five-year-old kids, who will never go to school, selling chewing gum or shining shoes. People are hired just to walk dogs, to watch cars or to deliver groceries. Large crews of street cleaners work with home-made brooms. Hawkers on the beaches sell everything and earn almost nothing. Restaurants seem to have more waiters than customers. The richest 10% of Brazilians control a whopping 54% of the nation's wealth; the poorest 10% have just 0.6%---and the gap is widening. Sixty million live in squalor without proper sanitation, clean water or decent housing. Over 60% of the people who work make less than twice the minimum wage (about $ 100). Unemployment and underemployment are rampant. Wealthy Brazilians live closed, First World existences in luxurious houses behind high walls protected by armed guards and guard dogs. In this developing country of almost 155 million people, 40 million people are malnourished, 25 million live in favelas (shantytowns), 12 million children are abandoned and more than seven million between the ages o£ seven and 14 don't attend school. Brazil, with its dreams of greatness, has misery that compares with the poorest countries in Africa and Asia. As always, these ills hit some groups much harder than others. if you are a woman, a black, an Indian or from the North or Northeast, the odds against escaping poverty are high. One third of the women employed in Brazil work as maids and nannies, and most earn less than the minimum wage. Of Brazil's 21 million illiterates, 13 million are black. Life expectancy in the Northeast is 56 years, compared to 66 in the rest of the country.

Telecommunications

As mentioned before, Brazil has one of the highest illiteracy rates within Latin America. Because the capital budget does not devote a significant amount of capital to education, the country lags behind its Latin

American counterparts.

In Brazil, the quantity of people entering into the telecommunications field has been fairly steady during the past five years. In 1994 there were approximately 83,000 full-time telecommunications workers,whereas in 1995, there were roughly 95,500. Moreover, in 1996, the amount of full-time telecommunications workers totaled approximately 108,000. Recent privatization efforts are projected to raise these numbers by 40% within the next three years.

IT/Human Resources

Brazil has 355 scientists and engineers working in scientific and technological development per million inhabitants, a figure comparable to other South American countries. In absolute terms, however, due to its large population, the number of professionals working in the IT sector whose level of education include undergraduate and graduate degrees is larger than any other Latin America country. ***Brazil Kore***

In 1997, Brazil had 700 Ph.D.s in the field of information technology, a substantial growth from 200 in 1980 (MCT-Sepin,1998:10). The nature of demands on IT capabilities has varied from the times of the market reserve policy. In a more open market, the demand for technical capabilities shifted from hardware design and manufacturing engineers to software and data processing. Rather than R&D, employment opportunities are now increasing in developing and updating business applications. In 1995, the IT industry employed 102,000 people, of which 40,000 had a university education. Of those, 10% were in R&D activities. However, total employment in the industry fell by 3% from 1991, and by 11% for university level employees. Nearly half of the industry's employees are in computer hardware firms and the other half in software and technical services. While employment in manufacturing is diminishing, the demand for people trained in software development, system maintenance, data communication management and other user-support activities is growing at a steady pace. The employment trend from hardware to software and services has had an important impact on the demand for skilled people. This may be assessed through the analysis of the distribution of employees by activity performed. Hardware firms employ more than 50% of total personnel in production and technical assistance while software firms employ relatively more in R&D and marketing. The majority of people employed in service activities perform “production” activities, a class ranging from simple activities such as data entry, data processing, and printing to more complex functions in data communications and system development.

The capabilitie s acquired by engineers expelled from the computer hardware industry in areas such as sales, technical assistance and R&D

could be diverted to software and service activities. The growth of the software sector demands a highly qualified workforce. About 40% of computer industry employees have a graduate or post-graduate degree. In contrast, in software, the percentage of university trained personnel jumps to 68% (Tigre, 1995:194).

Last modified Dec.6, 1999

Return to Home Page

Who We Are

Internet Adoption Process

Labor Markets

Education

Nature and Opportunity of Access

Telecommunications Infrastructure

Presentation I

Government Policies and their Effects

Financing and the Private Sector

Presentation II

Case study: Universo Online (UOL)

Case study: The Committee to Democratize Information Technology

Brazil: Internet Development for Whom?

Education

Background

The Brazilian educational system includes both public (federal, state, and municipal) and private institutions, ranging from pre-school, elementary (First Degree - I Grau), and secondary (Second Degree - II Grau) to university and post-graduate levels. Education is compulsory for ages seven through to 14. Public education is free at all levels. Non-profit private schools are also eligible to receive public funding. The 1988 Brazilian Constitution allocates 25 percent of state and local tax revenues to education.

Significant advances have been made in the Brazilian educational structure in the last 25 years. In I964, there were ten million students attending school at all levels. In 1990, there were 37.6 million students: 3.9 million in pre-school; 28.2 million at the elementary level; 3.8 million at the secondary; and 1.7 million at university. Despite this progress, less than 40 percent of the high-school-aged population are enrolled in school.

One of the biggest educational problems in Brazil is school non-attendance. Children from large poor families start working from the age of 10 in order to help their parents, despite the law of compulsory education between the ages of 10 and 14. Other reasons for school non attendance are the lack of sufficient school places and the high examination failure rate. Malnutrition also materially affects the intellectual development of children, giving them little chance of adapting to an educational environment.

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Final Presentation

Interesting Links

Send us a message

The Ministry of Education has ultimate control over virtually all of higher education. Its principal standard-setting agency is the Federal Council of Education. The Federal Government maintains at least one Federal university in each state. Due to the great demand for higher education and the lack of places, colleges (faculdades) and universities in Brazil, both public and private, require an entrance exam (vestibular). Upon completion of a full academic course of study, university students may obtain the Bachelor Degree (Bacharelado) and may also have an additional year's teacher training (Licenciatura). Twenty years ago there were few post-graduate courses in Brazil. In 1989 there was a total of 902 tertiary institutions, including 93 universities. More than 1,000 post-graduate courses are available, most of which benefit from highly proficient faculties, on a par with similar institutions in the more advanced countries.

Source: The Brazilian Embassy in London

Problems Facing Education

Education levels of the Brazilian population are extremely low in comparison to those of other upper middle-income countries. An estimated 17 percent of Brazilians over seven years of age are illiterate. In 1990, the average schooling for the adult population was only 4 years, approximately the same as El Salvador, Guatemala and Nicaragua, countries with less than half the income level of Brazil. Brazil's low educational attainment rates are directly related to high repetition in primary education, particularly in the early grades. Each year over 50 percent of students in the first grade of primary school repeat, the highest first grade failure rate in Latin America. The average Brazilian student currently spends 7.7 years in primary school, longer than for any other Latin American country. Yet during those 7.7 years, the average student does not even complete the fourth grade. According to a 1993 report, 63 percent of children drop out of primary school before completing it. One of the main reasons for such high dropout and repetition rates is the need for children to contribute to family income by working either for wages or on family enterprises. Currently, about seven million children work in Brazil.

At the higher level of education, the Federal Council of Education does not possess sufficient staff resources to exercise these wide powers. It also does not have any responsibility for directing resources to the institutions which are placed under its supervision that would give real authority to its statutory powers. The costs and financing of the federal universities are subject to legislation affecting the wages and salaries of public employees and a federal constitutional prohibition against imposition of tuition. The private colleges and universities do receive

indirect support from the federal government in the form of loans to students attending the institutions. Nevertheless, only about a fifth of students in private universities and colleges avail themselves of loans provided through commercial banks (Albrecht and Ziderman 1991, 15). The scheme is administered by a unit of the Federal Ministry of Education and not by the Federal Council of Education which has accrediting functions and, thus, could use this policy device to improve the low standards of many private institutions.

Source: World Bank "Reforming Higher Education Systems"

Bolsa Escola (Stipend for Schooling)
In 1995, Governor Buarque (Federal District, Brasilia, capital of Brazil) established Bolsa Escola, a pilot scholarship program, to eliminate poverty-induced school dropout. The program was developed to counter child labor and ultimately reduce school dropout. The stipend (or bolsa) guarantees a minimum wage (equal to $128 per month/per family regardless of the size of the family or the number of children in the family) to every low-income family (only families in the lowest quintile of the income distribution that are employed or actively searching for employment, if unemployed, are eligible) keeping their children aged 7 to 14 years in school, as long as the children attend school regularly. Additional incentives are built into the program to reduce school repetition and dropout: a school savings program provides a deposit of approximately $90 into a savings account of each child whose family is a beneficiary of the scholarship program, if the child is successful in completing the year and is being promoted to the next grade. Also, repeaters are given extra classes during the school break so that they are not disqualified from the scholarship program.

Program Requirements

° Residency in the city for five years
° Family income less than or equal to $50 per month (per head)
° All children aged 7 to 14 years enrolled and attending school
° No more than two absences per month from class
° Unemployed parents must be actively looking for work

The bolsa-escola program operates in nine cities in Brasilia where it is sponsoring 22,493 families and benefiting 44,382 children (about 12 percent of public school enrollments in Brasilia in 1996) and has a budget of about $29 million, which represents less than 1 percent of the Federal District's total budget.

The bolsa-escola program deals with the demand-side (or opportunity cost) of education among the poor. It is an idea that might become relevant in the menu of tools to deal with school dropout due to the need for income from children from very poor families. Other cities in Brazil

are experimenting with the same idea.

Governor Buarque's objective is to round up support for a new initiative: an international "bolsa-escola" fund. He envisions a fund of $240 million benefiting a million disadvantaged children every year in several large cities in poor countries. Such a fund would be financed by bilateral and multilateral funding agencies (through grants and loans), and would count on counterpart funding from the local governments involved.

Impact
The program has been evaluated jointly by UNICEF and the Institute for Applied Economic Research, associated with the Federal Government of Brazil. Evaluation results indicate that the program has led to a significant reduction in both school dropout and repetition rates - it is estimated that the dropout rate has been reduced from 10.0 to 0.4 percent. Also, over the last two and a half years, the program has contributed to higher school enrollment rates.

By providing families with supplemental income that can be utilized as the family deems necessary, the scholarship and savings program have contributed to improved nutrition, health care and consequently higher standards of living. Moreover, the scholarship program has indirectly impacted the economy of those cities where it is implemented - the sudden flow of resources into poor neighborhoods has created an immediate growth in demand for basic goods, benefiting the local economy. In addition, the program has contributed to greater citizen awareness, promotion of women, improvement in education quality and a reduction in child labor.

School Savings Program
The scholarship program is accompanied by a program that encourages school enrollment. The School Savings Program provides a deposit of approximately $90 into the account of each child whose family is a beneficiary of the scholarship program, if the child is successful in completing the year and is promoted to the next grade. Half of the amount deposited can be withdrawn when and if the child reaches the fifth grade. Withdrawals can be made again upon successful completion of the eighth grade, and then upon successful completion of secondary school. If all recipients complete each year of schooling successfully, then the cost of the program is estimated to be $4.3 million per year.

Note: Unfortunately, Bolsa Escola fell victim to budget wars in late 1999 and has since been discontinued.

Global Information Infrastructure Commission
The Global Information Infrastructure Commission (GII) held a conference in July of 1997 for the purpose of addressing education within

Latin America. Entitled "Education in the Information Age: An Agenda for Action in Latin America and the Caribbean", the conference sought to increase the level of technology fostered within Latin American schools. In accordance, the theme of the conference was the perpetuation of technological innovation throughout Latin America. It has been postulated that if Latin American countries lose technically-qualified personnel, the technology-dependent industries will emigrate from the region.

Additional concerns stemming from the conference included the unwillingness of Latin American countries to alter their curriculum to integrate technology into the learning environment. One of the dilemmas facing many Latin American countries is the myth that technology will devalue their cultural, geographic, and linguistic traits. Consequently, a great deal of concern exists in regard to the Internet's influence, especially as it pertains to the overwhelming use of the English language.

Last modified Dec.6, 1999

Return to Home Page

Who We Are

Internet Adoption Process

Labor Markets

Education

Nature and Opportunity of Access

Telecommunications Infrastructure

Presentation I

Government Policies and their Effects

Financing and the Private Sector

Presentation II

Case study: Universo Online (UOL)

Case study: The Committee to Democratize Information Technology

Brazil: Internet Development for Whom?

Nature and Opportunity of Internet Access

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1. Introduction

In 1994 there were 36,000 Internet users in Brazil, all of them in Universities and research institutions. But that is history. Today that number has multiplied by a factor of 100. There are 3.6 million users in Brazil, and the number is growing at an estimated rate of 50% a year. On the supply side, Brazil ranks 14 in the world by number of hosts, well above countries such as Korea, Spain or China. Internet is not an academic phenomenon any longer: 90% of the domain names registered in Brazil are "dotcoms" (registered by private companies). Moreover, Brazil accounts for 88% of the total e-commerce revenue in Latin America.

All these impressive developments have happened in a period of 5 years, precisely at the same time that the Internet was taking off in other countries. For the first time in history, Brazil is adopting a new technology in parallel with the rest of the world. A little comparison may be useful to illustrate this point. The first Brazilian steel plant started operations in 1946, almost two centuries after the Industrial Revolution began in Europe. In contrast, the first Brazilian website was created in 1993, precisely at a time when the first websites were created in the US. However, as of today only a 2.5% of the Brazilian population has access to the Internet. This section reviews the development of the Internet in Brazil since its initial adoption in 1988 until today, and the forecasts for the upcoming years. A specific section on e-commerce, the major force that is driving the fast adoption process in Brazil, is also included.

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Final Presentation

Interesting Links

Send us a message

Finally, as we have elsewhere on this web site, we discuss the social challenges that inhibit widespread Internet access in Brazil.

2. The Early Days of the Internet in Brazil

Much alike the US, the Internet was introduced in Brazil as a network that connected academic and research institutions. It was not until 1995, after the Internet Service Law open the commercial ISP market to private companies, when the Internet started to be adopted by individual users and commercial applications. The diagram summarizes the key milestones in the development of the Internet in Brazil between 1988 and 1996.

3. The ISP market

The ISP industry is Brazil is highly deregulated. In 1995 the Internet Service Law declared the Internet an information service, and therefore free for people to provide and to access. In addition, the Law allowed anyone except telecommunications firms and Government agencies the right to provide retail (dial-up) service to the end-user.

A myriad of companies entered the new ISP space. Some of the pioneers such as ZipNet or Mandic, are still in the business. Universo On-Line (UOL) was launched in 1996, and after integrating vertically into the portal business, it soon acquired a dominant position in the market. Although there is a trend towards further consolidation, the market is still very fragmented with over 400 incumbents. The following chart summarizes the evolution of the Brazilian ISP market between June 1998 and June 1999. In this period UOL increased its market share from 16% to 31%.

Interestingly enough, Brazil did not follow the emerging trend in Europe towards free ISPs. On the contrary, the Brazilian ISP model resembles closely the US model, with strong players like UOL or ZAZ becoming also portals and content providers much alike AOL in the US. Users have to pay both for the dial-up connection and for the ISP services. ISP fees are in the area of US$ 40 per month for unlimited access. In spite of the large number of players, prices has not decreased substantially since 1996. Early in 1999 ZAZ, the second largest Brazilian ISP and also one of the largest portals, initiated plans to start offering free ISP services in year 2000. ZAZ expected that the trend towards free ISPs will soon spark in Brazil, thus it decided to make the first move. However, Abranet, the most important of the several existing ISP associations, succeeded in stopping ZAZ's move. Furthermore, all major ISPs (members of Abranet)

agreed on not allowing "predatory prices".

AOL has recently announced its immediate entrance in the Brazilian ISP market. This will likely drive the ISP prices down, although a price war is not expected. At most, prices are forecasted to drop to the US$ 18-20 range for unlimited access. This is still higher than current US rates. However, the costs for Brazilian ISPs are also higher than for US ISPs. Brazilian ISPs pay US$ 6,000-8,000 per 2 mbps of bandwidth, while US ISPs pay only US$ 800-1,000.

4. Internet hosts

Brazil was ranked 14th in the world (top country in Latin America) by number of Internet hosts. As of June 1999 there was approximately 300,000 Brazilian hosts, which represents an enormous growth from the 100,000 registered as of January 1998 (Source: Comite Gestor Internet Brasil).

5. Internet Users

Brazil is the largest Internet market in Latin America by number of users, too. Brazil accounts for 60% of all the users in the region. The number of Internet users is increasing rapidly. As shown in the graph below, there were approximately 158,000 Brazilian users in 1995, while today estimates are in the range of 3.6 to 3.8 millions. Moreover, for the year 2003 IDC forecasts that there will be more than 9 millionInternet users in Brazil.

The profile of the typical Brazilian Internet user, according to the survey carried out by IBOPE in June 1999, is summarized in these graphs.

However, Internet penetration still remains low: only 2% of total population in 1999. Internet penetration is constrained by both relatively low PC and fixed telephony penetration. In fact, according to the last survey published by IBOPE in June 1999 only 11% of Internet users own both a computer and a fixed line at home. However, the penetration of fixed telephony has increased substantially since the privatization of Telebras in 1998: from 8 lines/100 inhabitants in 1994 to 16 in 1999. As far as PCs is concerned, current penetration rate is only 5.3% (4.1% in 1998). Average PC prices are going down substantially (according to some industry analysts, prices are expected to fall from US$ 1,479 in 1998 to US$ 1,275 in 2001). As a result, the growth rate of the PC sales in Brazil is higher than in the most developed economies. Thus by 2001

IDC estimates that the installed base will have quadrupled levels seen in 1996, reaching the level of 12 millions.

