

# **3G MOBILE POLICY:**

## **THE CASES OF CHILE & VENEZUELA**

This case has been prepared by Ben A. Petrazzini <[Ben.Petrazzini@itu.int](mailto:Ben.Petrazzini@itu.int)> of the Strategy and Policy Unit of the ITU, and Martin Hilbert <[mhilbert@eclac.cl](mailto:mhilbert@eclac.cl)> of the UN Economic Commission for Latin America (ECLAC). The preparation of the study has been possible thanks to the valuable contributions of Jesus Rivera of CONATEL, Venezuela; and Gabriel Bernal of the ITU Area Office in Santiago, Chile. *3G Mobile Policy: The Cases of Chile and Venezuela* is part of a series of Telecommunication Case Studies produced under the New Initiatives program of the Office of the Secretary General of the International Telecommunication Union (ITU). The New Initiatives program is directed by Tim Kelly <[Tim.Kelly@itu.int](mailto:Tim.Kelly@itu.int)>. The Case Studies Program is managed by Lara Srivastava <[lara.srivastava@itu.int](mailto:lara.srivastava@itu.int)>. Other country case studies on 3G, including China, Hong Kong SAR, Ghana, Japan and Sweden, can be found at <<http://www.itu.int/3g>>. The opinions expressed in this study are those of the authors and do not necessarily reflect the views of the International Telecommunication Union, its membership or the Governments of Chile and Venezuela.

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## 1 Introduction and the mobile market in Latin America

The rise of 3G services has been received with great enthusiasm in Latin America. The region has an impressive track in the adoption of mobile technologies and services. It has been one of the fastest growing mobile markets in the world. This is quite outstanding considering that: (1) most countries in the region have a relatively low income per capita, and (2) steep growth is maintained in spite of an already relatively high level of mobile penetration—over 12 mobile subscribers per 100 inhabitants.

Forthcoming 3G services, however, present a number of considerable policy challenges for the region. Several of the countries of the region have already allocated for PCS services large parts of the spectrum that has been identified and approved at the ITU's World Radio Administrative Conferences for 3G services. Countries of the region will have to find a compromise between the needs of existing and forthcoming services taking into account world and regional trends. Chile, for example, is facing this dilemma and postponing a decision until the some of the key elements of the puzzle are in place. Venezuela, instead, has 3G bands of the spectrum unoccupied and is free from these problems. Venezuela, however, as other countries of the region is facing a number of other dilemmas. When is the right time to grant the licenses? Are markets ready for a technology like this? Will hardware and services be available in the near future? Should the regulator adopt absolute neutrality in regard to standards? Or should it provide incentives so that at least one of the new operators adopts one of the ITU recommended standards?

This case study lays out these issues in the context of the forthcoming licensing of 3G services in Chile and Venezuela. The paper starts by looking at the current status of the mobile market in Latin America. It then goes to explore in some detail the case of Chile to delve later into the experience of Venezuela. Each of the cases offers a summary of the main socioeconomic indicators of the country, it presents in brief the telecommunications market in the country (with special attention to the mobile market) and it then goes into the various issues related to the licensing of 3G services in each country—including licensing procedures, license requirements, spectrum allocation, emerging technology, likely services and operators, among others.

The Americas region (which includes Canada and the US) has been one of the regions in the world that has embraced more widely telecommunication market reforms. As of 2000 the region had the highest percentage of countries with privatized telecommunications companies of any region in the world (see Figure 1.1 upper left chart). The Americas region had also a high degree of competition in mobile and Internet services. Some 80 percent of the countries in the region had in 2000 two or more mobile operators in the local market, while some 85 percent of the countries had multiple providers of Internet services. Competition in basic services, however, is not so outstanding. In 2000 only 38 percent of the countries allowed some form of competition in one of the segments of the basic service market (Figure 1.1). This market restructuring has been accompanied by institutional reforms. The introduction of privatization and competition triggered the rise of new, separate regulatory agencies in a considerable number of countries of the region. As of 2000 some 65 percent of the countries in the region had created a separate regulatory agency. This made the Americas, the region with the highest percentage of separate regulators in the world.

These significant market reforms have had a direct impact on the growth of the mobile market in the region, and in particular in the two markets that are subject of these case study: Chile and Venezuela. Both countries had achieved by the end of 2000 the highest mobile teledensity of South America, doubling the average for countries in the South of the Americas (Table 1.1).

