Mobile Telephony in Latin America and Brazil: Similarities and Singularities

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Abstract

The development of Information and Communication Technologies in Latin America as well as in some developing countries calls the attention. However, none of these technologies presents numbers as high as those of the mobile phones. The number of mobile devices grows visibly in Latin America, especially when compared to fixed lines. To better understand these high numbers that involve mobile telephony in the region it is necessary to understand some aspects of economical, social and political contexts that ultimately influence this development of mobile telephony. Issues such as social inequality, economic crises, privatization of fixed and mobile telephony companies, together with the infrastructure of the region are some of these aspects. After discussing these issues, we will focus more specifically in the Brazilian case which although sharing most characteristics of other Latin American countries, also has its singularities regarding the introduction and dissemination of information and communication technologies, especially the mobile phones. Besides being the country with the largest number of handsets, Brazil also collects the title of most expensive mobile telephony in Latin America, which restricts the use of mobile phones by many users. Other aspects such as the advancement of mobile technologies in the country, the current market and the used technologies are also contemplated.

Keywords: Mobile Telephony; Latin America; Brazil; Inequality.

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1. Introduction

Mobile telephony has been the fastest-spreading technology in history. In 1991, there were around 16 million mobile telephone users worldwide. By the end of 2009, 4 billion people had cell phones amidst a world population of 6.7 billion. Despite the significant numbers, there is a gap as regards the dissemination, closely related to the degree of development of the countries and the people's income, although "penetration levels do not follow the classic patterns of social inequality" (Castells et al, 2011, p.13).

A significant increase in the worldwide penetration throughout the last decade is mostly attributable to the explosive growth of mobile services in developing countries. Whereas in developed countries mobile services became part or acted in addition to the existing fixed networks, in developing countries their impact has been far more remarkable, as the populations had limited access to traditional telephones (Barrantes, Galperin, 2008, p.521; Rouvinen, 2006).

In 2003, mobile phone signals had already evidenced certain signs that they might be a promising investment in developing countries. By the end of 2006, "two thirds of worldwide mobile subscriptions were in developing countries, leaving behind the 50% of market they represented in 2003" (Castells, 2011, p.64). In 2009, there were 68 active mobile lines per 100 inhabitants worldwide. In Latin America there were 92 lines per 100 inhabitants, a number above the world average, according to data from the International Telecommunication Union (ITU) (Castells, 2011, p.21).

The evolution of telecommunications in Latin America has been a remarkable success world-wise. In late 2008, some Latin American and Caribbean countries had a mobile penetration of over 100 per cent. Mobile phones have become a major aspect of the digital divide in the Americas, with several countries presenting higher levels of mobile phone penetration than Canada and the United States (ITU, 2009).

As these new information and communication technologies spread rapidly across Latin America and the Caribbean, a new generation of public policy began to emerge: the politics of development and digital inclusion (Digiworld, 2007, p.108).

These policies include oversight of telecommunications, education, e-government, health, promotion of the industries of information and communication technologies and

adjustment of the legislation. The goal was to accelerate the diffusion of information and communication technologies (ICTs) and the people's familiarity with them in order to enable them to support non-discriminatory development strategies, which required several adjustments in the fields of oversight, legal amendments, financial instruments and subsidies, as well as a major effort to modernise the public administration (Digiworld, 2007, p.108-109).

Beside the policies required, five domains of critical significance for a digital policy agenda have been identified by Latin American and Caribbean countries, concerning: access to infrastructure, training and know-how, efficiency and transparency of contents and public services, political instruments and fostering a favourable environment. However, as identifying these critical areas is not enough, active policies are necessary, otherwise "new technologies can increase the existing inequalities even further, which makes the need for public action to ensure socially desirable outcomes increasingly important" (Digiworld, 2007, p.109-110).

To Waverman et al (2005, p.11) "mobile phones in less developed economies are playing the same crucial role that landline telephones played in richer economies in the 1970s and 1980s." While in richer countries mobile phones serve as a complement to fixed lines, in poor countries these devices have been replacing landlines and, in many cases, they have become the main communication networks. Many countries with underdeveloped fixed networks have achieved rapid growth in mobile telephone coverage with much smaller investments than those required to set up fixed networks.

To Mariscal (2007, p.141-142) the development of mobile technology marks a new stage in the adoption of ICTs in Latin America. Along with this development, some innovations related to the oversight authorities led to further penetration of mobile telephones among the poorest groups of the population, which made the numbers rise considerably, such as billing the calls to the caller and the introduction of prepaid services, which provided a great boost to the expansion of mobile telephones.

2. Latin America and some of its contexts

In order to understand the current stage of development of mobile communications in Latin America both from the market and industry point of view as well as from that of the population and consumers of these services, not to mention the high penetration rates comparable to those of the developed countries, it is necessary to try to understand the contexts and social, economic and political characteristics of the region, which have played a critical role in this development.

Throughout this paper we shall consider some aspects that have influenced the path undertaken by mobile telephone communications in the region: the issue of social inequality, the crisis and privatisation underwent by many companies in several countries, along with the arrival of multinationals, the telecommunications infrastructure and the investments attracted.

3. The issue of inequality

From an economic point of view, Latin America is the most uneven region in the world. Inequality is a trait that has long accompanied these countries and can be understood as a result of a combination of highly segmented economic, social, gender-related and ethnic structures that tend to reproduce themselves in a complex way across generations. One of the most explicit signs of inequality is the uneven distribution of wealth, which is also cause and effect of other inequalities. Thus, "the distribution of per capita family income reflects the (uneven) way that education, knowledge, equality and access to employment and funding is distributed across the population of the region" (Machinea; Hopenhayn, 2005, p.8).

Inequality in the region is not only significant, but also persistent. This feature is related to certain factors rooted in the style of development which have actually grown stronger with the new wave of modernisation (Machinea; Hopenhayn, 2005, p.5). Some of these structural factors are access and quality of education, unstable employment and social security systems; macroeconomic volatility and certain socio-demographic characteristics of specific population groups.

According to Castells et al (2011, p.57), we can separate three groups of countries in Latin America according to their degree of inequality: high, medium and low. The situation is quite heterogeneous, as there are other countries that are among the most unequal in the world:

- High level of inequality: Brazil, Bolivia, Ecuador and Paraguay.
- Average level of inequality: Chile, Colombia, Panama, Guatemala, Honduras, Mexico, Nicaragua, El Salvador and Peru.
- Low level of inequality: Argentina, Costa Rica, Dominican Republic, Uruguay and Venezuela.

Due to the differences in levels of social inequality, it is important to note that for some researchers the ICT play an important role in terms of their effects on inequality (Toledo, 2008, p.13-14), as they may contribute to empower the poorest and increase general well-being.