6. E-commerce

Brazil is also by far the most developed e-commerce market in Latin America, according to a research report by the Boston Consulting Group. As of May 1999, Brazil accounted for 88% of the e-commerce revenues and 307 out of the 422 active e-tailers in the region.

Other industry sources such as Lehman Brothers point out that Brazil has reached a point of "critical mass" where the size of the Internet market is large enough to support a domestic e-commerce market. In fact, there are 3 factors that make Brazil a particularly attractive e-commerce market:

- High Internet penetration in Upper and Middle Classes (33%)
- Brazilian users are accustomed to online banking since early 1990s
- E-commerce market expected to explode as penetration of credit card increases

In 1999 e-commerce revenues are estimated to be over US$ 400 millions, up from approximately 150 millions in 1998. For the year 2000 industry analysts forecast that the 1999 revenues will double, to reach approximately US$ 900 millions.

By categories, the Brazilian e-commerce industry tracks closely the US industry. All business models that have achieved some success in the US are being replicated in Brazil. Thus not surprisingly the most popular e-tailer categories are books, music and computer products.

7. The Social Challenge of Increasing Access

The adoption of the Internet remains limited to upper-income groups in Brazil, a country with one of the most unequal distributions of wealth in the world. Despite the impressive statistics on mainstream adoption that we have presented, only 2% of Brazilians use the Internet today. It is clear that use of the Internet is highly correlated with social class: 33% of people belonging to the highest two income groups use the Internet. 84% of Internet users belong to one of these two groups. As noted on our page on the Internet Adoption Process, mainstream adoption of the Internet in Brazil really only contemplates the highest income groups. The great masses of Brazilians have so far been left out of this process. Elsewhere on this web site, we discuss possible ways of promoting the access of lower income groups in Brazil to the so-called Information Revolution (Internet Adoption Process, case study on CDI).

Last modified Dec.6, 1999

Return to Home Page

Who We Are

Internet Adoption Process

Labor Markets

Education

Nature and Opportunity of Access

Telecommunications Infrastructure

Presentation I

Government Policies and their Effects

Financing and the Private Sector

Presentation II

Case study: Universo Online (UOL)

Case study: The Committee to Democratize Information Technology (CDI)

Final Presentation

Interesting Links

Send us a message

Brazil: Internet Development for Whom?

Telecommunications Infrastructure

BASIC TELECOMMUNICATIONS INFRASTRUCTURE

1. Historical Evolution

In the early 1960s the newly-established military government reorganized the Brazilian telecommunications network, whereby legislation was introduced to coordinate an infrastructure upgrade. The existing telephony infrastructure was concentrated in the Central East region of the country (60% of the installed terminals), and was operated by Companhia Telefônica Brasileira (CTB), a wholly-owned Canadian subsidiary of Canadian Traction Light and Power Company - the company that supplied the network equipment, which included crossbar exchanges and other types of transmission equipment. Long distance calls were extremely expensive, carried on low capacity microwave networks interconnecting Rio de Janeiro, Sao Paulo, Campinas, Belo Horizonte and Brasilia. International services were provided by a number of foreign carriers. The Telecommunications Act of 1962 created a new company, Embratel, whose duties included building a network to connect all the capital of the States and the main cities in the country, together with operating the international service. In 1966 Embratel acquired CTB.

Also in 1967 the prevalent telecommunication council, known as Contel, was replaced with the Ministry of Communications (Minicom), who was then given the responsibility of infrastructure planning and development, as well as control of the Brazilian postal and radio services. Under Embratel's control the quality of long distance and international services has increased remarkably, but local service was still in a very poor condition. To address this problem the Minicom established a new telecommunications holding company in 1972, known as Telebras. Telebras's responsibilities included the creation of 25 regional telecom companies (one per state), the establishment of an interconnected telecommunication service throughout Brazil, and the coordination of all long distance and international communications under Embratel, who became a subsidiary of Telebras.

Between 1972 and 1982, the Telebras infrastructure was constructed and implemented throughout Brazil. Integration of the new infrastructure included the following:

- a highly-modernized long distance trunk network
- Direct Distance Dialing linking 200 Brazilian cities
- installation of 50,000 long distance circuits
- installation of 36,000 km of telephone cable **throughout each state**

The Telebras infrastructure, which was created "from scratch" within this 10-year time frame, was widely considered as one of the most important infrastructures in the world, interconnecting 20,000 municipalities all over the country. Between 1976 and 1986 the population and the GDP increased by 50% and 80%, respectively, while Telebras's installed base of terminals grew by 400%. However, traffic went up at a higher rate: 900% for local services and above 1,700% for long distance communications, putting immense demand pressure on the existing infrastructure.

Moreover, demand came only from corporations and high-income households (80% of residential users

were classified into Classes A and B). Despite the lack of reliable research, in 1996 the total potential market for telephony services was estimated at 18-25 millions of households, provided that the existing pricing scheme (self-financing) was substituted by a lower upfront installation payment. However, only 14.5 millions had effectively phone services. Moreover, only 2% of the households in non-urban areas had a fixed phone.

Since the early 90s, real telecommunication service charges fell down, as rates had been periodically frozen in an effort to control inflation, which had been plaguing the country for years. As a result, operating margins within the telecommunication industry were squeezed, thereby limiting investments in modernization and expansion of infrastructure. Consequently, this resulted in a scarcity of new lines, even in regions with high demand. Thus installations of phone lines constituted a 2-year delay (on average) for subscribers, as Telebras and its subsidiaries did not have the resources to consistently invest in the network infrastructure to match demand growth. Moreover, the national network was quite antiquated, as only 45% was digital as of 1995 (70% in long distance exchanges).

2. The PASTE Program (Recovery and Expansion Program for Telecommunication and Postal Systems)

In view of this situation and of the urgent need for a national development program, President Fernando Henrique Cardoso's Administration decided to promote a complete reorganization of the communication system. Future government initiatives should preserve public telecommunication assets and comply with the following overall guidelines: stimulate private sector investments; strengthen the role of the State as the agency regulating telecommunication activities; diversify the supply private sector services in this industry; and preserve public sector presence in strategic communication and technological development areas. The strategy, would be implemented through a long term program called 'Programa de Recuperação e Ampliação do Sistema de Telecomunicação e do Sistema Postal' - PASTE (Recovery and Expansion Program for Telecommunication and Postal Systems).

Thus since 1995, Brazilian telecoms industry has been the target of reforms. These represent a reaction to three basic factors: economic globalization, technological advance and the rapid change in markets and consumer needs. The specific objectives of the reforms, and the strategies adopted, are listed below:

SPECIFIC OBJECTIVES	STRATEGIES
❍ Strengthen the regulatory function of the state and end its role in business	● Creation of regulatory authority and implementation of privatization
❍ Expand and improve services ❍ Create attractive opportunities for investment and technical and industrial development in a competitive environment ❍ Ensure that sector development is in harmony with the State's social-development targets.	● Universal access to telephones and competition
❍ Maximize the sale value of telecom companies without jeopardizing the other objectives	● Planning and execution of privatization process

Source: ANATEL

Investments projected by PASTE amounted to R$ 75 billion in April 1995 values, of which approximately half would be paid during the first execution period (1995/1999) and the other half in the following period (2000/2003). These investments cover five programs associated with the structure of the National

Telecommunication System, as shown in the table below:

	1999		2003	
Segment	**Fixed**	**Cellular**	**Fixed**	**Cellular**
Total	26	12	40	23
Urban Areas	15.9 (43%)	8.0 (21%)	22.2 (55%)	14.5 (35%)
Rural Areas	1.8 (20%)	0.9 (10%)	3.2 (40%)	1.2 (15%)
Corporate	8.3 (40%)	3.1 (15%)	14.6 (50%)	7.3 (25%)

The present home telephone service is concentrated in higher income families. Over 90% of families with a monthly income of more than R$1,000 are covered while, on the other hand, the degree of penetration among families with a monthly income of less than R$300 is negligible. One of PASTE's objectives is to change this picture by providing universal access to basic communication services, at the same time that it meets the demand for other services in different segments of the society.

As previously observed, PASTE intends to establish the basis for a new relationship between telecommunication companies and their customers. It gives the highest priority to the supply of services with desirable intrinsic quality so as to achieve universal access by all layers and segments of society, transforming the telecommunication industry into a fundamental component of national development.

The expansion proposed by PASTE will open a privileged opportunity for Brazil to make technological gains, restructure its systems and review traditional technical and operational procedures. By the year 2003, the current network will represent only about one third of the network that will exist at that time.

The basic segments of broadband networks will be implemented initially at local, regional, and national levels through the employment of advanced switching and transmission techniques (ATM for switching, and optic communication and SDH for transmission), that will make up their cores. Users will be connected to these networks by modern access means, such as optic accesses, wireless accesses, distributed switching, local ring networks, and so on. Without any doubt, this is one of the segments that will acquire growing importance for the implementation of future networks, especially low speed ones.

An intensive use of satellites to offer a wide range of services is also projected, besides current voice and video interconnections. One of the most notable applications is the one that will create worldwide communication facilities for users when they subscribe one of the many systems offering global coverage for mobile terminals, based on an array of satellites strategically distributed around the Earth in low (LEO - Low Earth Orbit) or medium orbits (MEO - Medium Earth Orbit). Even if the volume of these services is not as significant with respect to what may be obtained with traditional cellular systems, they will be highly relevant because they will enable quick coverage in locations where normally this would be very difficult, or would mean extremely high costs. This is the case, for instance, of a great number of rural areas and isolated localities in the country, mainly in the Northern, Mid-Western, and the Northeastern regions.

The benefits resulting from this approach are obvious, both for operators and users. They may be identified as reduction in costs and in project maturation time, systems modernization, improved service quality standards, faster access by users not presently covered, supply of services in remote locations, and access opportunity for low income users through public message services (virtual telephone).

The goals proposed in the PASTE program will allow for the telecommunication development process to be resumed in the country, considering that its growth has been curtailed during recent. In this way it will

be possible to meet Brazilian society needs in a qualitative and quantitative way.

It must also be mentioned that, besides supplying a larger number of telecommunication services and meeting demands within shorter terms, these activities will have a very positive impact on other industries. A large number of new jobs will be generated; national manufacturers will be strengthened; there will be a significant increase in tax income; national technology will be improved: and small and medium sized companies will be encouraged to grow.

In this way Brazil will be repositioned in the world ranking of telecommunication services quality indicators, especially with respect to telephone density versus per capita income. At the same time, the Brazilian economy will be strongly influenced by the new basic infrastructure to be created. Thus, the telecommunication industry will have an increasingly more important role in the economic and social development of the country.

3. The Restructuring of Telecommunications

3.1. New Regulation

For this process to be successful changes had to be made in existing regulatory legislation. Important among the changes were:

- **Constitutional Amendment Nº. 8 / Aug/95**. By relaxing the federal monopoly, this altered the model previously defined in the Federal Constitution. Approval of this amendment represented the initial step in the process. The Ministry of Communications built on this by preparing the PASTE restructuring program (Program for the Recuperation and Expansion of the Telecommunications and Postal Systems) for the years 1995/2003. The Program, which was revised in 1997, estimated potential sector capital expenditure at R$91.0 billion during the period considered.
- **Law 9,295 / 19 July 96**. Also known as the "Minimum" or "Specific" Law, because it contained regulatory elements but lacked the additional legislation necessary to ensure the changes were in fact introduced. The main items dealt with in the Law were:
  - Mobile Cellular Service: the Law defined that the service would be provided by way of 15-year concessions, renewable for a similar period. Telebrás was authorized to set up subsidiaries to supply the service and the government was permitted to sell these subsidiaries. The participation of foreign companies was limited to 49% of share capital during the three years following the publication of the Law.
  - Satellite Services: 15-year concessions were defined and companies already operating in the segment were guaranteed licenses.
  - Data Communications: The provision of limited services, such as corporate networks, was authorized for unlimited periods without the need for bidding for the licenses concerned.
  - Added Value: It was defined that added-value services, such as the services 0800, 0900 and the Internet, would not be characterized as telecommunications services, and that the Brazilian Telecommunications System (BTS) was not obliged to provide them. Development of these services was left to private initiative.

  The Minimum Law was complemented by Decree Nº. 2,056 / 04 Nov. 96 (dealing with regulation of the Mobile Cellular Service) and by Regulation Nº.1,533 / 04 Nov. 96, the "General Telecommunications Norm", that divided the country into 10 distinct areas for the effect of the provision of Mobile Cellular Services (SMC).

- **General Law of Telecommunications (GLT) (Law 9,472 / 16 Jul. 97).** This comprises 4 volumes:

  I. Fundamental Principles: 10 Articles deal with basic aspects of the service and establish the Duties of Public Authorities and the Rights of Users:

  Duties of Public Authorities:
  - Responsibility for promoting competition.
  - Prevention of concentration (monopoly, oligopoly, cartels).
  - Punishment of breaches of the law.

- Creation of investment opportunities and stimulation technological development.

Rights of Users

- Access to service.
- Freedom to chose provider (a).
- No discrimination.
- Right to communications privacy.

(a) Initial choice of long-distance provider followed by choice of local provider and finally, as from 2001, choice between a number of providers.

II. Creation of Regulatory Body - Decree Nº. 2,338 / 7 Oct. 97: The National Telecommunications Agency (ANATEL) was set up on 5 November 97. Among the agency's attributions the following are of particular importance:

- Implementation of national sector policy.
- Regulation and inspection of services and telecommunications networks.
- Awarding of concessions to provide services in the public domain.
- Authorization of services provided in the public domain.
- Fixing, monitoring and controlling of tariffs in the public domain.
- Administration of the radio-frequency spectrum and orbit use.
- Issuance of norms and standards and specification of telecommunications products.

III. Organization of Services: The GLT established that two aspects have to be considered:

- *Legal regime*. Telecommunications is considered to be a public service and can be provided under private- or public-sector regimes. The Law also determined that fixed-switching telephony would be the modality of service to be provided under the public regime, that is: the regime where the state takes on responsibility for the existence, continuity and provision of the service.
- *Interest*. There are two situations:
  - *Collective*
  - *Restricted*

While all services are provided with a view to the collective or public interest, restricted services can be provided (corporate services, for example) as long as the collective interest is not jeopardized.

IV. Privatization of State Companies:

- Authorization of alterations in shareholdings.
- Authorization of sale of stakes in companies.
- Establishment of the general rules of the process.
- Preservation of research and development activities.
- **General Plan of Concessions - Decree Nº. 2,534 / 2 Apr. 98** This established a definition of Fixed-Switched Telephony and complemented the GLT as follows:
  - The country was divided into 4 "regions". Three regions covering local telephony were subdivided into the 34 sectors corresponding to the operational concessions then in existence (R1* 17 sectors; R2 * 13 sectors; R3* 4 sectors). The fourth region consisted of long-distance telephony.
  - After privatization of the BTS, it determined that there would be bidding for licenses for mirror companies. Bidders were permitted to acquire licenses in any or all of Regions I, II and III and to operate the services in a unified manner. In the case of Region IV (long distance), however, bidders were forbidden to acquire licenses in other regions.
  - An intermediate phase was defined in process of transition to a competitive market. In this phase duopolies were permitted in markets for local-telephone, inter-regional and international long-distance services. In the case of intra-regional long-distance operations a

"tetropoly" was defined. Operators of the same region were permitted to offer long-distance interstate services in their region (and no longer just interurban services in their own states). Long-distance operators were allowed to provide interurban services between municipalities of the same state (previously only local concession holders had this right).

- It was decided that the market would be totally open to competition as from January 2002. However, companies already functioning are allowed to offer services in other areas as soon as they meet quality and "universalization" targets. In the case of "authorized" companies the final date for meeting the targets is December 2002; in the case of concession holders the final date is December 2003.

- **General Plan of Targets for the "Universalization" of Fixed-Switched Telephony under the Public Regime: Decree 2,592 / 15 May 98.** This also complements the GLT. As its name suggests, it is designed to oblige telecommunications companies, at the time of privatization, to commit themselves to extending conventional-telephone use among lower-income groups. The targets not only deal with the numbers of residential and public fixed telephones to be installed but also with service quality and a time schedule. Fulfillment of the universalization targets will mean that after three years, starting in 1999, Brazil will have a line density of 20% (without considering mirror companies).

3.2. The Spin Off and the Privatization

Sector restructuring continued with the splitting up of BTS companies as from January 1998. This procedure was defined in the Minimum Law, which authorized Telebrás to constitute cellular-telephone subsidiaries or affiliates. Cellular operations were spun off from fixed-line operations to newly-formed cellular companies. The operation changed the face of the sector. When it was complete the BTS consisted of 54 companies (compared to an earlier 28): 28 fixed-line and 26 cellular providers. Shares ex-spin-off were traded on stock exchanges as from May 1998.

A second step in the process was the spinning off from Telebrás of 12 new publicly-held companies: one long-distance, three fixed-line and 8 cellular providers. The share capital of the new companies was divided into the same number of shares as the original Telebrás. This meant that shareholders in each of the new companies received the same number of common and preferred shares as they owned in the mother company. In accordance with the procedure defined in the General Plan of Concessions (GPC), fixed-line companies were set up on a regional basis, as were cellular companies (in accordance with the General Telecommunications Norm). See the list of fixed-line companies on page 6.

Telebrás was also authorized to set up a private foundation to absorb its Research and Development Center.