Growth rates in most countries of the region have stood in the second half of the 1990s at very high levels. Central America, for example, grew at more than 80 percent per year between 1995 and 2000, bringing mobile teledensity to over 11 mobile subscribers per 100 people. This means that at the turn of the century Central America had more mobile subscribers than fixed-line subscribers. This latter indicator is particularly impressive in the case of Venezuela, where by the end of 2000 close to 70 percent of all telephone subscribers were mobile subscribers.

**Table 1.1: Growing fast**

Profile of mobile markets in the Americas, Chile and Venezuela.

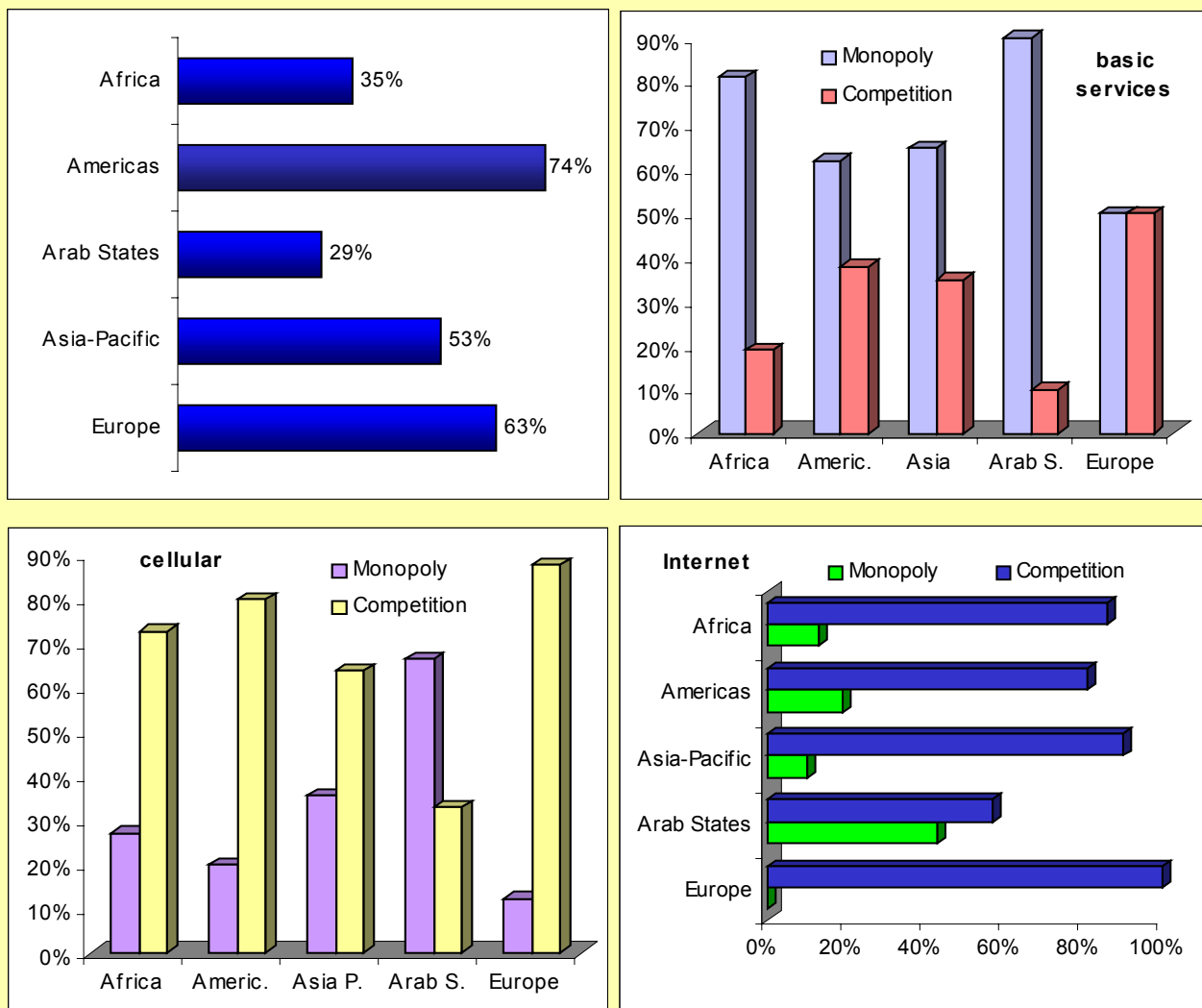
Region/country	1995 (k)	2000 (k)	CAGR (%) 1995-00	Per 100 inhabitants	As % of telephone subscribers
Central	756.7	15'442.8	82.8	11.47	50.1
North	36'381.8	118'241.9	26.6	38.65	35.7
South	2'698.5	43'639.8	74.5	12.65	43.5
Caribbean	420.2	2'587.2	43.3	6.83	36.5
Americas	40'257.1	179'911.7	34.9	21.85	38.3
<b>Chile</b>	<b>197.3</b>	<b>3'401.5</b>	<b>76.7</b>	<b>22.36</b>	<b>50.3</b>
<b>Venezuela</b>	<b>403.8</b>	<b>5'256.0</b>	<b>67.1</b>	<b>22.23</b>	<b>67.9</b>