4. Crisis and privatisations

From 1990 to 2003, "four episodes of macroeconomic crisis in Latin America, to a greater or lesser extent, contaminated most countries in the region" (Castells et al, 2011, p.46):

- The Mexican Crisis: devaluation of the Mexican peso in December 1994.
- The Brazilian Crisis: devaluation of the Brazilian real in January 1999.
- The Argentinean Crisis: devaluation of the Argentine peso in January 2002.
- The Venezuelan Crisis: a national strike that paralysed the country for several months (2002-2003).

This latest decade has also shown a resurgence of socialist-leaning governments: Venezuela, Ecuador, Nicaragua, Bolivia, Paraguay and even Brazil. Mexico, after seven decades, has experienced the end of the uninterrupted rule by the Institutional Revolutionary Party (PRI). Several financial crises have considerably affected the region, most notably the 1999 currency crisis in Brazil, the dollarization of Ecuador in 2000 and the Argentinean collapse in 2002. On the other hand, the Latin American decade has also been marked by the introduction of several agreements of great importance to the economy of the region, namely the establishment of the Free Trade Area, CAFTA, the Chile-US agreement, the FTAA negotiations, among others (Flores-Roux, 2009, p.1).

As regards privatisations, which had ultimately shaped a whole period in Latin America, there were no new major-scale operations of this sort in the last 10 years - the last one was the privatisation of Telebrás, in Brazil, in 1998. However, what could be observed was "the consolidation of the policy models for the sector that were implemented in the nineties, most of them supported by the concept of independent regulatory agencies and accompanied by the gradual introduction of competition". The sector grew at a rather fast pace. Regulation, despite the delays when compared to the rest of the world, focused on imitating successful models from countries with much more advanced telecommunication sectors. The global and regional financial crises led to "a generalised exodus of international telecommunication operators (BellSouth, France Telecom, AT & T, etc.) and to the consolidation of two large groups at the regional level - Spanish Telefónica, and the Mexican companies Telmex and America Móvil" (Flores-Roux, 2009, p.1).

5. Privatisations and multinational companies

No other world region has witnessed so many privatizations in basic services throughout the last decade as Latin, especially in telecommunications. During the 1990s, 55% of all money generated through privatisations in developing countries found its source in Latin America, roughly 180 billion dollars. "These processes have opened windows of opportunity for foreign groups, which increased their presence in privatisation-friendly Latin America throughout the 1990s" (Santiso, 2007, p.127).

Regarding privatisations, the telecommunication sector evidences rather specific features. The privatisation of most telecommunication services in Latin America and, consequently, the introduction of foreign operators into the regional markets took place in the 1990s. After the 1980s - known as the lost decade - and as a result of the tax and structural adjustments that took place after this period, along with the debt crisis, the public investments shrank drastically, especially those pertaining to infrastructure (Santiso, 2007, p.128). Privatisation and the introduction of foreign capital partly compensated for this fall and Latin America became one of the leading world regions in terms of private sector participation in infrastructure projects.

To illustrate this claim, it is worthy of note that Latin America concentrated half of the total value of privatisations in developing countries from 1998 to 2001, almost 400 billion dollars (general numbers, not limited to telecommunication infrastructure). According to Santiso (2007), in the early 1990s private companies provided only 3% of telephone and electrical connections in the region and almost no water service. In 2003, private companies managed 86% of telephone subscriptions, 60% of electric power line connections and 11% of the water distribution network.

But should we consider the outcome of these privatisations as positive? Santiso (2007, p. 127) points out that the impact of privatisations in improving services is quite unanimous. On the other hand, the author explains that there is a great paradox and contrast between the perceptions of the population, which are usually negative, and the reality of privatisation and foreign investment in infrastructure services, which are positive. Still, the efficiency and profits of the companies have improved noticeably.

In the countries surveyed by the author - Argentina, Bolivia, Brazil, Chile, Colombia, Mexico and Peru - the profits of the telecommunication companies, as assessed before and after the privatisations and the entry of foreign investment, have evolved positively and risen about 14%. This increase in profits greatly owes to many improvements in the field of operational efficiency, as well as to an average decrease in operational costs of 16%. However, the high labour cost is a negative aspect.

6. The infrastructure, the access and the investments

As mentioned above, in late 2009 there were 68.3 mobile subscribers per 100 inhabitants, a total of 4.7 billion subscriptions. In that same year, the number of fixed lines per 100 inhabitants hardly represented a third of the total (1, 2 billion). Thus, 79% of the telephones operating in the world were mobile (ITU, 2010).

Another interesting fact is that in late 2006, two thirds of the world's mobile telephone subscriptions were from developing countries, a significant advance from the 50% they represented in 2003 (ECLAC, 2008a). This implies that most of the expansion in mobile subscribers was generated in those countries. In this context, three countries stand out,

according to ECLAC, due to the outstanding growth in mobile communications: Brazil, Colombia and Mexico (Castells et al, 2011, p.64).

Also, the fastest growing technology was the mobile telephone, basically for two reasons: expansion in terms of territorial coverage and reduced prices of the service. In general, "the less developed a country is, the greater the relative economic effort it is required to undertake in order to access both internet and mobile telephone communications" (Castells et al, 2011, p.66).

In Latin American countries and also in the rest of the world, the mobile penetration kept on expanding until it reached 91.7 mobile telephone subscribers per 100 inhabitants in 2009. Prepaid cards have been a key element of the market diffusion of mobile telephones, as the most popular option; they covered 85.3% of total mobile phone subscriptions in 2008 and have maintained a steady lead over the years until today (Castells et al, 2011:67). Not only has the mobile penetration increased, but also the total revenue of the telecommunications sector, which has grown steadily. "[...] in 1997 the sector generated $ 43 billion; in 2007 it increased to 131 billion" (Flores-Roux, 2009, p.6).

Data from countries in the region suggest Argentina as the country with the widest penetration rate, with 129 mobile lines per 100 inhabitants. Other countries also have penetration rates above 100%, such as Ecuador, El Salvador, Guatemala, Honduras, Panama and Uruguay. The countries with the lowest penetration rates are Nicaragua (55.8) and Costa Rica (42.6). The countries with the largest number of mobile subscriptions in absolute terms are the two with the largest populations in Latin America: Brazil and Mexico. Brazil leads the numbers with 90 million subscriptions, followed, though at a significant distance, by Mexico, which has 84 million. "These two countries accumulate 51% of 503 million mobile lines operating in 18 countries in Latin America (representing 34.6% and 16.6% of the Latin American market, respectively)" (Castells et al, 2011, p.68).

Regarding the investments in the sector, Latin America received larger private investments in telecommunication than any other world region - 10.8% of the regional GDP (Santiso, 2007, p.129). In order to visualise this situation, it is worth mentioning that

from 1998 to 2007, 164 billion dollars were invested – an amount that exceeds by 33% the investments made from 1990 to 1999 (Flores-Roux, 2009, p.6).