In order to ensure competition a number of restrictions were established. During the privatization sales the same shareholder, or group of shareholders was forbidden to acquire, direct or indirect control of:

- more than one of holding companies I to IV
- more than one of holding companies V to VIII
- more than one of holding companies IX to XII
- any of holding companies V to XII when the company operates in an area where the bidder owns, directly or directly, a Mobile Cellular Service concession.

New controllers were also forbidden from merging holding companies I to IV with holding companies V to XII, or with any of their subsidiaries.

After privatization of the companies, the Ministry of Communications is authorized to liquidate Telebrás. This operation is expected to occur in the second half of 1999.

Concession contracts signed with operators have the following characteristics:

	FIXED	CELLULAR

Concession period	To 2005, renewable for a further 20 years if obligations fulfilled	15 years, renewable for equal period if obligations fulfilled
Corporate modifications (merger or spin-off)	Requires ANATEL authorization	Requires ANATEL authorization
Tariffs	Adjustment form established in contract	Adjustment form established in contract with determination of maximum value using reference basket
Universalization and quality targets	Defined to Dec. 2003 for each concession holder	No targets but obligations previously defined by companies

On 16 November 1998, trading in ADRs (American Depositary Receipts) of each of the 12 companies resulting from the division of the Telebrás holding began.

With the spin-off process at an end and with the new BTS companies set up, the next step was privatization. The privatization auction was held on 29 July 1998. The R$ 22.1 billion raised from the sale of 19.26% of the total capital of the 12 spin-offs represented a premium over the minimum price (R$ 13.5 billion) of 63.7%. The value paid implied a valuation for Telebrás of R$ 114.7 billion - if we ignore the fact that the value also included a premium for control. The table below shows the values paid for each of holding companies at the auction.

HOLDING	TERMINALS IN SERVICE (M)	VALUE OF TELEBRÁS SYSTEM R$'M	VALUE PER TERMINAL R$	MINIMUM PRICE R$M	AUCTION PRICE R$M	AUCTION PRICE / TERMINALS IN SERVICE	PREMIUM %
FIXED TELEPHONY							
Telesp Part.	5,6	26.800	4.786	3.520	5.783	7.862	64,29
Tele Centro Sul	3,1	12.800	4.129	1.950	2.070	4.383	6,15
Tele Norte Leste	6,6	22.600	3.424	3.400	3.434	3.458	1,00
Embratel	-	9.460	-	1.800	2.650	-	47,22
MOBILE TELEPHONY							
Telesp Celular Part.	1,3	8.000	5.935	1.100	3.588	19.358	226,18
Telemig Celular Part.	0,5	1.435	3.175	230	756	10.435	228,70
Tele Celular Sul	0,5	1.580	3.160	230	700	9617	204,35
Tele Sudeste Celular	0,6	3.980	6.656	570	1.360	15.880	138,60
Tele Centro Oeste Celular	0,4	1.380	3.450	230	440	6.600	91,30
Tele Nordeste Celular	0,5	1.520	3.040	225	660	8.917	193,33
Tele Norte Celular	0,2	633	3.165	90	188	6.611	108,89
Tele Leste Celular	0,2	750	3.750	125	428	12.840	242,40
TELEBRÁS	**19,498**	**90.938**	**4.664**	**13.470**	**22.057**	**7.637**	**63,75**

OBS: A list of the winning consortia can be found in an annex to the report

After privatization of the holding companies spun off from Telebrás a further stage in the process got under way: the promotion of competition in fixed telephony. Licenses for mirror companies to Tele Norte Leste, Embratel and Telesp were sold at auction.

Technical proposals for mirror companies have been very ambitious. The idea is to use a mixture of cable and WLL (wireless local loop) technology so as to start operations as soon as possible. The mirror companies are authorized to use this technology immediately whereas current operators suffer restrictions. Until 31 December 2002 they are only free to operate in towns with up to 50,000 inhabitants or in areas that do not form part of the technical proposals of the mirror companies. Competition in intra-regional long-distance services will begin in July 1999. Each operator will have identification digits (which have already been defined) in accordance with a Numbering Plan. By 2005 all telephone numbers will consist of 8 digits and subscribers will be able to retain these numbers when they move.

The sector is now passing through a new stage of transition after the privatization. Brazilian telecoms have been divided into three regions and a long-distance concession. Three holding companies spun off from

Telebrás will provide services in each of the regions. From 2003 they can also operate inter-regional and international services. Embratel, the long-distance Telebrás spin-off, can offer local services from 2003. Duopolies will create initial competition in the concession areas as mirror companies implement programs, for the period through 2002, that they themselves proposed in their licensing bids. From then on, in the same way as other concession holders, they will be permitted to enter any segment. It will also be able to set up as many providers as wished, in whatever areas that suit their business strategy.

During 1998, as fixed-telephone companies were occupied with restructuring, earnings were jeopardized by provisions, with a number of companies showing losses. In 1999, however, the watchword will be competition. Mirror companies are already building infrastructure in the run-up to competition in intra-regional and intrastate markets. Under this scenario two important issues should be watched carefully: tariff adjustments (both upward and downward), and changes in the operational structure of the groups concerned (Tele Norte Leste and Tele Centro Sul have already shown signs of moves in this direction). With the decrease in revenues and profit margins produced by the ending of the monopoly status of companies, corporate restructuring (essentially mergers) is vital for achieving cost reductions and streamlining management.

There is important short-term potential among fixed-telephone companies for cost reductions: when cellular operations were spun off from fixed-line operations, the former appear to have emerged from the process with the more appropriate operational structures. Additionally, besides being cheaper than cellular services, fixed services are considered essential and have a low level of penetration. These considerations suggest that the downturn in economic activity in Brazil, and the associated fall in income, will have less impact on fixed-telephone companies. Meanwhile these firms are accelerating capital expenditure with a view to both meeting installation targets and countering competition from mirror companies. The latter are not expected to be operating to any significant extent before the end of 1999 or the beginning of 2000.

4. Current View of Telephony Infrastructure

USE IN HOUSEHOLD – BRAZIL

Electric power	93%	Computer	5%
Radio	90%	Pager	3%
Cooking ranges	97%	Water supply	75%
Fixed-line telephone	13%	TV	84%
Cellular telephone	4%	Postal service	87%
Cable TV	6%	Refrigerator	80%

Source: Anatel, IBGE, domestic-appliance companies

As a basic service, telephone use in Brazil, remains incipient. The result of having only one telecoms service provider in Brazil over many years has been massive unsatisfied demand. As the monopoly is now giving way to a multitude of providers subscribers can now shop around for the best deals in terms of service, price and technology. Potential in the sector is great: telephone use, when compared to the use of other appliances, shows significant room for growth.

According to the World Bank's 1998/1999 World Development Report, Brazil had **96** telephone main lines per 1000 people as of 1996. This figure is based upon an estimated population of 164 million inhabitants, and represented a 28% increase from 1995.

Country	Daily Newspapers	Radios	Television Sets	Telephone Main Lines	Mobile Telephones	Personal Computers
Argentina	138	---	347	174	16	24.6
Brazil	45	222	289	96	16	18.4
Uruguay	237	---	305	209	25	22.0

Venezuela	215	---	180	117	35	21.1

Regional characteristics confirm growth potential. Telephone density in São Paulo is Brazil's highest and is close to the average for Latin America. This does not mean, however, that growth potential in the state, given its economic importance in national terms, is not significant. Around 35% of Brazilian GDP is generated in this state, which also has the highest national per-capita income. It is estimated that telephone accesses will grow by 78% over the next two years. Tele Norte Leste's concession contains major regional differences. While it includes developed states with high population densities, such as Minas Gerais and Rio de Janeiro, and less populated states with lower per-capita income, it also includes areas which have shown economic growth rates above the national average over the last few years. Potential line growth in the region is accordingly estimated at 64%. In Tele Centro Sul's concession area, while line growth is expected to be lower, it is still significant: plant expansion of 45% is estimated over two years. Although the per-capita income of the region is below the Brazilian average, economic growth rates have been strong. The states of the center-west, for example, have recently seen important changes in the make-up of their GDPs, with the service sector growing strongly. Although telephone density is close to the Latin American average, unsatisfied demand is high EBITDA margins of Brazilian telecoms companies have been comparable with levels in the rest of Latin America. However, there is substantial room for improvement from increased use of digital equipment, which permits higher revenue per access and per employee.

FIXED TELEPHONE

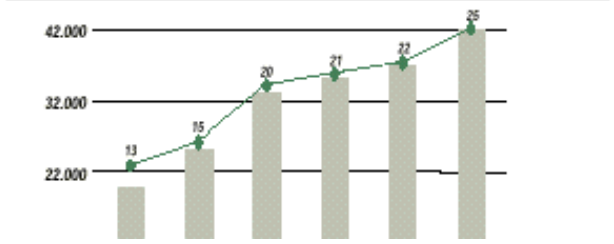
AREA	STATES	POP.	%POP TOTAL	AREA (Km²)	%TOTAL AREA	POP/ AREA	GDP/ POP.	%GDP	TERMINAL IN SERVICE	TELE DENS (%)
Telesp Part.	S.P.	35,3	21,8%	248.808	2,9%	141,8	8.245	35%	6.409.457	18
Tele Norte Leste Part.	RJ,MG,ES,BA,SE,AL,PE, PA,RN,CE,PI,MA,PB,AP, AM,RR	88,5	54,7%	5.436.233	63,6%	16,3	3.879	41%	7.800.000	9
Tele Centro sul	DF,GO,MT,RO,AC,MS, PR,SC, TO,RS(CTMR)	28,0	17,3%	2.577.313	30,2%	10,9	4.721	18%	3.777.123	13
BRAZIL		161,8	100,0%	8.544.416	100,0%	18,9	5.029	100%	20.000.000	13

Obs: Data relates to 1997, except terminal in service (1998)

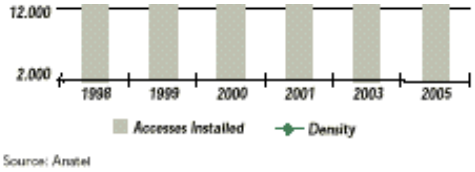
* Legend for states at end of report

While telephone density is not far from the Latin American average - with the exception of Region I (Tele Norte Leste's concession area) - a high level of unsatisfied demand remains. It is estimated that short-term demand in Region I is for 5.0M lines, in Region II (Tele Centro Sul) 1.7M lines, and in São Paulo a further 5.0M lines. These estimates represent a 58% growth on plant currently in service (20M accesses). The average consumer waiting period prior to the privatization of Telebras was between 1 and 3 years for wired telephony service. The privatization and the introduction of competition in the marketplace should help eliminate such inefficiencies. From this point, each holding, in accordance with strategies drawn up by the new shareholders, initiated a program of restructuring. In order both to meet the universalization targets required by ANATEL, and to build market share ahead of the entry of competitors, expansion and quality objectives were key elements in the process. In fact, due to the low rate of capital expenditure over recent years the sector accounts for only 1.8% of Brazilian GDP. The equivalent figure for Colombia, Mexico and Argentina is 2.2%, rising to 4% in the case of Canada and France 4%. The size of the capital expenditure which private-sector companies are obliged to invest to meet telephone-density targets will change this situation. An idea can be obtained when we consider that a telephone density of 25% is expected in 2005 (35% including lines to be installed by mirror-companies). Other telecoms services will see equally strong growth rates: data communications, for example, have expanded at a surprising rate over the last few years.

FIXED TELEPHONY



The first positive effects of the privatization and competition can be already observed. In regard to operational achievements, the fixed-line network expanded by 16% (Telebrás companies) in relation to the previous year, reaching a total of 17.8 million terminals in service. Telephone density rose to 13% (11% in 1997) and the number of digital



lines increased to 73% (68.8% in 1997).

Tariff adjustments in 1996 and 1997 also contributed to the advance of the sector. These adjustments were designed to reduce the cross-subsidies which had inhibited investment in the sector. Plant growth and tariff adjustments contributed to changes in the sales mix in 1997. In 1998, similar changes were primarily a result of an alteration in the criteria for remunerating long-distance calls.

As from June 1999, fixed-line companies will be able to adjust their tariffs. The formula established by ANATEL allows an average 7.9% hike for a basket of prices. The formula is based on the change in the IGP-DI index (General Price Index – Domestic Use) and involves productivity discounts on interurban (2%) and international (5%) services. The basket consists of the registration fee, monthly fee and pulse tariff. Whereas the adjustment can be different in the three cases, the average adjustment cannot surpass the maximum established. Fixed-line companies therefore establish their own partial adjustments. We believe that the monthly fee, as it has a fixed value (it is independent of usage) and is an important component in revenues (20% on average) will suffer the greatest adjustment. A rise of 17% is estimated, producing a gain of 3.4% in revenues. To keep within the ceiling we expect to see lower adjustments for registration (which in some cases could become merely a nominal value) and pulse, with the latter rising something like 7%. Interurban and international services, on the other hand, after the discounts foreseen in law, are expected to rise by approximately 7% and 2%, respectively. In fact these values correspond to the adjustment ceiling while, with competition beginning, it is likely that tariffs will fall. In the projections for 1999 and 2000 analysts assume an average reduction of 3% and 5%, respectively. The assumption derives from the fact that Embratel will be entering the intrastate market. Given the important contribution of interurban services in sales analysts believe that, to preserve market share, local-telephone companies will not implement the full adjustment permitted.

5. Internet Infrastructure

The building of the Brazilian Internet infrastructure started as early as in 1988, when some regional academic communication networks started to be deployed across the country. The most important of those initiatives was the ANSP network, owned by Fapesp, a foundation that supports academic research in the state of Sao Paulo, and integrated both Universities and research centers.

Seeking to coordinate all Internet-related efforts and secure integration of regionla networks into one national network, the Ministry of Science and Technology created RNP in 1989. RNP's mission was to operate a backbone network dedicated to teaching and research institutions and Government agencies. The effective implementation of such backbone took place in 1992, using Fapesp's international connection. Since the first day the network has been growing at a fast pace. By 1995, when the commercial ISP market was opened to private companies, RNP had already national coverage. At present the RNP network serves more than 800 institutions in 26 Brazilian states.

In 1998 RNP started to lead the efforts to build a high performance network for academic purposes, named RNP2. The development of the REMAV (High Speed Metropolitan Netowrks) was initiated with the collaboration of several Universities and research centers. This project requires that the associated institutions are connected to their respective telcos by fiber optic networks. Applications for tele-medicine, remote education, virtual libraries, virtual labs and network management are given priority. Once the network implementation is finished, RNP intends to connect it to Internet2 in the US to facilitate new partnerships between Brazilian and US universities.

After the opening of the ISP market in 1995 some companies such as Global One started to provide connection services using their own Internet backbones. Since the long distance communications were still a monopoly operated by Embratel, such backbones had to be necessarily built over Telebras's data transmission networks.

After the privatization of Telebras and deregulation in 1998 the new carriers started their investments in fiber optic networks, submarine cables and other telecom infrastructures. Simultaneously the privatized companies started an ambitious program to expand and improve their networks. For instance, Telefonica built an IP network covering the whole state of Sao Paulo and interconnecting all the states included in its

concession area to its own Internet backbone.

Embratel, now controlled by Worldcom, was the first operator of the commercial backbone network. As of today Embratel owns the largest Internet backbone network in Latin America by transmission capacity and coverage. It has connection points in 110 cities, in all states. A detailed description of the technical capabilities of the network can be found in the company's website.

According to Embratel, since 1998 the Internet traffic in Brazil has grown fourfold. Embratel expects the traffic to increase by 70% in the upcoming three years. Traffic is still concentrated in the Sao Paulo - Rio connection. Embratel estimates that 60% of the Brazilian traffic is generated in Sao Paulo, 30% in Rio and the remaining 10% in the rest of the country, particularly Brasilia, Belo Horizonte, Porto Alegre, Curitiba, Florianopolis, Salvador and Recife.

The following map, obtained from the RNP website, shows the Brazilian Internet backbone network

Last modified Dec.6, 1999

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Return to Home Page

Who We Are

Internet Adoption Process

Labor Markets

Education

Nature and Opportunity of Access

Telecommunications Infrastructure

Presentation I

Government Policies and their Effects

Financing and the Private Sector

Presentation II

Case study: Universo Online (UOL)

Case study: The Committee to

Brazil: Internet Development for Whom?

Government Policies and Their Effects

1.1 Introduction

Without some level of government support, a country cannot become an important player in the information technology industry (e.g. Evans, 1995; Dedrick and Kraemer, 1998; Amsden, 1989).

Emerging from the "lost decade" of the 1980s, Brazil faced the task of stabilizing a stagnant economy marked by debilitating inflation rates. In an attempt to cultivate the country's IT industry, the Brazilian government continues to adapt to the international arena. It has moved from a protectionist policy that advocated

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domestic production to one that encourages foreign competition within its borders.

1.2 Economy

1.2.1 Economic Situation

With 160 million people and its strong industrial base, Brazil possesses both the critical mass to effectively compete both as producers and consumers in the global IT marketplace. It is the largest economy in Latin America, and the world's eighth largest economy (www.corporateinformation.com/data/statusa/brazil/comphardware.html).

Brazil experienced its economic golden period from 1965 to 1980 when the value-added growth in the manufacturing sector averaged 9.5% a year, surpassed only by South Korea, Singapore and Indonesia in world terms. However, in the 1980s, Brazil encountered rampant inflation and economic stagnation which crippled its global competitiveness.