Note: Compound Annual Growth Rate (CAGR)

Source: World Telecommunications Indicators Database

**Figure 1.1: Deep and wide**

Percentage of countries with privatized carriers, by region, 2000 (upper left chart); percentage of countries with competition in basic services, by region, 2000 (upper right chart); percentage of countries with competition in mobile services, by region, 2000 (lower left chart); percentage of countries with competition in Internet services, by region, 2000 (lower right chart).



Source: ITU World Telecommunication Regulatory Database 2000.

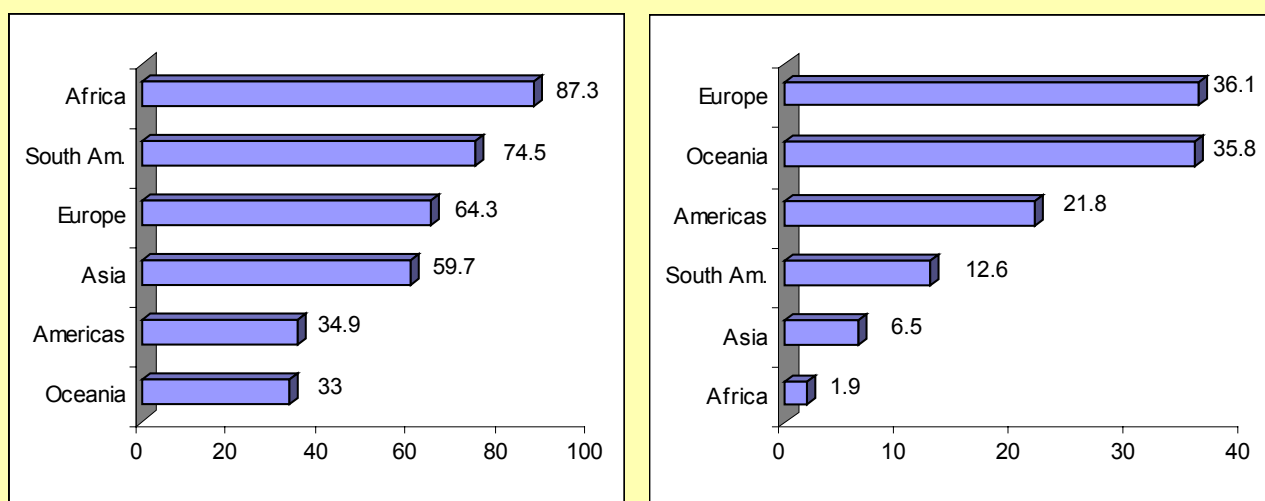
The growth of the mobile market in Latin America remains impressive even when placed in the global mobile marketplace. From an international comparative perspective only Africa, with 87.3 percent, has a higher compound annual growth rate than Central America. South America (where Chile and Venezuela are located) had in the second half of the 1990s a CAGR of 74.5 percent (Figure 1.2, left chart). Yet, a closer look at other indicators shows that the growth rate of Africa is partly based on the fact that it has started from a very low base. As of the end of 2000 it has only 1.9 mobile subscribers per 100 people. South America,

instead, was able to sustain a similar CAGR (i.e., close to 75 percent) with a much larger market. By the end of 2000 the region had 12.6 mobile subscribers per 100 people (Figure 1.2, right chart).