In 1990, the year when important fibre optics installations where initiated and mobile telephones started to become an easily accessible means of communication, $ 452 were invested in Latin America per capita. This number falls short when compared to Europe (2300), the United States (1940) and Japan (3455). "This means that Latin America has been investing only 23% of the amount invested per capita in the United States in the last 20 years" (Flores-Roux, 2009, p.9).

There are several multinational companies from OECD (Organization for Economic Cooperation and Development) countries present in the telecommunication industry in Latin America. Multinationals such as Nokia and Ericsson have significant presences in the region, "performing in 2005, respectively 32% and 8% of their net sales in the region". As for the operators, none concentrates such great presence as the Spanish Telefonica. In 2005, 41.5% of its profits came from the region (Santiso, 2007, p.134). A second very strong multinational mobile communications company in the region is Telmex - America Movil.

Market Share 2006-2010 (%)

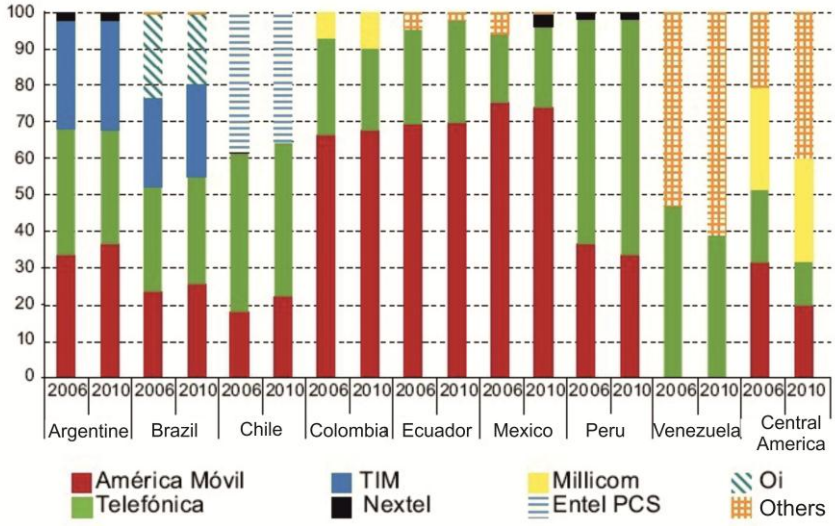

Figure 1: Mobile telephone: market share by country and operator, in percentage 2006-2010 (CEPAL, 2010).

7. Costs of mobile telephone communication and the use by the Latin American populations

The costs of mobile telephone communications differ from country to country and also across operators working in Latin America. One must, however, consider that 90% of subscriptions in the region are prepaid. In order to study the rates offered by operators, Barrantes and Galperin (2008, p.522) conducted a study in seven Latin American countries - Argentina, Brazil, Chile, Colombia, Mexico, Peru and Uruguay - which represent approximately 80% of the regional market, along with data on personal income and expenditure from the respective national institutes of statistics. The study used a methodology of "sample basket of services" to compare the values of tariffs, deemed the most adequate for reflecting the mobile communications consumption patterns.

The researchers achieved three main conclusions. First, the poor generally pay a premium cost for the use of prepaid subscriptions, which allows better control over costs. Secondly, accessibility is an important indicator of penetration of mobile telephones, as it captures not only the tariff levels, but also certain variables pertaining to well-being and thus the ability to pay for mobile services. Third, mobile operators in Latin America are lagging behind as regards the adoption of new business models specifically designed to attract low-income clients. The cost is the main barrier, which restricts both the reach of mobile services and the range of services used by the poor. Thus, according to the authors, the priority should be placed on policies to reduce tariffs and encourage the introduction of commercial innovations aimed at low-income groups (Barrantes, Galperin, 2008, p.522).

If we consider that for a universal access to telephone services three basic dimensions are required – accessibility, availability and economic means to pay for a service, the first two dimensions are more easily measurable, as it is very difficult to establish what would be an affordable price for telecommunication services targeting diverse audiences. In developed countries, however, several studies show high rates of teledensity (above 80%), whereas a basket of basic services does not exceed 2.5% of the family's average expenditure (Barrantes, Galperin, 2008, p.522).

On the other hand, recent research on the costs of telecommunications in developing regions suggests that "low-income families are willing to spend a much larger share of their income on telecommunication services than low-income families in the developed world". Estimates made by the operators themselves also range from 5-10% (Barrantes, Galperin, 2008, p.522).

Mostly, the studies on telecommunication tariffs use the OECD mobile service baskets as standards of comparison. For the consumption patterns of users with a low level of mobile telephone consumption in Latin America the OECD low-volume mobile service basket is used (Barrantes, Galperin, 2008, p.524). The general level of mobile telephone tariffs in Latin America is significantly higher than in OECD countries and in other emerging markets (Galperin, 2009).

There is wide dispersion of mobile telephone tariffs in the region. While the regional average cost of the basket is $ 15, there are countries where this cost is higher, as in Brazil, one of the most expensive in Latin America, where the basket costs about $ 45 (Galperin, 2009, p.4).

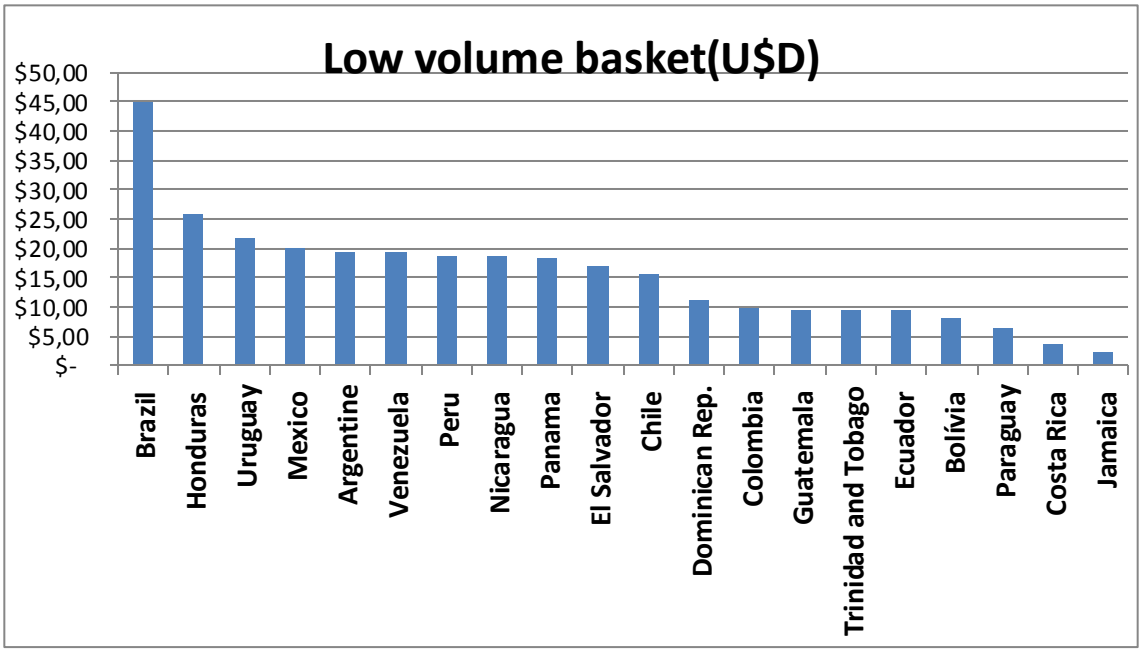

Figure 2: Cost of the prepaid low-volume basket in current dollars (2009) (Galperin, 2009).