1.2.2 Economic Stabilization: The Real Plan

In 1994, the government instituted the Real Plan which has been the most successful economic stabilization policy in the past 15 years. To stop the inflationary spiral, the Real Plan introduced a new local currency, the real, which was linked to the dollar in a relatively fixed rate. The inflation rate dropped from 2111% in 1993 to 2.5% in 1998. The Real has also created more buying power for many Brazilian consumers, particularly for the majority of the population in the lower income levels. Salaried workers realized a 15 percent to 30 percent increase in actual purchasing power after the Real was introduced. However, in 1998 consumer demand fell somewhat due to mounting debt locals and continued high interest rates.

Brazil's recent economic performance

	1991	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	1998
GNP growth	0.1	-1.1	4.4	5.7	3.9	3.1	3.7	--
GNP per capita growth	-1.5	-2.6	3	4.2	2.5	1.8	2.3	--
inflation rate (%/yr)	--	991	2111	2166	59.7	15.5	6.0	2.5

Source: MPP-IBGE (1997 and 1998) and International Monetary Fund, 1998

While maintaining inflation to a stable low, the Real Plan has had a negative effect in trade and investment aspects of the economy. The interest rates are among the highest in the world. Imports increased as a result of lower tariffs and reduced non-tariff barriers. A historically positive trade balance thus turned into a

negative one. In the IT industry from 1991 to 1997, imports of assembled products grew by 741% while exports remained unchanged. The import increase was due mainly to the import of final products.

Information Technologies Balance of Trade (US$ million)

	1992	1993	1994	1995	1996	1997	1998
Imports	1,772.1	2,521.7	3,518.4	5,395.6	6,487.8	7,617.7	3,207.9
Exports	801.8	829.4	791.3	859.7	1,005.3	1,157.2	593.2
Deficit	-970.3	-1,692.3	-2,727.1	-4,535.9	-5,482.5	-6,460.5	-2,614.7

Includes data processing, consumer, electronics, telecommunication, components
Source: Brazilian Ministry of Science and Technology

1.3 IT Industry

1.3.1 Market Reserve Policy

In 1977, Brazil initiated its market reserve policy in order to protect its domestic computer manufacturing market by prohibiting computer imports. Within this protected market, several local companies that had specialized in providing technical support for machines manufactured abroad, began to manufacture their own products. This policy resulted in higher prices, lower quality and poor technology standards. Under this market reserve policy, most of the computers "manufactured" in Manaus, one of Brazil's Free Trade Zone, were actually imported computers that were dismantled and re-assembled receiving a local brand.

1.3.2 IT Policies

In October 1992, the government ended its market reserve policy and changed to an international course that capitalized on the benefits of foreign competition.

1. **Basic Productive Process**
   Policies and executive initiatives related to the national IT industry are under the direct responsibility of the Ministry of Science and Technology (MCT), through the Secretariat of Informatics and Automation Policy (SEPIN). In the early 1990s, the Brazilian government implemented the Basic Productive Process (PPB). The new policy focused on building a strong base for innovation, strategic partnerships with local and foreign industry, and quality assurance of products. It created incentives for local production in the computer industry while attracting significant new investments to Brazil.

   This IT sector is regulated by five specific regulations:

   1. Informatic Law (#8248/91)
   2. Software Law (# 7646)
   3. Manaus Free Trade Zone Law (# 8387/91)

4. Law on Imports of Goods for Scientific and Technological Research (# 8010/91)
5. Technology Training Law for Industry and Agriculture (# 8661/93).

The PPB provided tax incentives to computer companies that locally manufacture their product. In order to qualify for the tax breaks, the companies must meet the following requirements:

1. Invest 5% of total revenue in research and development (3% can be internal and 2% must be invested in Universities or other legal entities recognized by the Government)
2. Meet ISO 9000 standards of quality within two years
3. Manufacture products from the motherboard level up

The companies that apply for and receive PPB certification for a specific product line, receive the following benefits which are expected to extend until 2013:

1. Reduction of up to 50% of corporate income tax (valid until December 31,1999)
2. Reduction of IPI (excise tax) averages 18%
3. Reduction ICMS (sales tax) ranges from 12% to 7%.

Using the current taxation levels, a PC assembled in Brazil that fell under PPB coverage could cost up to 35% less than an imported one. As a result, many international companies (IBM, Compaq, Acer) have began established local manufacturing facilities for the brazilian and export markets.

2. **Internet Policies**
   1. **Internet Service Law**
      In May 1995, the Ministry of Science and Technology and the Ministry of Communications instituted regulations of the Internet service sector to promote growth of competition.

      The regulations:

      1. Declared the Internet an information service, and therefore free for people to provide and to access
      2. Allowed anyone except telecommunications firms and the Brazilian government the right to provide retail (dial-up) service to the end-user
      3. Resulted in an upgrade of university-operated Internet backbone to include 2 Mb/s lines and to connect all state capitals

      http://www.american.edu/carmel/CS8329A/government_policies.htm

2. **National Research Network** The National Research Network (RNP) has been a major driving force behind Internet diffusion in Brazil. It is managed by a committee of academics and representatives of the IT user business community. In 1997, the program invested $20 million in local IT services providers, schools, and infrastructure, such as high-speed backbones, and linking universities and business centers. RNP aimed at developing Internet links at science and technology institutions, but it has also boosted commercial use of the Internet by providing infrastructure and technical capabilities. The project is now shifting to academic and social use, since private backbones are now available to support electronic commerce.

3. **Software Policies**
    1. **National Program for Software Export**
    The National Program for Software Export (Softex 2000) was introduced in 1993 with the following goals:
        1. country capture 1% of the world software market by the year 2000
        2. local firms attain 50% share of the national market

        In order to accomplish its goals, it proposed to:
        1. create an estimated 50,000 skilled jobs
        2. build regional centers to stimulate cooperation among small software firms
        3. install marketing offices overseas (USA, Germany, Argentina, China) in order to support Brazilian firms' export efforts
        4. provide incentives for in-house training of IT professionals

    2. **1998 Software Law**

        While the market reserve requirement was technically ended in October 1992 by the Informatic law(#8248/91), this reserve subsisted in the Brazilian legal system because the software law still contained discriminatory provisions against foreign capital. It was not until Brazil enacted its new software law (#9609/98) on February 19, 1998 was the market reserve permanently eradicated in the IT sector.

        The 1998 software law has now completely abolished the requirement that contracts be approved and software be registered with SEPIN. The law thus consolidates the process of opening the country's software sector to foreign capital and making the information technology sector more flexible.

1.3.3 Effects of IT Policies

1. **Effect on Domestic Firms**
   The cumulative share of foreign capital in the privatization process has been growing steadily over the period 1996-1998, when it reached 42 %. In response, domestic companies adopted a defensive strategy centered on major adjustments to reduce costs and improve competitiveness of locally manufactured products. The liberalization of the IT market for imports and foreign investments in the 1990s altered the industry structure. International leaders in the IT industry gradually took over most existing firms and turned away from local design and manufacturing to imports. The surviving locally-owned firms were those oriented toward niche markets such as banking automation, client-specific software, and telecommunication equipment, where the client-supplier relationship was strong enough to withstand foreign competition (La Rovere, Tigre and Fagundes,1996).
2. **Effect on Internet Diffusion**
   A major factor behind Brazil's rapid Internet diffusion is the technological capabilities accumulated during the market reserve policy when tens of thousands engineers where involved in R&D activities. Many of then now run Internet providers, design applications and give support to the diffusion of on-line information systems.

1.4 Further Government Intervention

The persistence of a large gray market for IT products estimated to be growing at a much higher rate than the overall market, indicates that the real trade deficit is larger than the official figures suggest. There is indeed a pressing need for stricter government control on smuggling of IT products. This should be accompanied by a continuation of fiscal incentives that help bring computer prices down. Tax exemptions in IT-related programs amounted to R$600 million in 1997, but smuggled products pay no taxes. Higher taxes may act as a stimulus to smuggling of computers as well as prevent locally produced computer prices from falling.

Last modified Dec.6, 1999

Return to Home Page

Who We Are

Internet Adoption Process

Labor Markets

Education

Nature and Opportunity of Access

Telecommunications Infrastructure

Presentation I

Government Policies and their Effects

Financing and the Private Sector

Presentation II

Case study: Universo Online (UOL)

Case study: The Committee to Democratize Information Technology

Brazil: Internet Development for Whom?

Financing and the Private Sector

A. INTRODUCTION

In the current environment of privatization and deregulation, the private sector is intended to play a key role in the introduction of the Internet in Brazil. By private sector we mean the aggregation of all economic agents other than the Brazilian Government (whether federal or at a lower level, including state-owned companies and agencies) and supra-national institutions with development programs such as the World Bank, the IMF and the like.

The leading role of the private sector will comprise both industries classically regarded as exclusive domain of private initiative (PC hardware, software, Internet access, e-commerce…) and also other industries in which the State has traditionally played a more active role. The latter is, for instance, the case of basic telecommunications infrastructure, in which after the privatization of Telebras and Embratel (see the section on Telecommunications Infrastructure) the burden of the investment effort, and simultaneously the capacity to drive the development process, has been left in the hands of major global players such as Telefonica or WorldCom. However, it must also be acknowledge that the process is closely monitored and to a certain extent still driven by the State through the investment commitments, coverage goals and

(CDI)

Final Presentation

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service rate regulation that were imposed to those players with the occasion of the privatization.

Private investment follows the universal logic of return. Private investors will invest in the Brazilian IT industry if and only if they believe they can earn an attractive rate of return. The question should then be: is the IT market in Brazil an attractive industry to invest in? We will provide an answer based on two recent reports from very well reputed international research firms:

- Forrester (February 1999): "Should investors wait 10 years for South America? NO!!!" While the quote refers to the whole region, the report pictures Brazil as the most attractive market in the region. Forrester's resolute statement is supported by 3 main arguments:
    1. Large Brazilian cities (Sao Paulo, Rio) already provide telecom, ISP and e-commerce companies with ripe, dense masses of wealthy, well-educated citizens. These people are also likely to be more prone to adopting new technologies than the average Brazilian citizen.
    2. Online transactions already exist in Brazil as part of the everyday life
    3. Privatization and deregulation, together with competition introduced by second licenses, will spur improvement in telecom infrastructure and lower down the cost of access to telecommunications services
- Lehman Brothers (August 1999): "Latin America appears to be the next stop for investors looking to capitalize on new opportunities offered by the Internet". According to this investment bank, Latin America should become an expanding and profitable Internet market. There are 3 factors that support the positive prospects of the Internet industry in the region:
    1. Relatively young and large population
    2. Low but growing per capita figures
    3. Relatively large and attractive middle and upper class offering an attractive customer base lead. It's worth mentioning what Lehman presents as "more simple and less scientific research to back up this statement: the large number of Latin American shoppers in New York's Fifth Avenue stores or to vacation spots such as Disneyworld

As we mentioned before, the rationale for the private sector is simple: return. And Latin America appears to be the next stop for investors looking to capitalize on the new opportunities offered by the Internet. Part of this attractiveness doesn't have its roots in the region itself, but in the high returns enjoyed by both early private equity investors and

venture capitalists in the US first, and most recently in Europe and Asia, followed by the high level of returns of publicly traded Internet stocks in those 3 regions. So we can conclude that precisely the same reasons that in the past attracted investors to the volatile Latin American markets (essentially, those mentioned by Lehman) should lead investors to the conclusion that Latin America should become an expanding and profitable Internet market, too. This view can certainly be confirmed by looking at the rapid infrastructure development, and the growing figures of PC and Internet users. The particular socioeconomic structure of these countries, point number 3 in Lehman's investment case, provides Internet companies with a large enough customer base that is relatively sophisticated and willing to consume.

Specifically, Lehman's analysts point out that Brazil has already reached the point of "critical mass". Not only is the most developed e-commerce country in the region, but also the size of its Internet user base is already large enough to support a domestic e-commerce industry. Given its relative size, despite its relatively low per capita income, Brazil's middle and upper class have contributed to placing the country at the lead in Latin America in terms of potential market. Our section on the current state of the Internet industry in Brazil provides a detailed analysis.

As a result, an array of international and local players is diligently looking to carve out their own niches in the Brazilian growing Internet space. In this section we examine how private sector initiatives in the Internet industry are articulated in Brazil. First we start examining the role of the entrepreneurs, and the difficulties associated with starting new ventures in Brazil. In particular, the current possibilities of access to venture capital and the capital markets are analyzed. Then we study the role of the current incumbents, the large "brick-and-mortar" Brazilian corporations. Finally, we study the role of international players that create Brazilian subsidiaries or invest in existing Brazilian companies. Our second presentation contains a revision of the funding models used by the most important Internet players in the Brazilian space (mainly portals and ISPs). These mini-case studies show a tremendous variety : from entrepreneurial initiatives (like ZipNet) to funding by existing incumbents (like UOL).

B. ENTREPRENEURSHIP

The Silicon Valley model for financing the growth of start-up Information Technology (IT) and Internet businesses is based on three key factors:

- Entrepreneurship: a large number of new start ups being launched
- Availability of venture capital to fund those new ventures at their

early stages of development,

- Access to a specialized stock market (Nasdaq) that provides venture capitalist with an exit mechanism and the company with new sources of funding as well as a "Net currency" to finance acquisition and enormous growth rates

These 3 elements are mutually self-reinforcing, creating a sort of virtuous circle that has driven to the explosion, in economic terms, of the Silicon Valley area as the most dynamic economic area in the world, and the paradigm of technological innovation. To a great extent in Brazil, these three elements either do not exist or are just in their incipient stages. Venture capital has been relatively scarce for Brazilian start-ups, for reasons discussed below. As for IPOs, the comparatively small size of the Brazilian stock markets limits the extent to which public equity offerings can be considered a valid means of raising capital for small and medium sized high-tech companies. And without expectations for reward entrepreneurial spirit does not flourish.

1. RISK TAKING IN THE BRAZILIAN BUSINESS ENVIRONMENT

In a recent interview for the Brazilian online magazine Exame (http://www2.uol.com.br/exame/), one of the leading business magazines in Brazil, Ivan Moura Campos, a Brazilian consultant who works with new technology and Internet ventures, points out that one of the key factors for the development of the Internet in Brazil is the "emergence of Entrepreneurs (with capital E)". In his view, access to technology is not the most serious constraint: "Technology is the least difficult issue. As of today, Brazil is much better endowed with technology than with entrepreneurial spirit, and international marketing skills". According to his analysis of how the Silicon Valley model could be imported into Brazil, "In Silicon Valley there is an impressive rate of new start ups being launched every month. Almost every minute there are new companies being born and some other companies die. In contrast, taking large scale risks does not form part of the business culture in Brazil. For instance, in the US failure does not necessarily damage irreversibly an entrepreneur's social and business reputation. In fact, an entrepreneur can fail several times before his/her reputation is affected. Here in Brazil this simply does not happen. Failure means the end of a person's credibility".

In the same issue of Exame Jack London, founder of two successful Brazilian e-commerce ventures, BookNet (Amazon's copycat, subsequently acquired. It can now be found at www.submarino.com.br) and Valeu (eBay's copycat, at www.valeu.com.br), addresses the issue from a humorous perspective. According to him, Brazil needs two things to produce

Internet companies such as Amazon, Yahoo! or eBay: garages (referring to the fact that many of today's Internet giants were started by the founders in a home garage with a small and old PC) and fathers-in-law (after the fact that successful entrepreneurs such as Sam Walton (WalMart)- and Jeff Bezos (Amazon)- started their companies with funding from their respective fathers-in-law). What he really means with this amusing analogy is that Brazil lacks the breed of entrepreneurs that has driven the Internet explosion in the US: "the word risk is not included in the Brazilian entrepreneur's personal dictionary. Instead, entrepreneurs prefer certainty, but certainty is not possible by definition when it comes to the Internet. Certainty and Internet are antonyms".

Paulo Guedes, an economist and regular contributor to Exame's reports, fundamentally agrees with Ivan Moura's diagnosis: the "culture of risk", as it is commonly referred to in the business world, is still at an early stage in the development process in Brazil. According to him, the entrepreneurial culture was wiped out by the Brazilian economic policies in the previous decades. Years of hyperinflation and astronomic interest and tax rates suffocated the entrepreneurial spirit: "To start with, the tax burden was completely irrational. The Government generated a deficit of approximately 8% of the GDP, together with tax revenues of 30%. Thus Government would control and manage almost 40% of the GDP. This is a centralized economy very similar to that of countries like the USSR, but without the benefits of socialism such as a more egalitarian distribution of the national income and a strong base of human capital. The outcome from those policies was that the Brazilian economy dramatically slowed down its growth rate. While Brazil grew at an average rate of 7.5% over the first 75 years of this century, the rate dropped to 2.5% in the 80s and only 1.6% in the 90s". For Mr. Guedes, it is clear that this low risk tolerance is not intrinsically embedded in the Brazilian businessman, yet it is merely the result of Government policies: "The Government continuously change the rules of the game, imposes heavy tax rates, raise interest rates, confiscate companies… Being an entrepreneur in Brazil is a sort of nightmare"

2. FUNDING NEW BRAZILIAN VENTURES: VENTURE CAPITAL

The introduction of technology in Brazil has historically confronted serious difficulties associated to lack of capital. This problem has started to be addressed with the recent and gradual arrival of venture capital firms. There is still a long way ahead for Brazil to develop solid and sophisticated financial markets and a vigorous venture capital industry, but according to Exame

Brazilian technology companies increasingly receive funding from private financial investors to accelerate their growth. As a result, names of Brazilian technology companies such as Microsiga, Datasul, Booknet, Nutec or Logocenter are becoming familiar. The appetite of financial investors for Brazilian opportunities is based on the impressive growth of the Internet in Brazil. Industry sources estimate that the number of venture capital and private equity firms that are seeking opportunities in Brazil has grown ten fold in the last 12 months, and will double in the upcoming year.