Latin America has been identified as a region with great potential in its telecommunication market in the coming years. This has led a large number of international mobile operators to place their resources in the region. Practically all new cellular market entrants are backed by strategic foreign investors.<sup>1</sup> The largest foreign investor, in terms of subscribers, is BellSouth of the United States, whose Latin investments have been made in both existing operators as well as in new license awards in a dozen countries in the region. Other major investors include Telefónica (which acquired most of its cellular companies/investments as from privatization processes), and Luxembourg-based Millicom. These three alone can account for around 40 per cent of all cellular subscribers in Latin America and this figure rises to above 50 per cent when the Mexican market, where these three investors have no interests, is excluded from the analysis. More recently a few Canadian and Asian companies—such as TIW of Canada and DDI of Japan—have also entered the Latin mobile market.

### Figure 1.2: Latin mobile in the global context

Compound annual growth rate (CAGR) of mobile subscribers 1995-2000, by region (left chart); and percentage of mobile users per 100 inhabitants, by region, 2000 (right chart).



Note: The Americas region includes Latin America, Caribbean and North America (i.e., Canada and the USA).

Source: ITU World Telecommunication Regulatory Database 2000.

Overseas interest in the Latin American mobile market is also reflected in the variety of mobile standards coexisting in the region. This stems from the influence of the various European and North American investors. Some claim that Latin America has even become something like a “battle-field” for North American and European communication equipment suppliers. At the end of the first quarter of 2001 the region had some 32 million TDMA subscribers, some 15.9 million mobile users with CDMA handsets, and 4.9 million users with GSM handsets (Figure 1.3, left chart).<sup>2</sup> Both CDMA and GSM are growing fast in the region. During 2000 there were more than 50 commercial deployments or trials of CDMA networks going on in Latin America and the Caribbean. The growth of GSM is also manifest. While as of April 1999 there were three GSM networks in Latin America, by July 2001 the number had risen to some thirteen networks across the region.<sup>3</sup>

<sup>1</sup> Telmex (in Mexico) is the only large telecommunications company in the region providing mobile services in which domestic capital is in control of the firm.

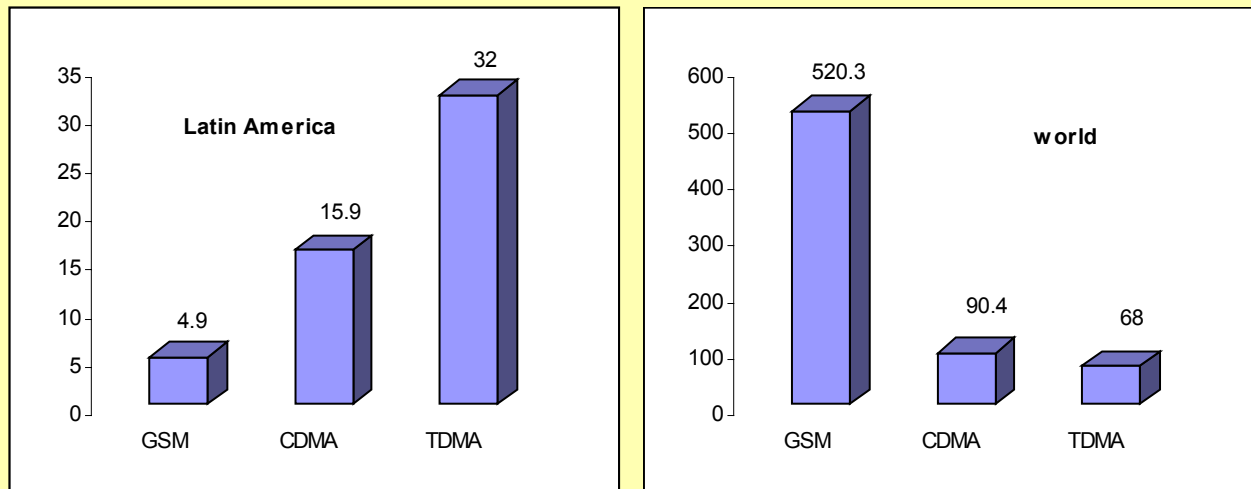
<sup>2</sup> The GSM figure for South America is 2.7 million subscribers and for North America is 12.2 million subscribers. North America includes México, which has an estimate of 2.2 million GSM subscribers—Canada and the United States accounted in March 2001 for some 10 million GSM subscribers. For further information on mobile standard distribution worldwide, see <http://www.uwcc.org>; <http://www.cdg.org>; and <http://www.gsmworld.com>.