The high cost of telecommunication tariffs results in "a low level of accessibility of services for users at the base of the pyramid". In most countries in the region, the cost of the basket significantly exceeds 5% of the income, regarded as the maximum affordability threshold for service users (Galperin, 2009, p.4).

The regional market evidences low accessibility and the analysis of the accessibility gap enables a distinction between three groups of countries according to Galperin (2009, p.4): a) countries with appropriate accessibility due to low tariffs and low levels of inequality in income distribution, such as Costa Rica; b) countries with moderate accessibility gaps due to low tariffs, such as Ecuador, Jamaica and Paraguay, and / or lower levels of inequality in income distribution, such as Venezuela and Uruguay, c) countries with high or very high accessibility gaps due to a combination of high tariffs (especially Brazil) and high levels of inequality in income distribution (in this case Nicaragua, Honduras and Peru stand out). In these countries, 90% of the population is likely to spend "more than 5% of their income to buy a minimum basket of mobile services". Thus, many countries in the region show high levels of diffusion of mobile telephones, but with limited usage, especially among the poorest. A typical mobile telephone user from Latin America dedicates an average of 116 minutes per month to the use of such technology, which falls below the Asian average, of 290 minutes a month, and even below the African average (an average usage of 129 minutes per month) (Galperin, 2009, p.6).

8. Low volume basket - Prepaid x Post-paid

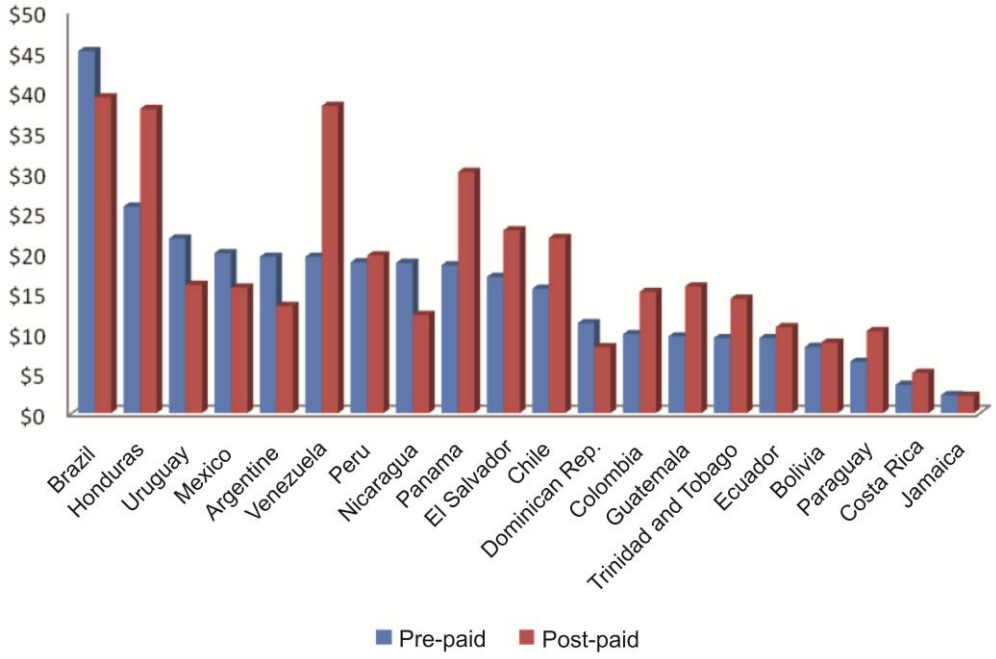

Figure 3: Cost of low-volume mobile basket in prepaid and post-paid options, in current dollars (2009) (Galperin, 2009).

Regarding credit topping up of prepaid mobile telephones, the operators generally require a minimum sum. In Brazil, for example, the minimum load is $ 6.6. As in Brazil, in other Latin American countries this minimum recharge is often unaffordable by low income people and micro-prepayments could provide an alternative, as this option has already reduced the threshold of affordability in other developing countries. By allowing micro-prepayments, which is only barely starting out in Latin America, one enables users to add small amounts of credit to a prepaid mobile account (sometimes just enough to make a short call or to send a few text messages), according to their needs at the moment (Barrantes, Galperin, 2008, p.526).

In some countries there have been significant reductions in the level of tariffs and a greater degree of accessibility, even among lower-income population groups, thanks to the introduction of new actors into the regional markets. The operator Tigo (Millicom International Cellular), which has entered Bolivia, Guatemala and Paraguay, provides a good example, as it reached a significant share of the market in those countries, with a low-cost model similar to that used by operators in Asia. In the remaining countries tariff models that hinder and sometimes prohibit the consumption of services remain in force. This attitude has had the effect of restricting the expansion of the market toward

services focused on the needs of the users at the base of the pyramid (Galperin, 2009, p.6).

According to Galperin (2009, p.6), there are several reasons for this phenomenon, including the high level of concentration of mobile communication markets in Latin America; lack of clear policies for interconnection across service providers and the tax burdens that weigh heavily on these services in most countries in the region.

9. Mobile telephony in Latin America: the current picture

The last decade has undoubtedly reported a significant growth in the industry of telecommunication services in Latin America, with annual growth rates above the world average (ECLAC, 2010, p.217) and a share of 56% of industrial earnings in 2010.

Given the abovementioned socioeconomic and political characteristics of the region, the Latin American telecommunications market has attracted the attention of major international providers with its prospects of great potential for expansion. Due to the saturation and stagnation of the European mobile market and increased competition in their own domestic markets (ECLAC, 2010, p.217) these providers took off to developing regions and countries in search for greener pasture. Today, the Latin American market is dominated by multinational companies and the telecommunications industry is one of the major recipients of direct foreign investment.

However, in recent years, under the influence of the international financial crisis, along with a dying out momentum in the mobile segment, there has been a slowdown in the growth rates of the industry, which can be explained by high levels of mobile penetration in most countries in the region, in many cases comparable to those of developed countries. This slowdown, however, by no means has made the achievements of the telecommunication services sector in Latin America less shiny: this market "represents 10% of the world, and even generated 141 billion dollars in 2010" (ECLAC, 2010, p.217).