There is no reliable estimate for the amount of funds currently available for venture capital or private equity investments in Brazil. Industry estimates range fom US$ 250 to 2,500 millions. According to a survey recently carried out by Exame there is approximately US$ 1 billion available in the market. Investments are not exclusively focused on the Internet: biotechnology, telecommunications, services and healthcare are other major areas. However, it is primarily the Internet the force that is driving the emergence of venture capital in Brazil. In fact, 90% of the business plans received by Bozano, Simonsen, a leading Brazilian investment bank that manages a US$ 100 million venture capital fund in Brazil, are Internet-related. All the business models that have been relatively successful in the US market are being replicated in Brazil.

Obviously Brazil is still far from the US levels. Venture capital has existed in the US for more than 30 years. Pricewaterhouse Coopers estimates that in 1998 total investments amounted to US$ 14.3 billions, which represents a 24% growth over 1997 and a 78% growth over 1996. Moreover, in the first semester of 1999, the investments in technology-related ventures only amounted to US$ 10.5 billions, the same amount invested over the whole year in 1998. Focusing only on Internet ventures, the investment has grown four fold in the first semester of 1999 compared to the same period in 1998. Some industry sources point out that Brazil is now where the US was 20 years ago. Building a vigorous venture capital industry takes time, but it is generally agreed that the development of venture capital in Brazil will be much faster than it was in the US, since investors have much more accumulated experience from the US operations.

As well as differences in absolute industry volume, the Brazilian venture capital industry has so far focused on already relatively established companies, with revenues over US$ 10 millions. For example, in December 1998 WestSphere, a US-based fund, invested US$ 20 millions in Datasul, the largest Brazilian software

company. Universo On-Line (UOL), one of the largest Internet players in Latin America, is another example of the role of private equity investors. In October 1999 the owners of the company sold a 12.5% stake to a group of private equity investors led by Morgan Stanley, raising US$ 100 millions to pursue the company's international expansion strategy. Therefore technically speaking these deals are not properly venture capital investments, but private equity. These companies present a lower risk profile than true start ups. True seed or venture capital to fund emerging start ups is still scarce in Brazil. As a partner from a local venture capital fund points out "in order for us to invest in a new start up, this has to meet one of these two pre-requirements: either the entrepreneur has a huge experience in the proposed business, or the company is going to target a new market niche in which there is no currently another player".

Local venture capital or private equity funds are still mostly managed by investment banks such as Bonzano, Simonsen, Icatu and Garantia. However, new pure players have recently entered the space. Internetco Investments and EVM Empreendimentos, both located in Sao Paulo, are good examples of this new breed of players. Why this growing interest in venture capital? In the past, extremely high interest rates provide investors with an attractive alternative to make a high return without bearing the risk associated to a new venture. As interest rates beginning to go down, investors started to turn towards other investment options in search for high returns. Obviously investors had to face higher risk. In fact, not so long ago the only venture capital investors in Brazil were Government agencies such as BNDES (the National Bank of Social and Economic Development) via BNDESPAR, its venture capital subsidiary. BNDESPAR has a program, called Contec, for new high tech ventures. Maximum investment in a venture is approximately US$ 1 million, and the equity stakes acquired can be as high as 30% of the new start up. Together with BNDES, but from the private sector, CRP (Companhia Riograndense de Participações, located in the state of Rio Grande do Sul), has been also very active for many years in the venture capital space. Founded in 1982, it manages three different funds that invest in minority stakes in new ventures. Approximately 24% of its current investment portfolio is composed of technology companies. In fact, last October it launched another fund (RSTec) that will invest exclusively in ventures that are developing innovative technologies. Initially RSTec will focus on ventures within the state of Rio Grande do Sul, but in the near future CRP intends to extend its scope to technology ventures in other states.

Emerging Brazilian venture capital funds are working very closely with Universities and incubators to identify promising business plans and innovative ideas. An incubator is a company, an institution or an environment where an entrepreneur with a business idea can find the minimum conditions required to start up the business. Initially conceived as rooms within Universities where several entrepreneurs shared basic IT resources such as phone, fax, copier or computers, incubators have evolved to value-added environments capable of generating synergies by promoting interaction and exchange of ideas among entrepreneurs. From the perspective of venture capitalists, incubators also provide start ups with a sort of "quality stamp" that certifies that the entrepreneurial idea has gone through several filters and reality checks. However, the presence of large international high-tech companies could help significantly the incubation of new ideas and innovation.

Despite this promising landscape, in the global economy Brazil remains behind other countries such as India, Ireland, Israel or Argentina as far as development of venture capital is concerned. The main reason for that is the immaturity of the Brazilian capital markets. Another important point is lack of coordination between Government and private initiatives. Even within the public sector, the various existing development agencies operate with very little coordination, which prevents them from generating significant synergies and benefiting from a steeper learning curve. There is no national agency or industry association grouping all the players in the venture capital space. In Ireland, the Irish Development Agency concentrates all the information relevant for the potential interested parties. In Brazil, all the data are disseminated across different agencies, or simply is not available. An organized structure, particularly at the level of national development agencies, would also help promote the country's image abroad. For instance, there are many Irish and Indian entrepreneurs that have built support networks in Silicon Valley. Brazilian start ups do not have access to those resources for funding or counseling. Finally, there are also some cultural differences between the Brazilian entrepreneur and the entrepreneur from elsewhere. In Brazil the average entrepreneur wants to own the whole business. They do not fully understand the advantages of bringing in partners. In a way they still choose to own 100% of something worth US$ 50,000 to 5% of something worth US$ 500 millions. The good news is that, according to some industry sources, this attitude has started to change significantly, and Brazilian entrepreneurs have started to "think big" and the quality of the business plans submitted for the consideration of venture capital firms has

improved significantly. Thinking "big" or "global" is essential from the perspective of venture capital funds. In addition to excellent management teams, venture capitalists look for products or services that can be projected beyond the Brazilian market: the largest the potential market, the lowest the risk for the venture capitalist.

3. THE BRAZILIAN CAPITAL MARKETS

The absence of well-developed capital markets is arguably the main obstacle for the emergence of a large wave of new technology companies in Brazil. Start up companies are too small to access the capital markets. Even for not so small, already well established local technology companies raising funds in the local capital markets is tough, since the market remains largely unsophisticated and does not understand the risk profile of these companies. On the venture capital side, investors are reluctant to put money in companies for which there is no clear exit strategy.

Taking a company public in Brazil is not an easy task. The stock markets in Brazil, the largest of which is the BOVESPA exchange in Sao Paulo, do not approach the size of the largest exchanges in the world. Small and medium-sized Brazilian companies (not to mention many large ones) tend to be privately held. This has historically been true of most industries. The largest companies may trade on the BOVESPA exchange and also issue American Depositary Receipts (ADRs) on the New York Stock Exchange and trade on other foreign exchanges. The stock market is very narrow and concentrated on a small number of companies. Only the stocks of the largest corporations have enough liquidity. Another problem is the lack of transparency in the information disclosed by many companies. Moreover, very rigid regulations make very hard for small or medium size companies at their early stages to raise equity in the market.

Some venture capital players have already requested a reform of the rules governing the access to the capital markets. The creation of a specialized market like the Soma, in Rio de Janeiro, may be a viable alternative to help solve this problem. Industry experts point out that in Germany venture capital investment grew by 84% in 1997, the year in which the Neuer Market, a specialized marketplace for high tech stocks, was launched.

As far as the problem of liquidity is concern, the increasing access of the small investor to the stock market may help. In Brazil only 5% of the total market volume is traded by individual investors. In

the US, this percentage is approximately 60%. Here the Internet can play an instrumental role, by facilitating individual investors the access to stock trading via online brokers.

4. ALTERNATIVE SOURCES OF FUNDING

Commercial Lending

Commercial lending is not a viable option for new Brazilian ventures. It has been stymied by high interest rates under the Real Plan, reaching levels of around 40% in 1998 and the first two quarters of 1999. Only recently have interest rates begun to fall again. Corporate debt issuances in world capital markets, meanwhile, are reserved for only the largest and most credit-worthy borrowers.

NASDAQ

A potential alternative for the already well-established companies such as UOL or ZAZ may be the US stock market (Nasdaq), where funds are relatively easily available at lower costs of capital. StarMedia, with a market capitalization of approximately US$ 2 billions, and Terra Networks, with completed its IPO in November 1999 with a market capitalization in the area of US 3.5 billions, have shown the way for the largest players. However, Nasdaq is only an option for companies with large size, implementing pan-regional strategies. Ventures with pure Brazilian strategies do not have the critical mass required. Even for large companies such as UOL or ZAZ there are significant obstacles. First, all the financial statements and accounting and governing rules must be in compliance with US laws. Since the companies are based in Brazil, this requires double book-keeping, which is costly and time consuming. Moreover, US investors are not fully aware of the local issues: ignorance makes harder for investors to appreciate the company's core capabilities and assess its prospects. This leads to more uncertainty, which translates correspondingly in higher required risk premiums (relative to comparable US companies). As a result, valuations for Brazilian companies are not as attractive and they would be should they be floated in the Brazilian stock market. This "valuation penalty" may discourage Brazilian companies to seek funding in the US or other international markets.

5. CONCLUSIONS

If enough progress is made in these areas, particularly in the

development of capital markets, Brazil could close the so-called virtuous circle. More developed capital markets will reduce the exit risk for venture capital firms, which in turn will attract more start ups. Moreover, well established companies will create its own venture capital funds to pursue new growth opportunities. Thus the development of the Internet will not depend on large funds or financial institutions, which are traditionally much more conservative in their investment approach. For many industry analysts, it is merely a matter of time before venture capital definitely takes off in Brazil. The profit opportunities are too big to be ignored.

Some Brazilian economists advocate for a profound reform of the National Security System, which would allow to mobilize an enormous amount of capital through the financial system. This capital would eventually fund new ventures or support the development of strong capital markets, which are instrumental for the creation of a business environment that fosters the emergence of new ventures. These economists envision a future business environment where company ownership will be spread amongst the whole Brazilian society, rather than the current concentration in the hands of a few number of large conglomerates. Much alike the US, companies will be started as small ventures. Then they will have access to venture capital to support their development, and ultimately they will go public in the Brazilian capital market. Large shareholders will only retain 6-10% stakes, the rest will be owned by a myriad of institutional and retail private investors. This financial model will enable entrepreneurs to share and diversify risks since the early stages, and so will spur the creation of new ventures.

C. CURRENT INCUMBENTS

Unlike the US, current incumbents are likely to play a major role in the Internet industry in Brazil. First, those companies have learnt the lessons provided by the US experience, and have already started to react to the new challenges posed by the Internet. Thus it is unlikely that new ventures could achieve the size and the market power that companies such as Amazon, eBay or Yahoo! have achieved in the US. New ventures will face a much more intense competition from the Internet subsidiaries of the so-called "brick-and-mortar" players.

But there is another important reason why current incumbents have a decisive advantage over new ventures in Brazil. Current incumbents are already large, consolidated companies, with relatively easy access to funding. In some cases, they are enormous conglomerates with excess of cash ready to be invested in diversification opportunities. In some other

cases, size and a proven track record enable them to access the international markets or even the local stock and corporate debt market.

UOL, launched by two of the largest media groups in Brazil, is probably the best example to illustrate the role of current incumbent within the private initiative in the Internet space. Our website include an extensive study of UOL.

D. INTERNATIONAL INVESTMENTS

With the reorientation of the Brazilian economy away from import substitution development models, in which rapid industrialization took place through state-owned monopolistic firms in key industries, foreign direct investment (FDI) has grown enormously in Brazil. From US$1.6 billion in 1992, FDI reached US$26.1 billion in 1998 and US$22.7 billion by September 1999. Particularly important in explaining this trend is the privatization program of President Fernando Henrique Cardoso's government, which has sold state electric utilities and Telebras, the telephone company. For further discussion of this trend (in Portuguese), see www.bndes.gov.br/sinopse/poleco.htm

The financial events in January 1999, after the Asian crisis and the devaluation of the Russian ruble, caused widespread investor concern and capital outflows. After watching its foreign reserves dwindle, the Central Bank allowed the Brazilian currency to float outside the narrow dollarized band which had previously characterized foreign exchange policies. The result was an effective devaluation of the Brazilian real. Capital outflows continued; many sources show, however, that these outflows have stabilized and that foreign direct investment has begun to grow again.

Meanwhile, investment in Information Technology has also grown. In the 1980s, the government reserved the domestic computer hardware market for Brazilian industry (see section on Government policies). The opening of these markets has caused renewed interest in foreign investment, although global competition has also threatened the previously-protected industry. Investment in software and particularly Internet companies more closely falls under the venture capital models presented above.

The globalization of the world economy requires that large technology companies implement decentralized structures, with several R&D and manufacturing centers in different locations to take advantage of local competencies. This creates an opportunity for a country like Brazil to become a major technology hub, hosting the R&D and manufacturing centers of companies like Microsoft, Cisco, Sony or Dell. Pure

manufacturing facilities are not enough to promote technological development, Brazil needs to attract also the "technological intelligence", namely R&D centers. Those R&D centers could generate a big wave of entrepreneurial initiatives in Brazil. Obviously, there are many countries in the world that are after the same thing. Thus a more decisive Government action is required to create the environment that attracts technology companies to Brazil. In Mr. Guedes's own words: "There was tons of political action mobilized to attract the Ford plant to Brazil. Why doesn't the Government make a similar effort to create a Silicon Valley in Bahia, for example?"

The other source of foreign investment are large multinational Internet players who are initiating their penetration into the Latin American markets. In fact, most major portals have recently announced moves into Brazil:

- Yahoo!: introduced Yahoo Brazil in 6/99 (followed by Mexico in 10/99)
- AOL: introduced AOL Brazil in 7/99 (joint venture with Cisneros Groups, also in Argentina and Mexico)
- Lycos: introduced Lycos Brazil in 10/99 (also in Argentina, Chile, Mexico, Peru and Venezuela)
- Microsoft: Already a Brazilian site since 1998 offering limited content (mainly promotion for MS's products). It has joined Telmex (Mexico) in a joint-venture to create a regional portal early next year, with 85% of its content localized for specific countries. It is also planning to work with cable operator Globo Cable on a portal for Brazil
- Excite: not immediate plans to launch a portal in the region (license search engine to StarMedia)

Last modified Dec.6, 1999

Notes

Outline

Brazil: Internet Development for Whom?
Government Policies, Financing,
Private Sector

Thad Dunning

Christian Gebara

Karen Han

Antonio Varas

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Government Policies, Financing,
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Internet Service Law

- Regulated Internet service sector to encourage competition (May 1995)
- Regulations:
  - Declared the Internet an information service, and therefore free for people to provide and to access
  - Allowed anyone except telecommunications firms and government the right to provide retail service to the consumer

National Research Network

- Invested $20 million in ISPs, schools, and infrastructure
- Resulted in an upgrade of university-operated Internet backbone to include 2 Mb/s
- Connected all the state capitals to the Internet

Policy Effects on Internet Development

- Market Reserve Policy
  - Created a skilled labor force who now run ISPs, design applications, offer support to diffusion of on-line information systems
- National Research Network
  - Boosted commercial use of Internet by providing infrastructure and technical capabilities

Potential Sources of Financing

Foreign Direct Investment

High-Tech Venture Capital

- Opportunities:
  - Lack of alternative sources of funding (high interest rates)
  - Changes in business accounting culture: “transparency”

- Quality improvement in national hardware and software production and high-tech services

Barriers

- Traditional high cost of borrowing
- Multinationals have tended to finance R&D in central country headquarters

Venture Capital Models

BNDES, the national development bank, takes a minority equity interest through BNDESPAR

Financing comes from Emerging Business mutual funds, regulated by CVM

Combination of the above with private equity and commercial lending

Private Investment

Private Investment

Estimate cost of an ISP in Brazil

EMBRATEL

Controlled by MCI WorldCom

Has the largest backbone in Latin America, both in transmission capacity and coverage

- Its connections represent more than 320 Mps while all the other Brazilian connections together represent 40 Mps
- Present in every state in the country and in more than 110 cities

Will face internal competition for the first time: Bonari (Sprint and France Telecom) will start operating in the long distance Brazilian market in the end of 1999

Government Incentives
Contec

- Condominium for the Capitalization of Technology-oriented Companies (Contec)
- Created by BNDESPAR
- Shares the risks with small and medium developers of new technologies (equity stake)
- Helps technology-intensive companies in the design, start-up, expansion or early development stages overcome funding barriers due to the risk they entail
- Provides loan interest loans to these companies

Privatization of Telecommunication

- In 1998, Telebras was privatized
- Goal: Ensure development of the phone network and establish a framework for competition
- Split into 12 companies and sold to different consortia formed by international operators
- Additional licenses to create duopolies in the concession area
- Concession areas open to free competition in year 2002

Starmedia
Other Pan-Regional Players
Existing Local Players
Existing Local Players
Global Internet Players
A Proposed Growth Model

Notes
Outline

Notes
Outline

Brazil: Internet Development for Whom?
Government Policies, Financing,
Private Sector

Thad Dunning
Christian Gebara
Karen Han
Antonio Varas

Real Plan

Benefits
Tamed inflationary spiral

Salaried workers realized 15-30% increase in actual purchasing power

Market Reserve Policy

Goal: To protect domestic computer manufacturing market by prohibiting computer imports
Results:
Higher prices
Lower quality
Often times, the computers were imported, dismantled, and re-assembled under local brand
Ended in 1992 with the Basic Production Policy

Basic Production Policy

Effects of Basic Production Policy

PC assembled under PPB coverage is as much as 35% less than imported one
Many international corporations (IBM, Compaq, Acer) have established local manufacturing facilities
However, does not address gray market

Internet Service Law

- Regulated Internet service sector to encourage competition (May 1995)
- Regulations:
  - Declared the Internet an information service, and therefore free for people to provide and to access
  - Allowed anyone except telecommunications firms and government the right to provide retail service to the consumer

National Research Network

- Invested $20 million in ISPs, schools, and infrastructure
- Resulted in an upgrade of university-operated Internet backbone to include 2 Mb/s
- Connected all the state capitals to the Internet

Policy Effects on Internet Development

- Market Reserve Policy
  - Created a skilled labor force who now run ISPs, design applications, offer support to diffusion of on-line information systems
- National Research Network
  - Boosted commercial use of Internet by providing infrastructure and technical capabilities

Potential Sources of Financing

Foreign Direct Investment

High-Tech Venture Capital

- Opportunities:
  - Lack of alternative sources of funding (high interest rates)
  - Changes in business accounting culture: “transparency”

EMBRATEL

- Controlled by MCI WorldCom
- Has the largest backbone in Latin America, both in transmission capacity and coverage
  - Its connections represent more than 320 Mps while all the other Brazilian connections together represent 40 Mps
  - Present in every state in the country and in more than 110 cities
- Will face internal competition for the first time: Bonari (Sprint and France Telecom) will start operating in the long distance Brazilian market in the end of 1999

Government Incentives

Contec

- Condominium for the Capitalization of Technology-oriented Companies (Contec)
- Created by BNDESPAR
- Shares the risks with small and medium developers of new technologies (equity stake)
- Helps technology-intensive companies in the design, start-up, expansion or early development stages overcome funding barriers due to the risk they entail
- Provides loan interest loans to these companies

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Starmedia

Other Pan-Regional Players

Existing Local Players

Existing Local Players

Global Internet Players

A Proposed Growth Model

- Quality improvement in national hardware and software production and high-tech services

Barriers

- Traditional high cost of borrowing
- Multinationals have tended to finance R&D in central country headquarters

Venture Capital Models

BNDES, the national development bank, takes a minority equity interest through BNDESPAR

Financing comes from Emerging Business mutual funds, regulated by CVM

Combination of the above with private equity and commercial lending

Private Investment

Private Investment

Estimate cost of an ISP in Brazil

EMBRATEL

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Return to Home Page

Who We Are

Internet Adoption Process

Labor Markets

Education

Nature and Opportunity of Access

Telecommunications Infrastructure

Presentation I

Government Policies and their Effects

Financing and the Private Sector

Presentation II

Case study: Universo Online (UOL)

Case study: The Committee to Democratize Information Technology

Brazil: Internet Development for Whom?

Universo Online

Market opportunity
In 1995, the Brazilian government approved new regulation that opened the commercial ISP market to competition. In the first year, 90% of the traffic in the Internet from Brazilian users was directed to non-Brazilian web sites. There was not enough content that was produced domestically. UOL entered the market in 1996 as a wise attempt to extract value from this new market. The company was literally an early entrant. It was one of the first private Internet initiatives in Brazil.

Business model
UOL followed closely AOL's business model that was successfully deployed in the US. Like AOL, UOL started primarily as an ISP. The idea behind the strategy was to first get a good numbers of subscribers and later try to lock them in offering an excellent portal to access the net. It was exactly what they did and the UOL portal was launched some time later.

Funding
Unlike the US players, UOL could not finance its operations in the VC market. At this time, this type of finance did not exist in Brazil. However UOL was not a typical start-up. It was actually the result of a joint entrepreneurial effort of two large Brazilian media groups:

- Folha : The largest newspaper publisher in Brazil.
- Abril: The largest magazine publisher in Brazil (some magazines: Veja, Exame, Caras, etc.)

For all these reasons, UOL had a first mover advantage in the Brazilian Market. It was a new company in a new industry but it was backed by

(CDI)

Final Presentation

Interesting Links

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two big local groups that provided financial resources for a quick market penetration. The shareholders also transferred their brand and reputation to this new venture what helped considerably UOL's acceptance in the market. Once the portal was launched, UOL also benefited from the high quality content that Abril and Folha provided (newspapers, magazines, 24 hour news and etc…). It also leverage shareholders sales in their core business (subscribers could read some articles on line and end up buying the magazine) creating a cross-selling effect.

Local Content Provider

UOL's value proposition is based on the provision of content tailored to the interests and needs of the Brazilian user. It follows again the AOL model, efficiently translated to the local reality. UOL offers free content for everyone and premium content exclusively for UOL ISP subscribers or Folha and Abril's subscribers.

Among other services, UOL offers the following:

- 28 stations and about 500 channels with more than 3.6 million pages of news, information and training in Portuguese
- A "24 h site" offering daily editions of local and foreign newspapers (e.g. Portuguese versions of FT, NY times and le monde)
- Weekly magazines, as well as foreign news services like France press, Cox and Reuters
- Library station provides encyclopedia, dictionaries, guides, manuals and reference works
- Search tools: miner and radar UOL (created through a partnership with Inktomi)
- E-mail (including e-mail of Brazilian celebrities), instant messenger, chat rooms, videoconferencing
- UOL promotes public opinion surveys, murals and discussion lists for online debates
- E-commerce (UOL shopping mall)
- Online games, Webcasts
- Personalization ("Meu UOL")
- Web-page hosting and web design tools

UOL Subscribers

UOL provides ISP services to end users through a proprietary backbone network (AccessNet), Global One backbone and other backbones owned by telcos. The cost of subscriptions is currently R$ 19.95 / month (approximately US$10) for unlimited access. This price has been

practically constant over time. UOL has recently started to offer DSL access (through agreement with Telefonica) to subscribers in determined areas. Along with ZAZ, UOL is the only one offering this service.

Based on our first question "Internet for whom" UOL exemplifies who are the current consumers and users of this new industry and environment. As stated in the charts, 48% of UOL subscribers earn between US$ 1,000 and US$ 2,500 a month. In a social class context, it means that 90% of the users belong to classes A and B (42% to Class A). In the level of education, 63% of the subscribers are college graduates. They are also very young, with 58% of people below 30 years old (25% between 12 and 18 years old).

A Success Story

UOL is Brazil's biggest online service and Latin America's largest private supplier for Internet access with over half a million subscribers in 118 Brazilian cities. UOL is the world's most visited Portuguese language site. Over 81% of Brazilian Net Surfers use UOL. A pioneer in promoting the Unique Visitor for audience monitoring, UOL has over 5.1 million registered users accessing its pages every month. With more than 19.000,000 pages visited each day, UOL has a daily average of over 1.5 million visitors. UOL has managed to aggregate an audience that establishes it as one of the most frequently visited sites in the world. It passes the mark of 130 million pages visited weekly, putting it well above sites like Disney (17.25 million a week) and CNN (100 million).

Current Challenges

After being established in the Brazilian market, UOL had clear that the next step was to expand in the Pan-American market. UOL founded the UOL International and launched the first international site in Argentina in September 1999. In November 1999, UOL reached two other countries, Mexico www.uol.com.mx and Venezuela www.uole.com.ve . The strategy is to be present in seven countries until January 2000. The next sites should include Chile, Colombia, Spain and US (for Hispanics).

In order to finance the Pan American expansion, UOL sold 12.5% of its total shares to private equity groups led by Morgan Stanley Dean Witter and CS First Boston. The proceeds of this deal totaled US$ 100 MM and it was closed in October 1999. It is clear that UOL will need more than that to accomplish its aggressive expansion and an IPO is probably the next step. However, there is a lot of concern regarding the market's ability to absorb UOL after StarMedia and Terra Networks' public offers.

Another concern is related to UOL competitive advantage in Brazil and its transferability to other countries. UOL has high quality Brazilian content due to its shareholders' local businesses. However it is strictly local and in Portuguese. Finally, UOL was a pioneer in Brazil and it is already a late entrant in other markets. The promising Pan American market has attracted many big international players like AOL , Yahoo , and Microsoft. The questions are how many players can this market sustain and how competitive can UOL be.

Last modified Dec.6, 1999

Return to Home Page

Who We Are

Internet Adoption Process

Labor Markets

Education

Nature and Opportunity of Access

Telecommunications Infrastructure

Presentation I

Government Policies and their Effects

Financing and the Private Sector

Presentation II

Case study: Universo Online (UOL)

Case study: The Committee to Democratize Information Technology

Brazil: Internet Development for Whom?

The Committee to Democratize Information Technology

Introduction

The Committee to Democratize Information Technology is a Brazilian, non-governmental, non-profit organization who train students in *favelas* (poor, urban communities) to access and use information technology. This is done through the establishments of CDI schools, called Computer Science and Citizenship Schools. The schools are run by self-selecting community groups who apply to CDI for support. CDI in turn donates hardware and software to the schools, assists in curriculum development, and trains teachers and school managers.
View a slide show on CDI.

Rodrigo Baggio's Background

The theme of computers has run throughout Rodrigo Baggio's life. The son of an IBM executive, Baggio learned to program in his teens and dropped out of college to become a systems analyst. In 1993, he began teaching computer course in two private high schools in Rio de Janeiro. According to Baggio, it was during that time that he drempt one night that poor children using computers to better their lives, and "the CDI was born that night."

CDI Model

The success of CDI schools stems from the self-managed, self-sufficient

(CDI)

Final Presentation

Interesting Links

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model established by Rodrigo Baggio. It was important to Baggio to avoid paternalistic models of development in which decisions and revenue flow in a top-down way. Instead, the CDI model produces self-sufficient schools that generate their own revenue. Each school is also designed to meet the needs of its particular community, thus producing unique schools.

Creation Process of a CDI School

1. Self-selecting groups, such as residential associations in *favelas*, locate physical spaces, often civic centers or churches, in or near their communities that can serve as sites for schools. These spaces must be appropriate to their communities in terms of safety and their capacity to accommodate necessary electrical installations.
2. CDI begins the process of teacher training.
3. Eventually, graduates from the schools will take over the task of teaching new students, but CDI's role is more active when the schools are first founded.

Long-term Viability of CDI Schools

1. Self-sufficiency

   Students contribute a "symbolic" monthly payment of R$10 (about US$5) towards their education. For some, even this commitment may be insurmountable, since the minimum monthly wage in Brazil is around US$65. These students can find other ways of contributing labor to the schools in exchange for classes. Besides student fees, schools generate revenue when their graduates use schools facilities to charge for computer services rendered or to run cyber cafes. The key point, however, is that the schools are SELF-SUFFICIENT; they generate their own revenue for the payment of teachers. A teacher in a CDI school makes roughly twice the salary of a teacher in Brazil's public school system.

2. Scalability

   CDI schools have proven that the model it follows can be successfully applied in a wide variety of locations. In the five years since the founding of CDI, eighty successful CDI schools have been established in eleven Brazilian states. This is in part due to the fact that CDI schools are tailored to their individual environments with high focus on curriculum development. Rodrigo Baggio has said, "It is not an ultimate goal to teach computers for poor children. What is more important is to change their lives." As important as computer science education in the CDI platform is using information technology to teach low-income kids about

human and legal rights and concepts of citizenship. Here, too, the CDI assists schools in developing a curriculum that is appropriate to the target community. For instance, in Sapukai, Guarani Indians use computers powered by a generator and learn to compute in their indigenous language. CDI has also started a school for the blind and has worked in state penitentiaries.

Sources of Financing

CDI receives its funding from private donations from individuals, corporations, organizations, and governments. In the funding process, they have formed numerous partnerships which supply them with more than monetary resources.

1. Rodrigo Baggio receives a living stipend as an Ashoka fellow. Ashoka is funded through private contributions.
2. Microsoft Brazil has agreed to donate $1.5 million worth of software to CDI, and the institute will distribute an additional $3 million worth of Microsoft wares.
3. The White House made a symbolic donation of 10 computers in 1997.
4. CDI and JCA-Net have a joint venture Passo Project that is aimed to gather hardware donations from Japan to be delivered to the CDI schools in February 2000.

Last modified Dec.6, 1999

Notes

Outline

Adaptation of the AOL-like business model: UOL's value proposition is based on the provision of content tailored to the interests and needs of the Brazilian user

- Free content (for everyone) and premium content (only for UOL ISP customers or some magazine's subscribers)
- 28 stations and about 500 channels with more than 3.6 million pages of news, information and training in Portuguese
- A "24 h site" offering daily editions of local and foreign newspapers (e.G. Portuguese versions of FT, NY times and le monde)
- Weekly magazines, as well as foreign news services like France press, Cox and Reuters

Brazil: Internet Development for Whom?

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- Web-page hosting and web design tools

UOL – Local Content Provider

UOL Subscribers

UOL – A Success Story

- Largest ISP in Latin America: 500,000+ subscribers in 118 Brazilian cities
- One of the most trafficked sites: 19.000,000+ pages/day, 1.5 million daily visitors

UOL – Current Challenges

Differences in Adoption

Limits of the Adoption Model

Strategic Alternatives

"Committee to Democratize Information Technology..."

- Committee to Democratize Information Technology (CDI)
- NGO created by computer scientist and social activist Rodrigo Baggio in April 1995
- Goals
  - To promote Internet ACCESS, TRAINING, and USE in favelas and other poor communities

- "I want to include the world's excluded" (Baggio)
- To improve economic opportunities and participation in civic life through these skills
- "It is not an ultimate goal to teach computers for poor children. What is more important is to change their lives" (Baggio)

Action

- To set up SELF-SUFFICIENT, SELF-MANAGED SCHOOLS in favelas where community members learn computer skills and use computers for further learning and self-improvement

CDI – The Schools

- Students contribute US$10/month ("symbolic" of commitment but also sustainable revenue)
- Teachers make US$200/month, twice the average salary of public school teacher

"A sustainable solution"

A sustainable solution

- SELF-SELECTING community groups apply to set up schools (bottom-up approach)
- SELF-MANAGED schools eventually generate their OWN REVENUE (through fees-for-service-rendered, cyber cafes)
- Projects are SCALEABLE (can be repeated)
- At the same time, TAILORING of schools due to bottom-up approach means local differences are respected

Slide 23

Notes

Outline

Notes

Outline

Brazil: Internet Development for Whom?

Thad Dunning
Christian Gebara
Karen Han
Antonio Varas

The Information Society

The Internet Adoption Process

Internet Adoption – Early Days

Internet Adoption - Today

Internet Adoption - Today

Environment - Regulation

Environment - Infrastructure

E-Commerce

The Brazilian Adoption Model

Case Study – Universo On-line (UOL)

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UOL – Local Content Provider

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- Projects are SCALEABLE (can be repeated)
- At the same time, TAILORING of schools due to bottom-up approach means local differences are respected

Slide 23

CDI - Financing Sources

- CDI relies on private contributions and partnerships with philanthropic organizations, corporations, other NGOs, and governmental organizations
  - Baggio receives a living stipend as an Ashoka Fellow (Ashoka is funded by private contributions)
  - Corporate sponsors include IBM Brazil, Microsoft Brazil, McKinsey
    - Microsoft Brazil has agreed to donate $1.5 million worth of software to CDI
  - White House made (symbolic) donation of 10 computers (1997)

CDI at Work

Return to Home Page

Who We Are

Internet Adoption Process

Labor Markets

Education

Nature and Opportunity of Access

Telecommunications Infrastructure

Presentation I

Government Policies and their Effects

Financing and the Private Sector

Presentation II

Case study: Universo Online (UOL)

Case study: The Committee to Democratize Information Technology

Brazil: Internet Development for Whom?