Moreover, mobile services have recorded remarkable growth rates – suffice it to mention that the index of penetration has leaped from 10% to nearly 100% of the population in only a decade - despite this recent slowdown. While the average of mobile telephone penetration in the region reached 98% in 2010, in some countries, like Argentina, that

number exceeded 120%, as well as in other smaller economies such as Panama (165%), El Salvador (123%) , Guatemala (123%) and Uruguay (123%). "[...] the gap separating them from industrialized countries quickly begins to close, as well as across the different economies of the region" (ECLAC, 2010, p.219).

While in some countries of the region the penetration rate has already reached similar levels to those of developed countries, in the two largest economies - Brazil and Mexico - the penetration rates in 2010 also indicate a market niche worthy of exploration by international providers. Brazil has a penetration of 98%, while the rate in Mexico amounts to 81% (ECLAC, 2010, p.219).

The two largest economies in the region are far from offering the only growth perspectives for the telecommunications market. Latin America as a whole has great potential for growth regarding the use of mobile solutions for data traffic. One of the most important steps in order to enable the expansion of this market has already been taken: the migration of networks to the global standard system (GSM, from English Global System for Mobile Communications) which "has led to economies of scale, better interconnectivity across regional infrastructure and facilitated migration to 3G advanced technologies: Universal Mobile Telecommunications System (UMTS) and High Speed Downlink Packet Access (HSDPA) (ECLAC, 2010, p.220)". In Latin America and the Caribbean, GSM now accounts for 93% of mobile phone users.

On the one hand, we have high numbers of deployment of 3G networks in Latin America. However, with regard to penetration and use of 3G smart phones, the numbers are low when compared to those of developed countries. In Brazil and Mexico, the two largest markets in the region, 3G phones were about 10% in late 2010 (about 7% in Latin America as a whole). Mobile broadband also evidences rather shy figures in terms of penetration, between 2% and 3%. Again, the key reason preventing mobile broadband from winning over the market is the cost. Plans for 3G service with unlimited mobile internet access can cost up to three times the price of traditional basic voice plans (ECLAC, 2010:220).

Thus, the challenge for providers is:

> increasing the number of clients and further enhancing the use of wireless Internet among its subscribers through attractive commercial offers, handing

> out equipment to post-paid clients and incorporating new applications and services widely accepted and consistent with the idiosyncrasies of each market (video, music, news and games). However, it is likely that the increase in the use of mobile data solutions may help sustain the growth in the coming years (ECLAC, 2010, p.221-222).

10. Mobile telephony: the Brazilian case

In August 2011, Brazil had a population of 192 million people (IBGE, 2011). São Paulo remains the most populous city, with 11.3 million inhabitants, followed by Rio de Janeiro (6.4 million), Salvador (2.7 million), Brasília (2.6 million) and Fortaleza (2.5 million). The federal capital, which in 2000 occupied the 6th place among the most populous counties, in 2011 rose to 4th place. Also according to data pertaining to 2008-2009 from PNAD (IBGE, 2009), the Southeast, which concentrates the states of São Paulo, Rio de Janeiro, Minas Gerais and Espírito Santo, remains the country's most populous region with 42% of the total population.

The Midwest is the least populated region, comprising the states of Mato Grosso, Mato Grosso do Sul, Goiás and Distrito Federal, with 0.07% of the population, followed by the Northern region with 0.81% of the national population.

According to data from the Internet Management Committee, obtaining through search on ICTs Households and Companies 2010, the presence of mobile phones in Brazilian households has increased 6% when compared to 2009. In turn, the number of households with a fixed telephone line slightly decreased by 2% (CGI, 2010).

The growth in the presence of mobile phones in households points to an increase in ownership of technology, especially in low-income households. The highest growth occurred in rural areas in the Northeast and amidst the D-E classes (CGI, 2010).

In Brazil, access to mobile phone extends to all social classes. Due to its wide dissemination and rapid growth, it has usually been assumed that "mobile telephony has a sub-

stantial economic and social impact, particularly in segments that, thanks to it, have had personal access to information technology and communication for the first time" (Bar et al, 2011, p.223).

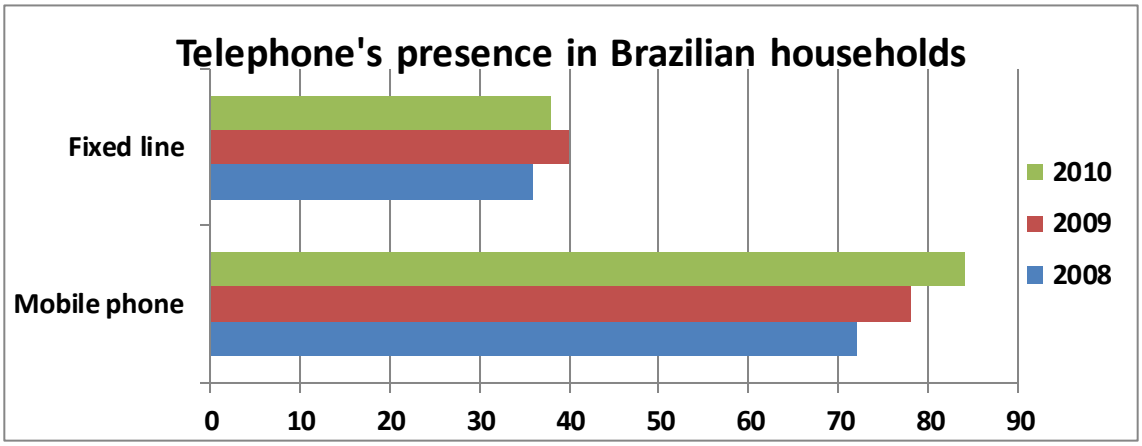

Figure 4: The percentage of households with access to telephone in Brazil from 2008 to 2010 (CGI, 2010:355).

11. The advancement of telecommunications in Brazil

Some facts help explain the current context of Brazilian mobile telephony and the ubiquity of mobile phones among the population. The first was the creation of the General Telecommunications Law, passed in 1997. Another important reason lies in the establishment of the National Telecommunications Agency (Anatel), a body created to regulate the telephone industry in Brazil. Lastly and most importantly, the Privatization of Telebrás in 1998, following the ongoing Latin American trend of privatization of state-owned telephone companies (Smith, 2007, p.120).

Even after the economic crisis experienced by the country in 2002 and 2003, inflation was kept under control and there was actually a reduction in the unemployment rate. In 2005, the unemployment rate fell from 11.5% to 9.9% and inflation ranged from 7.6% to 5.7%.

In this context:

> The investment in the telecommunications market in 2005 rose to 6,800 million, an increase of 9% over the previous year. With a decline in the index

> of country risk from 1,200 in 2002 to just over 300 in 2005, the inflow of direct foreign investment increased by almost 7% compared to last year and 33% in the telecommunications sector (Digiworld, 2007, p.214).

Brazil has taken advantage of these changes and has moved from a situation of lack of telephone access in 1998, when the country had only 15 million devices (landline and mobile telephones combined) to 125 million at the end of 2005. From these, 86 million are mobile phones and 39 million are fixed lines (Smith, 2007, p.119). The liberalisation of telecommunications has also played a key role in the increase of teledensity. In the recent history of Brazil no other infrastructure sector has grown as expressively as that of telecommunications. Undoubtedly, this increase in telephone traffic in the country "has brought about positive consequences to the economy, the exports and the relationships between people, bringing families, social groups, companies and institutions together" (Smith, 2007, p.121).

Leading the Mercosul, Brazil has an important role in the G20 and its volume of exports is among the largest in the world. Telecommunication products totalled 2.8 billion dollars, an increase of 148% compared to 2004 (Digiworld, 2007).

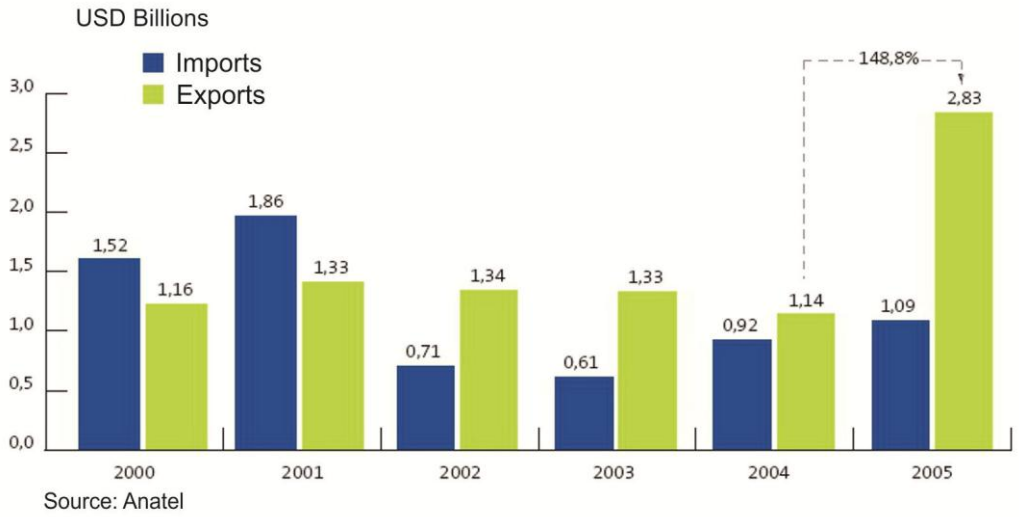

Figure 5: Brazilian balance of trade concerning telecommunication products (Digiworld, 2007:214).

12. Mobile telephony in the country

Brazil has the largest number of mobile phone lines in any country in Latin America. Simply by virtue of having the largest population in Latin America, Brazil owns 35.4% of mobile phones in the region (Smith, 2007, p.119).

ITU data from 2010 place Brazil as 6th world country in terms s of absolute number of mobile phone subscriptions, behind China, India, the United States, Russia and Indonesia. As far as the number of subscriptions per 100 inhabitants goes, Brazil occupies the 87th position, behind other Latin American countries, such as Panama (5th), Argentina (27th), Uruguay (36th), among others.

According to the Regulatory Authority of mobile telephony in Brazil, Anatel (2011), the number of mobile users exceeded 224 million in late August 2011. In the first eight months of this year alone, the Personal Mobile Service (SMP) recorded more than 21 million new licenses, a growth of 10.39% in the year. From the total number of active accesses in the country, 81.75%, i.e. more than 183 million are prepaid, while 18.25%, roughly 40.9 million, are post-paid. The Brazilian territory is divided into five political regions. However, Anatel presents the mobile telephony data (and the data on fixed telephony alike) divided into three regions. Region I covers the north of the country - except the states of Acre, Rondônia and Tocantins (which belong to region II) – the whole Northeast and Southeast region - except the state of Sao Paulo, which alone makes up region III. Thus, region II is formed by the states of the Midwest, of the South and the states of Acre, Rondônia and Tocantins.

Figure 6: Brazil's division according to mobile telephony regions (Anatel/Teleco).

The largest is region I, which comprises 16 federal units, followed by Region II, formed of nine states and the Federal District, and region III consists of the state of São Paulo only.

Region I has the largest share of mobile users in the country, 50.13%. However, its density in number of accesses per 100 inhabitants is the smallest in the country, 104.73. Region II participates with 25.33% of accesses and a density of 123.09 and the third region, which comprises the state of São Paulo, participated with 24.54% of mobile users and has the highest density of all regions: 114.88 accesses for every 100 inhabitants.

Region	**Market share (%)**	**Density (mobile phones/100 inhab.)**
1	50,13	104,73
2	25,33	123,09
3	24,54	131,92
Total	100	114,88

Chart 1: Mobile telephony regions and Brazilian market share (Anatel, 2011).

The Brazilian market and costs

In 2005, the Brazilian mobile market was headed with a somewhat comfortable lead by Vivo, which served approximately 34% of mobile phone users in the market, followed by TIM, with 23%, and Claro, with 21%.

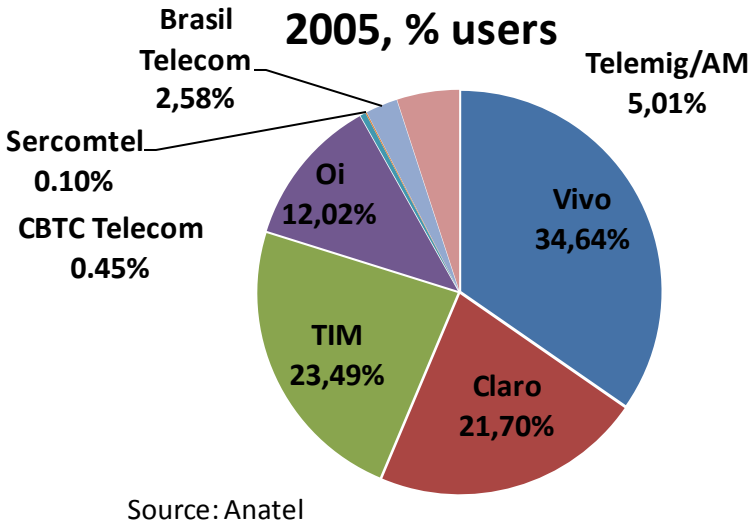

Figure 7. Market shares of mobile telephony in Brazil (Digiworld, 2007:216).

The situation in the market has undergone some changes recently, with the incorporation of Brasil Telecom by Oi. Anatel data from August 2011 present the Brazilian market as being served by seven providers. However, the most representative, which account for more than 95% of the market, are Vivo, Claro, TIM and Oi. Unlike the situation in 2005, Vivo has lost some share, while Claro and TIM grew and present very close market shares.