Interesting Links

Education
National Institute of Education (INEP)
National Research Network

General Background
CIA World Factbook 1999
U.S. Department of State
Welcome to Brazil Studies

General Internet Development Issues
Difficulty of Adapting to IT Use *in Portuguese*
Internet Issues in Developing Countries
Latin American Women Take on the Internet

Government Sites
Presidência da República
Ministry of Technology and Information
Science and Technology Policy in Brazil

Information Technology
Information Technology in Brazil
Computer Hardware Industry in Brazil
The Opening of Comdex Sucesu-SP 98 Shows Market Growth *addresses hardware smuggling issues*

(CDI)

Final Presentation

Interesting Links

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Technology vs. Human Development: Brazil, 1996

Infrastructure

Information Technology and Its Social-Economic Impact in a Modern Society

Global Information Infrastructure

Internet Service Providers

ANPI *National Association of IPS*

Abranet *Another Brazilian association of ISPs*

Assespro *Associação das Empresas Brasileiras de Software e Serviços de Informática*

Brazil ISP List

UOL

Inside Information Systems

DialData

Global-One

Sol

Unisys

Labor Market

Labor Market and Employment Generation

Brazil Employment Release

Child Labor in Brazil

Facing Up to Inequality in Latin America

Workers in an Integrating World *World Development Report 1995*

Newspapers

Estado

Folha

Globo

Jornal do Brasil

Telecommunications

Embratel *Brazilian long-distance carrier owned by MCIWorldCom*

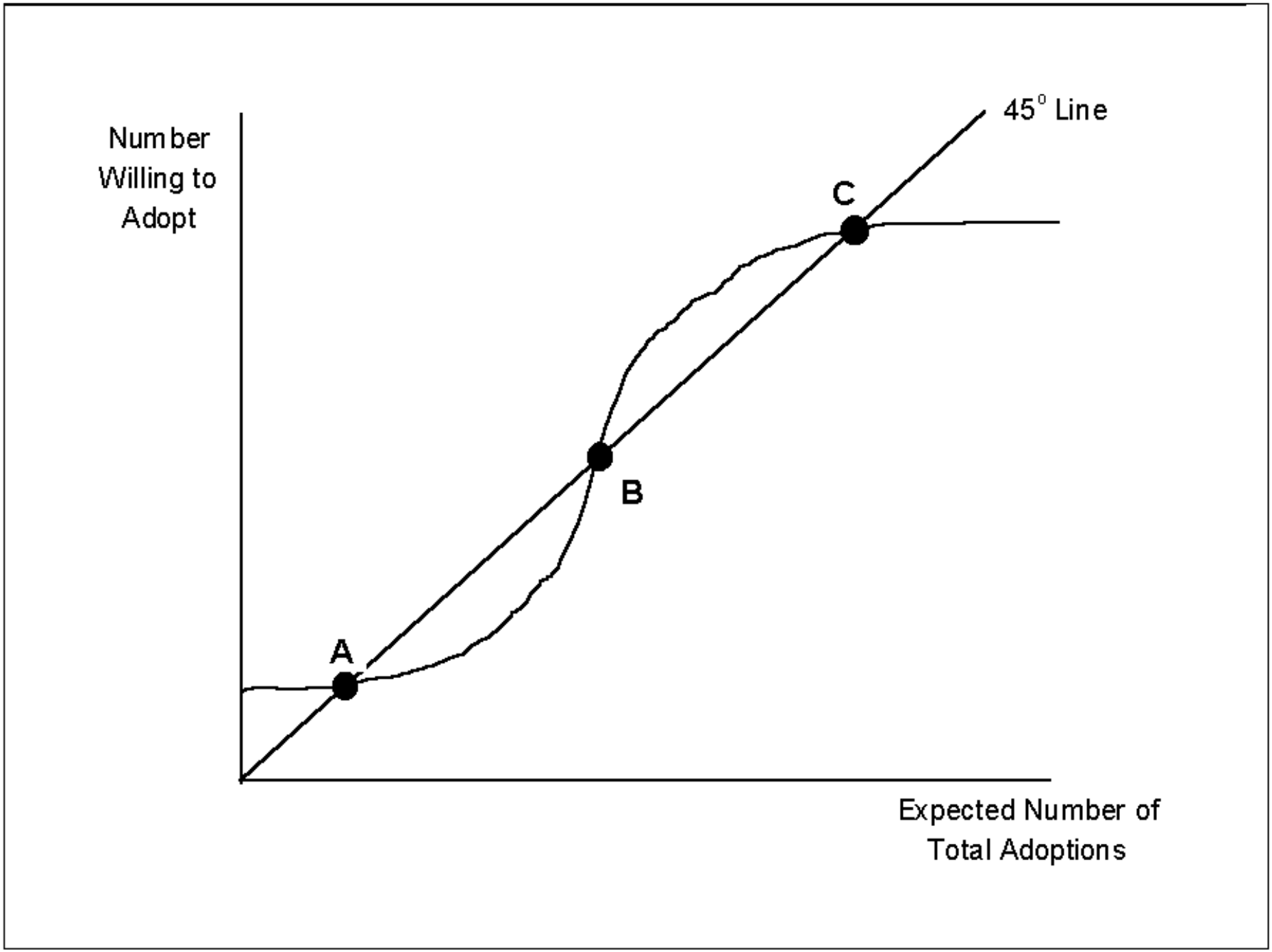
Nokia Wireless Trial

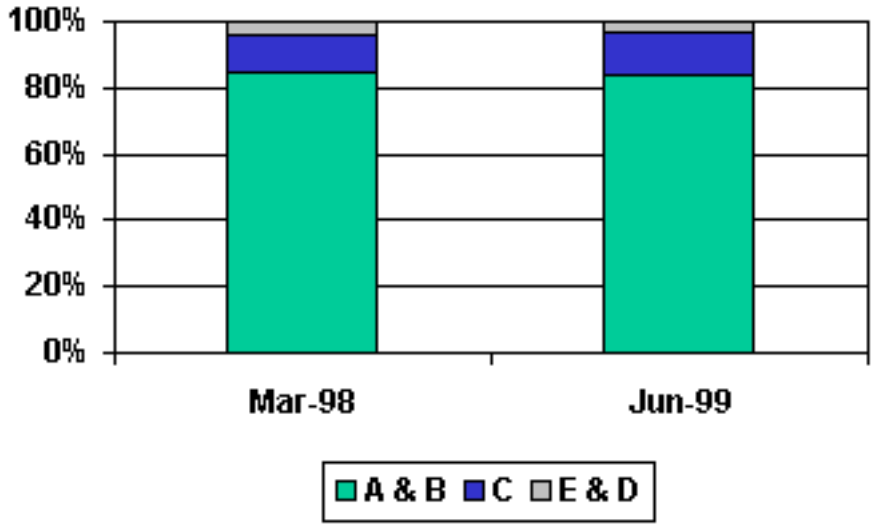
Miscellaneous

Guide to Brazil Websites*economics and market, politics and government, newspapers and magazines*

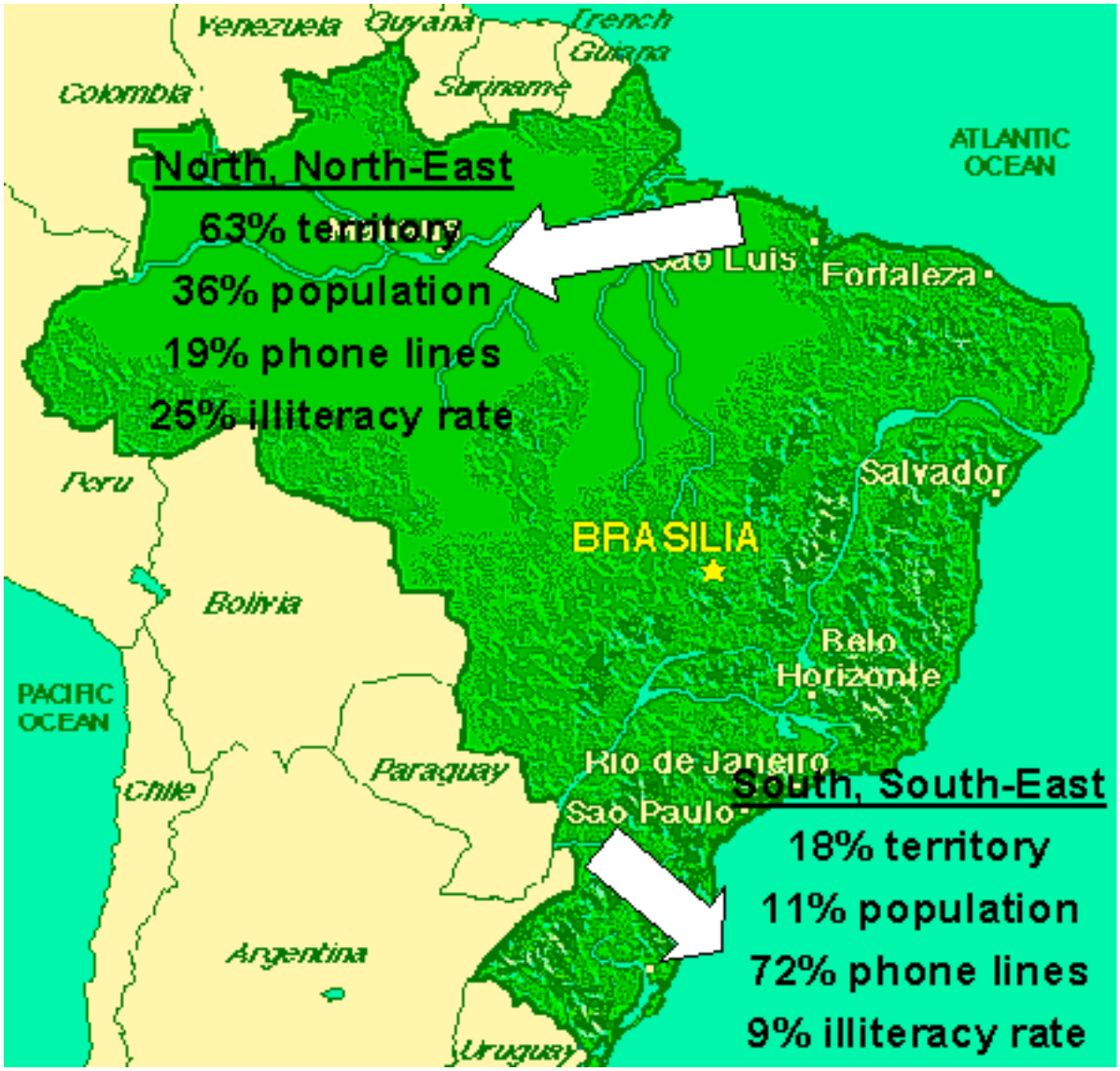
Brazil Stakes Claim on Global Online Map *Reuters article 11/21/99*

Last modified Dec.6, 1999


Number Willing to Adopt
45° Line
C
B
A
Expected Number of Total Adoptions


100%
80%
60%
40%
20%
0%
Mar-98
Jun-99
A & B
C
E & D

	Territory %	Population %	Phone Lines %	Montly Income (US$)	Illiteracy (%)	Yrs of School
North	45%	7%	4%	234	12%	5.2
North-East	18%	29%	15%	158	29%	3.9
Central-West	19%	7%	8%	302	12%	5.5
South-East	11%	43%	56%	366	9%	6.0
South	7%	15%	16%	325	9%	5.8
BRAZIL	**100%**	**100%**	**100%**	**287**	**15%**	**5.3**


Venezuela
Guyana
French Guiana
Colombia
Suriname
ATLANTIC OCEAN
North, North-East
63% territory
36% population
19% phone lines
25% illiteracy rate
Sao Luis
Fortaleza
Salvador
Peru
BRASILIA
Bolivia
Belo Horizonte
PACIFIC OCEAN
Rio de Janeiro
Sao Paulo
Chile
Paraguay
South, South-East
18% territory
11% population
72% phone lines
9% illiteracy rate
Argentina
Uruguay

Internet Adoption – Early Days

1988

- First regional academic networks to access the Internet (e.g. ANSP network created by Fapesp, a research center in Sao Paulo)

1989

- Ministry of Science & Technology creates RNP to coordinate emerging networks. RNP begins to operate a backbone network to provide teaching and research centers & Government agencies with Internet access

1992

- Effective implementation of RNP's backbone network, through the international connection of Fapesp

1995

- Internet Service Law breaks the RNP monopoly and opens the commercial ISP market to competition, using Telebras's network infrastructure
- Creation of Comite Gestor da Internet, a Governmental agency to coordinate the allocation of IPs and domains and submit policy recommendations

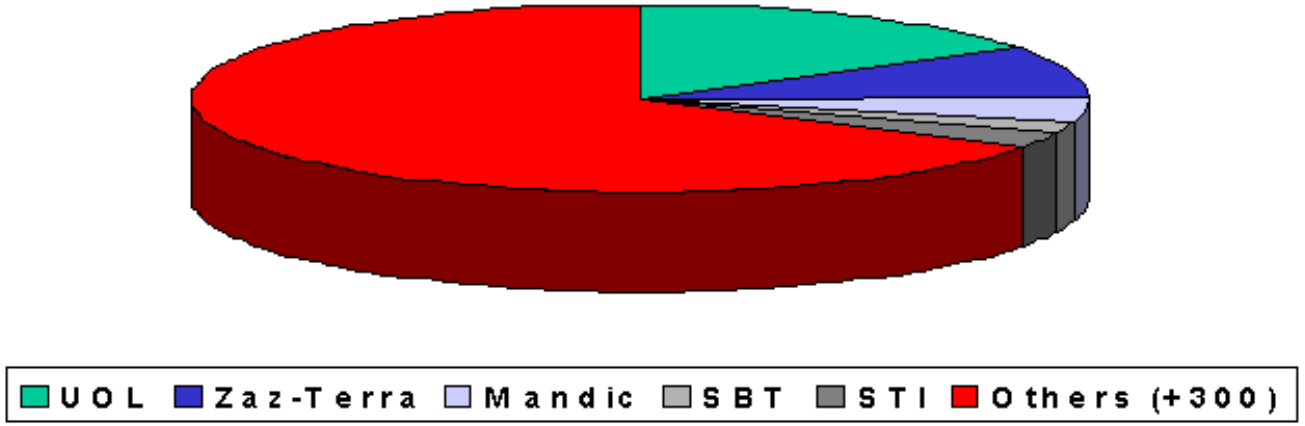
1996

- First private ISPs are launched to provide dial-up Internet access to individual users (Mandic, Itanet)
- Number of users grows from 160,000 to 465,000 (IDC estimates)
- 90% of traffic from Brazilian users still directed to non-Brazilian websites