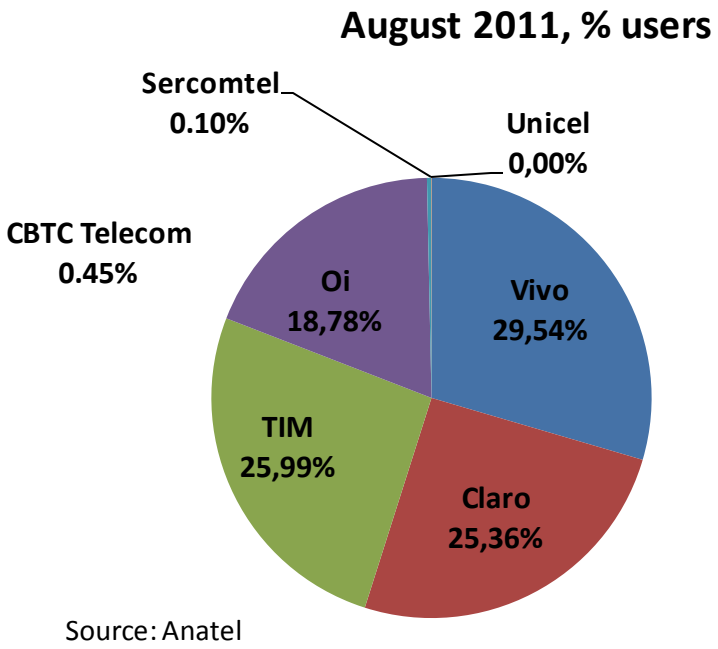

Figure 8. Market shares of mobile telephony in Brazil (Anatel, 2011).

With regard to the technologies used, a strong evolution towards digitalisation and standardization is noticeable, to the point that almost 85% of mobile phones have GSM technology. TDMA and CDMA technologies that were once rather ubiquitous nearly vanished altogether.

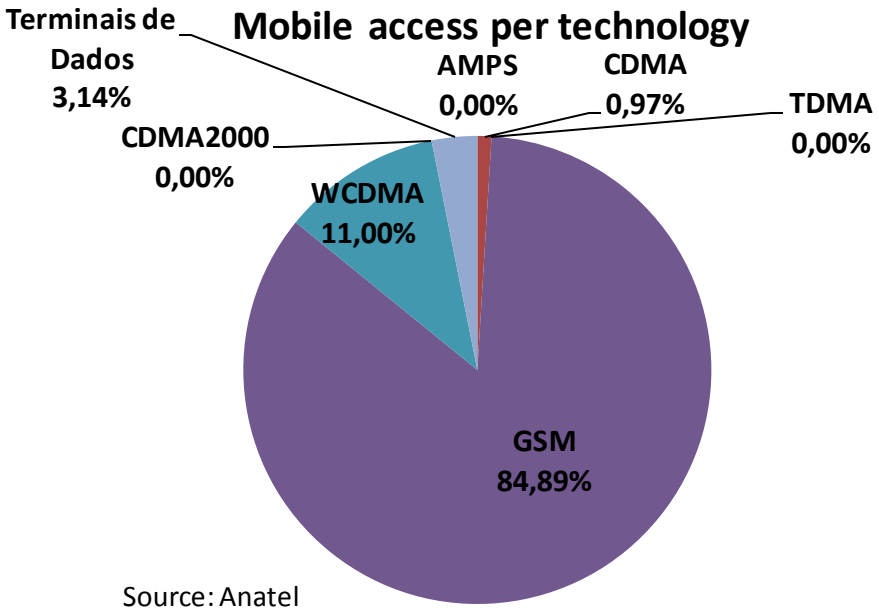

Figure 9.Mobile access by technology (Anatel, 2011).

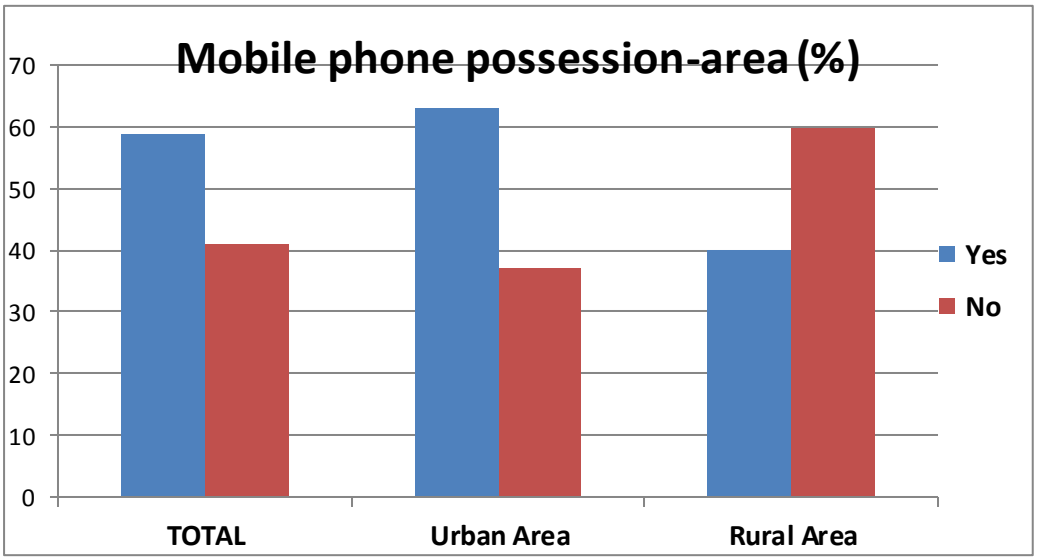

Figure 10: Proportion of individuals who own a mobile phone by area (in percentage) (CGI, 2009).

Ownership of mobile phones is much more pronounced in urban areas, however, mobile phone penetration in rural areas gradually increases. One of the problems affecting rural areas of the country is the issue of coverage, given the size of the territory and the geographic issues that might hinder the arrival/installation of the necessary infrastructure at costs that are compatible with the interests of providers.

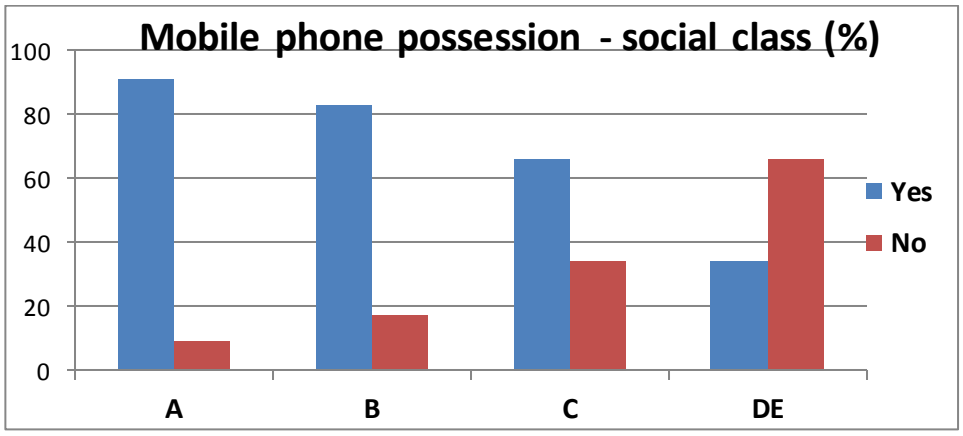

Figure 11: Proportion of individuals who own a mobile phone according to social class (in percentage) (CGI, 2009).