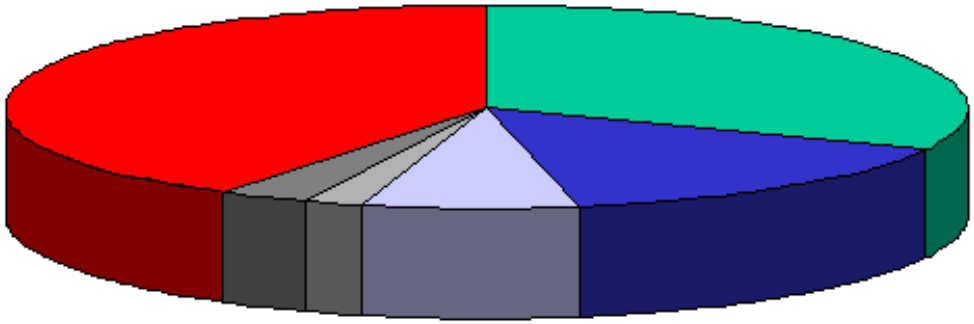
Brazil

Brazilian ISP Market

June 1998

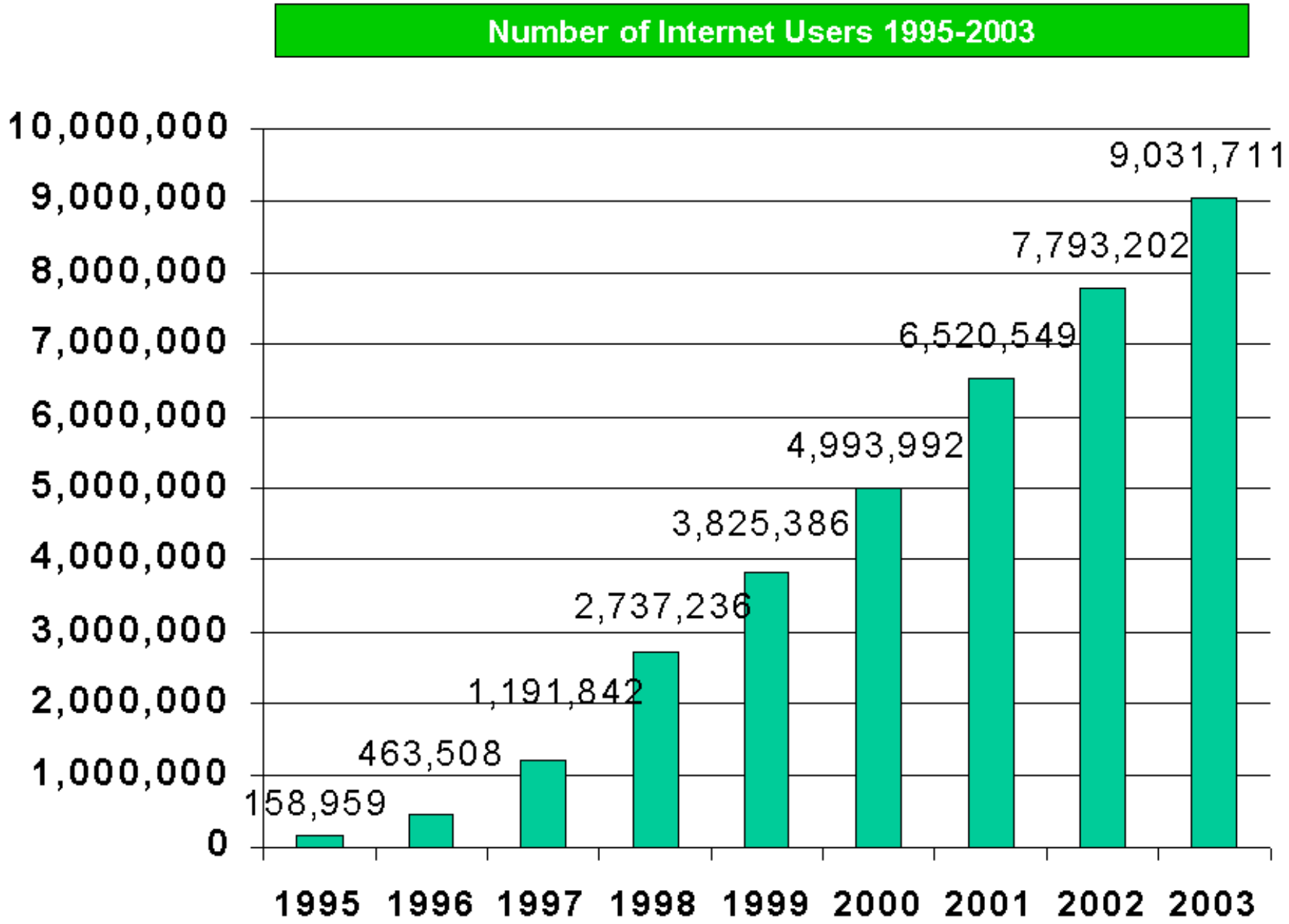


June 1999

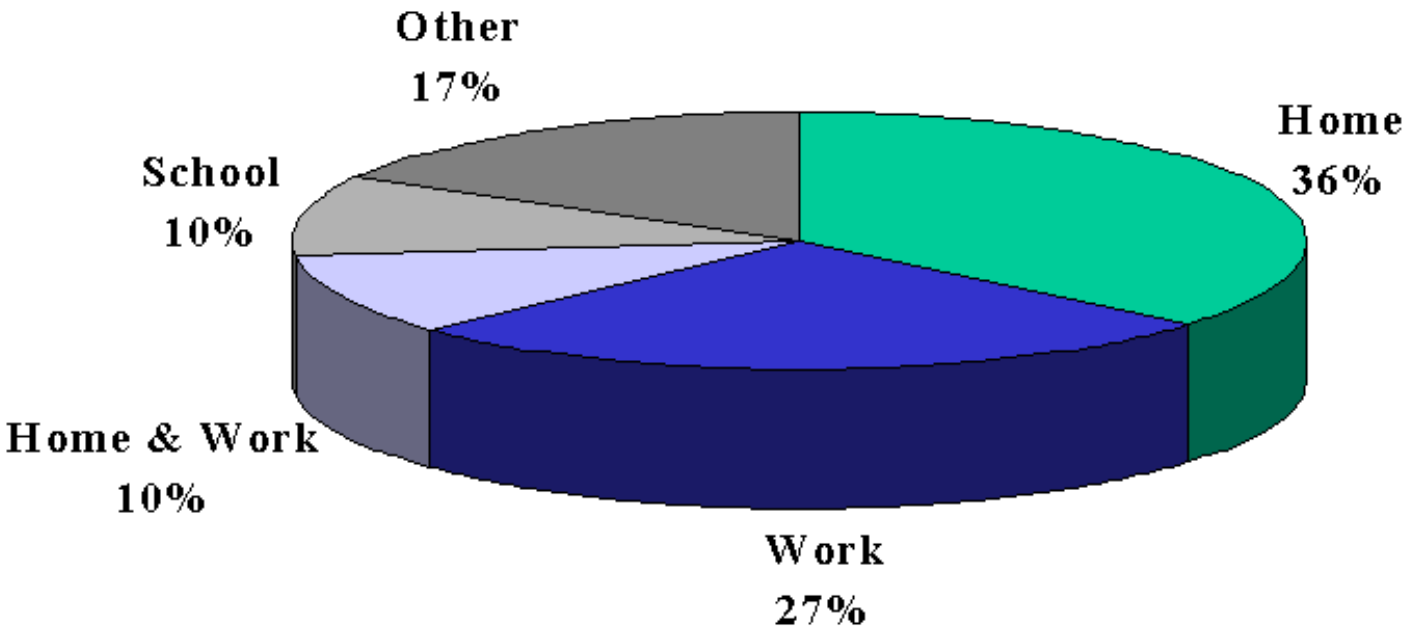


Source: Abranet

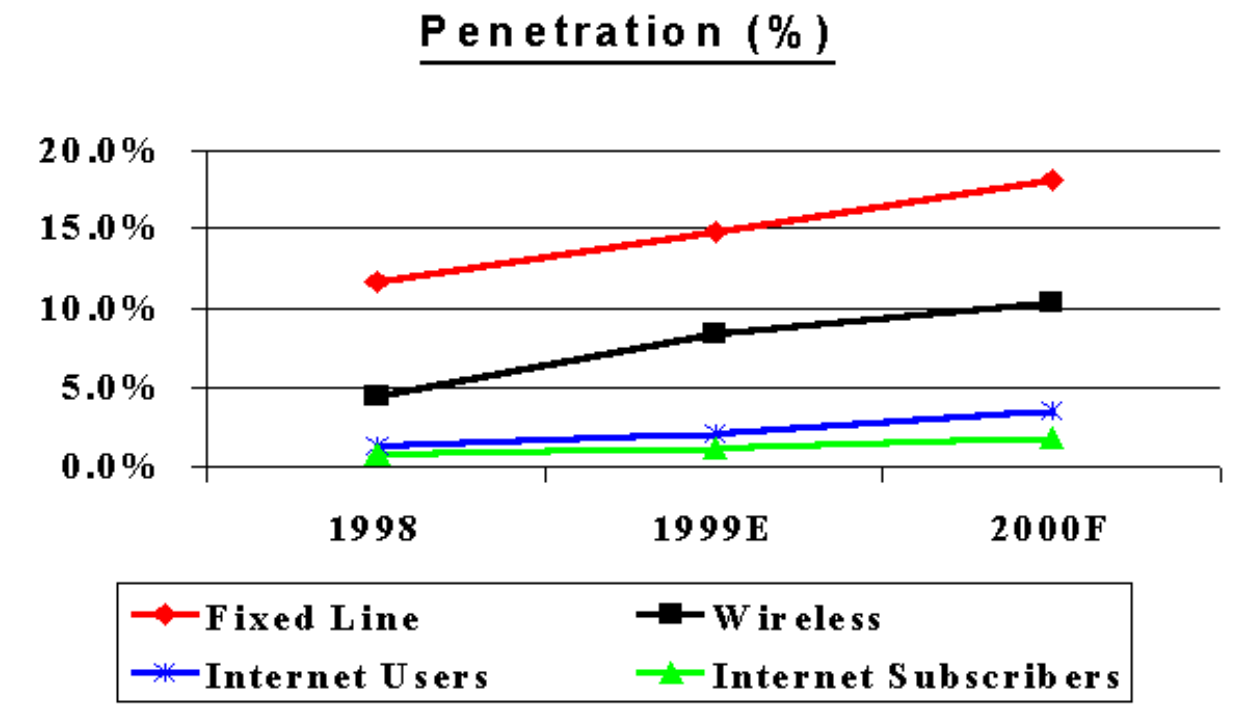
World Position	Country	Number of Hosts
1.	United States	40,970,347
2.	Japan	2,072,529
5.	Canada	1,294,447
14.	Brazil	310,138
20.	Mexico	224,239
28.	Argentina	101,833

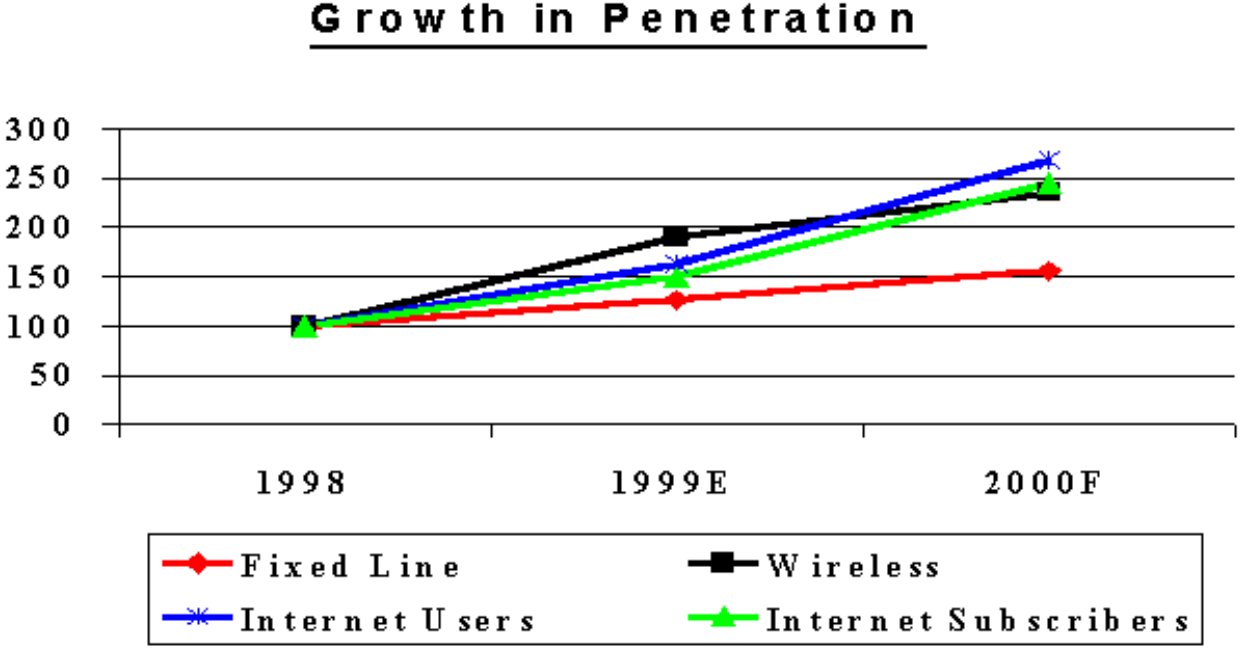

Number of Internet Users 1995-2003
10,000,000
9,000,000
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
158,959
463,508
1,191,842
2,737,236
3,825,386
4,993,992
6,520,549
7,793,202
9,031,711
1995
1996
1997
1998
1999
2000
2001
2002
2003

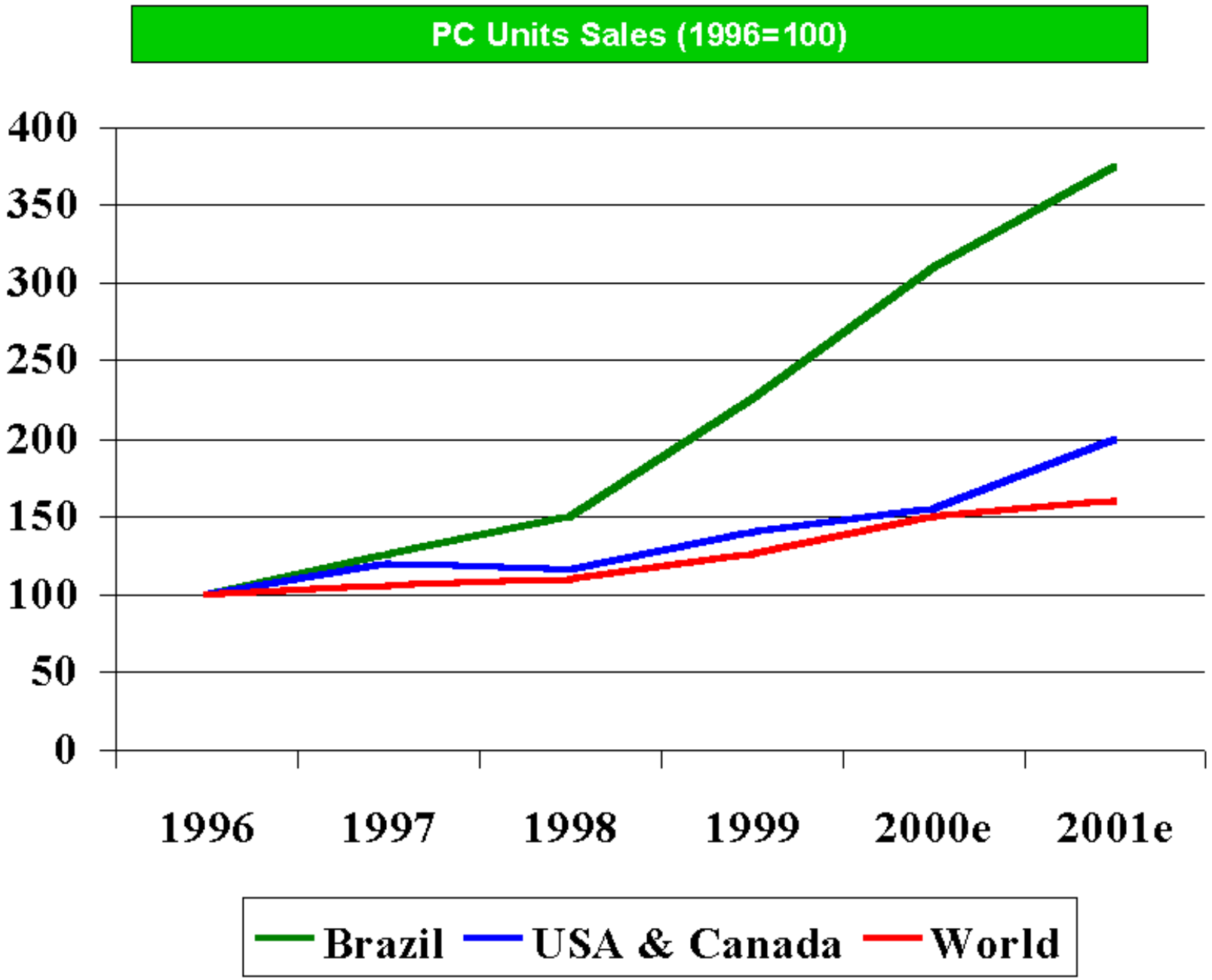
Profile of the Brazilian Internet User (June 1999)



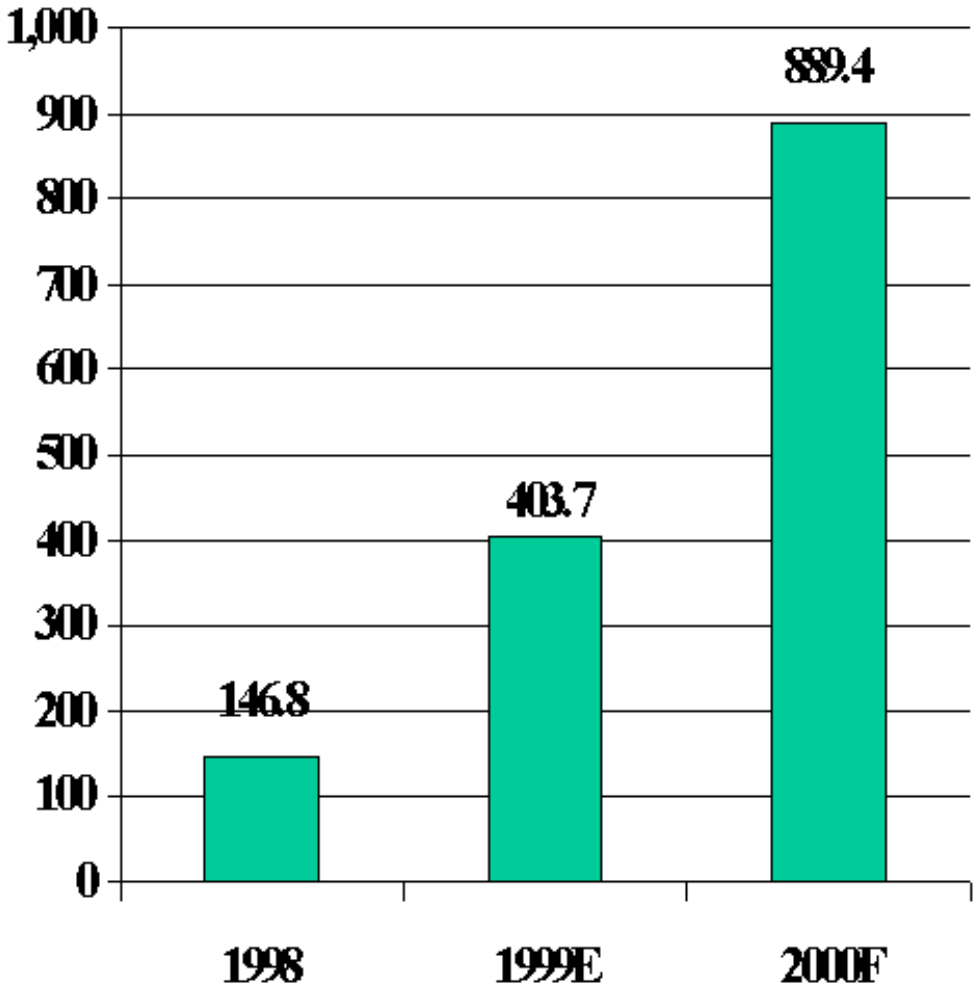
Light (once a month)	25%
Medium (once a week)	26%
Heavy (everyday)	49%


Penetration (%)
20.0%
15.0%
10.0%
5.0%
0.0%
1998
1999E
2000F
Fixed Line
Wireless
Internet Users
Internet Subscribers


Growth in Penetration
300
250
200
150
100
50
0
1998
1999E
2000F
Fixed Line
Wireless
Internet Users
Internet Subscribers


PC Units Sales (1996=100)
400
350
300
250
200
150
100
50
0
1996
1997
1998
1999
2000e
2001e
Brazil
USA & Canada
World

E-Commerce Revenues (US$ m)



Source: Lehman Brothers, IDC

E-Commerce Models

Closely imitate successful US models:

- *Books* – 59 e-tailers
- *Music* – 43 e-tailers
- *Computers* – 43 e-tailers
- *Financial Services* – 29 e-tailers
- *Electronics* – 16 e-tailers

Source: BCG, May 1999

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