In relation to social classes, mobile phones are much more widespread amongst those with a higher purchasing power, while the cost of services remains the greatest obstacle to the lower classes.

At the same time, "the mobile tariffs in Brazil are among the highest in the continent and in the world. Thus, with regard to prices, Brazil occupies the 151st position amidst a ranking of 186 countries (only a few European countries, like Germany, feature pricier services)". The providers argue that this difference in prices is attributable to the higher Brazilian tax burden, amounting to 43%, while in Argentina it is 21% and 18% in Chile (Bar et al., 2011, p.224).

The prices of text messaging in Brazil are also high. While in Latin America a text message costs an average $ 0.04, in Brazil it costs $ 0.15 (Bar et al., 2011, p.224). The study by Galperin (2009) on the tariffs in Latin America, including the cost of a prepaid low-usage basket of mobile services depicts Brazil with rates three times higher than the Latin American average.

The high tariffs of voice calls and text messages limit the use of communication services through mobile phones. Though mobile phone ownership is so common in Brazil, using the device to make calls and send messages is expensive. Consequently:

> Brazilian users, especially the poorest segments of the population, have adapted and developed practices to avoid expenses: giving just a ring (beep), using the

> phone only to receive calls, sending text messages, taking advantage of bonuses and promotions, besides taking advantages of free mobile phone tools and interfaces such as Bluetooth, infrared cameras, alarm and calendar applications (Bar et al., 2011, p.224).

Bar et al. (2011, p.265) in her survey on youth groups, theatre groups and sex workers in Brazil have identified the high value that mobile phones hold for their owners. From those groups studied, almost all individuals had their own phone - in some cases more than one device - even though this often represented a significant part of their economic resources. The vast majority of those respondents owned an entry-level model, a reminder of the economic condition of the sample. Hardly any respondents, however, mentioned the cost of the device as an obstacle.

On the other hand, all mentioned the cost of mobile services as an important limitation to the use of mobile phones (Bar et al., 2011, p.265).

13. Mobile Broadband

Regarding the Internet, 35% of Brazilians claim to have a phone with internet access; however, the number of those who actually use the internet on the device is much smaller, although there has been a negligible growth over the years. In 2005, 5% of the owners claimed to access the internet through the mobile phone; in 2009, this number had risen to 6%.

The lack of fluctuation in Internet use is related to the high cost of mobile phone use in the country. Although internet use via mobile phone is only starting out in the country, the higher the purchasing power, the greater the frequency of this practice. Considering the households that earn up to one minimum wage, only 2% of the respondents reported accessing the Internet via mobile phone, whereas among those with an income of five or more minimum wages the number rises to 22% (CGI, 2009, p.147). However, the balance of broadband recently released by Huawei/Teleco indicates a 35% growth in mobile broadband in Brazil in the first half of 2011. The density of 3G access reached 13.7 per 100 inhabitants, exceeding the world average of the end of 2010 (Huawei, 2011). During the same period, 27.9 million mobile broadband accesses were

reported, with 26.6 million accesses made from devices with 3G connection. The total number of 3G connections increased by 41% during the second quarter of the year. Mobile providers are focusing on increasing the capacity of the backhaul of their networks in the cities already served. According to data pertaining to the second quarter of 2011, mobile broadband is available to 76% of the population and 28% of Brazilian municipalities.

Providers are customizing packages for different uses like email, social networks, chat or conventional Internet access. This strategy encourages subscription to the plans offered, which currently no longer feature billing by speed, but rather by volume of data. The greatest limit to mobile internet dissemination in Brazil is still the price, which is above the levels that prevail in other countries, while the taxes are considered the greatest culprit by the providers.

In turn, providers have realized that mobile broadband is a great market segment that still has room for major expansion. One example of providers' policies aiming to attract new customers for mobile broadband plans is TIM, which provides internet access without restrictions to users with prepaid plans of 0.50 Brazilian cents (0.27 U $ D) per day.

14. Final remarks

From the discussions presented herein, we can conclude that although the countries of Latin America share several common characteristics with regard to the development of mobile telephony, they also feature significant singularities.

Issues such as social inequality, political and economic history of these countries involving privatisation and the arrival of multinational companies, which practically control the mobile telephony market in the region in the present day, have helped shape the landscape of mobile telephony in the region as we know it.

If the number of mobile phones is so high in Latin America, part of the reason lies on the lack and/or limitations of telecommunication infrastructures, namely fixed telephony lines, which have made this service so expensive and unattainable by a large part of the population.

Beside these issues, the costs of mobile telephony in the region are a major hindrance to wider use of equipment by the poorest families. Considering the great level of social inequality that prevails in the region, the number of families in this situation is very rep-

resentative.

Thus, after a decade of great expansion, some countries have begun to show signs of stagnation, while others - such as Brazil and Mexico - still evidence great potential for market expansion involving traditional mobile services, such as the sale of equipment and voice plans. However, from such stagnation one by no means should infer that the costs of these services have already become accessible to the entire population. The current tariffs, as well as the standard plans, represent a barrier to the poorest population, which makes up a significant part of the Latin American people. Not only do expensive tariffs inhibit mobile penetration, but also the actual use of the devices, encouraging informal practices of expenditure control, such as the use of mobile phones mainly for receiving calls, text messaging, the "beep" strategy, among others.

Yet, as Santiso (2007) remarks, if Latin America intends to expand its growth potential, more investment in infrastructure and greater regulation of services are required. The region spends less than 2% of GDP in infrastructure, when according to the World Bank it should spend between 4% and 6%, in order to reduce the digital divide. Providers face some challenges of their own as well, such as the implementation of numeric portability, the allocation of radio spectrum and greater reduction in tariffs, which are essential for a widespread access to become a reality. In turn, governments have a great responsibility and could greatly contribute to a reduction in the costs of mobile telephony, starting by reducing the tax burden on telephony - one of the justifications given by the providers for the high cost of the service - and other regulatory attitudes, such as imposing per second billing and micro-prepayments. "More importantly, governments need to rethink public policies that assume mobile phones as luxury goods to complement the traditional wire services" (Barrantes, Galperin, 2008, p.529). On the other hand, the market of mobile data services paves the way for the exploration of a vast continent; however, the success of this operation depends very much on cost reduction – both regarding the service plans and the most advanced mobile devices.

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