<sup>3</sup> Some big players in the region—such as Telcel, Mexico (10 million subscribers), Telecom Personal (1.6 million subscribers) and AT&T Wireless (15 million subscribers)—have announced that they would use PCS spectrum to introduce GSM/GPRS overlays shortly. Furthermore, the Brazilian regulator's decision in 2000 to partly follow the European standard for spectrum allocation in its PCS auctions (to use 1.8GHz for its PCS licensing), has significantly underlined the position of GSM in the entire region.

In spite of the growth of GSM and CDMA in recent times the standards picture in the region is rather different from global main trends (Figure 1.3, right chart). This divergence has raised the concern of some policymakers in the region, who believe that if Latin America makes mistakes in the allocation of spectrum or the choice of standards it might be left out of the main stream of the global 3G market—with all the negative implications associated to the loss of economies of scale in hardware, services, and applications.

**Figure 1.3: The standards dilemma**

*Mobile standards used by mobile subscribers, millions, Latin America, first quarter 2001 (left chart); and mobile standards used by mobile subscribers, millions, worldwide, first quarter 2001 (right chart).*



Source: GSM Association, CDMA Group, and Universal Wireless Communication Consortium.

Several of these foreign investors have come into the Latin American mobile market—or consolidated its position in it—through the recent wave of PCS licensing in the region.<sup>4</sup> Argentina, Bolivia, Chile, Costa Rica, El Salvador, Guatemala, Haiti, Honduras, México, Paraguay, Perú, Puerto Rico and Dominican Republic have recently licensed PCS operators in the 1900MHz band—and Colombia is planning to do so.

This recent increase in the number of players in the region's market is, for the rise of 3G mobile services, a mixed blessing. On the one hand, it increases the number of foreign players and the commitment of existing ones providing the forthcoming licensing of 3G services with a players that have or can gain financial backing and who have already commitments made to sustain their position in local markets.

On the other hand, PCS network rollout has demanded on existing and new operators considerable financial resources that have not yet been amortized. This certainly creates a certain resistance to new ventures in the short run. Adding to the reluctance of mobile operators, governments several countries of the region find themselves with complex scenarios to allocate 3G spectrum, given that PCS has been licensed to operate in the 1850-1990MHz—a band identified for 3G services. The 806-960MHz and the 2500-2690MHz band, which have also been identified by CMR-2000 for IMT-2000, are also used by other services in most countries.<sup>5</sup>

<sup>4</sup> While recent attention has focused on the PCS auctions, a quiet competitor is gaining ground in the wireless markets of the region: trunking. Nextel (a US-based trunking provider is already present in Brazil, Mexico, Argentina, Peru and Chile, accounting for a total of half a million clients in June 2000. The company is about to launch WADP (Wireless Application Delivery Platform) in Argentina, Brazil, Mexico, and Peru. WADP allows mobile phone access to the Internet at a flat rate. The technology provides access at 22kbps—compared with 14.4kbps in WAP/CDMA and 9.6kbps in WAP/TDMA. The company has been taken to court in Brazil, Chile, and Peru for providing mobile services for which, the established operators argue, it has no license. In most of these countries Nextel has won or is about to win the legal battles.

<sup>5</sup> The 800MHz band in the major economies of Latin America has been allocated to 2G mobile services in the following way: Argentina - 2 licenses (TDMA and CDMA); Brazil - 2 licenses (TDMA and CDMA); Chile - 2 licenses (TDMA); Colombia - 2 licenses (TDMA); Mexico - 2 licenses (TDMA and CDMA); and Venezuela - 3 licenses (TDMA, CDMA and GSM in the 900).



# Chile



Chile is located in the South-East of South America. It borders on the North with Peru and the East with Bolivia and Argentina. Chile's 756.6 thousand sq. km surface area is a long "strip" (4,329 km length and 150 km in width on average, squeezed between the Andes mountain range (with altitudes greater than 6,000 meters) and the Pacific Ocean.<sup>6</sup> In the middle of the Pacific Ocean, 3,760 kilometers offshore, lies the Chilean Easter Island. Chile ends at Antarctica, where it maintains five bases and a civilian settlement.

In 2000 the Chilean population was over 15 million inhabitants. With a growth rate of 1.5 percent during the 1990s, more than 28 percent of Chilean population is younger than 15 years. Urbanization stood at almost 86 percent in 2000 and it continues to grow. Illiteracy is one of the lowest of the region (4.3 percent).

Almost half of the urban population is employed in manufacturing, transport, equipment operation or general labors. Almost 20 percent of workers have professional, technical or other qualified jobs. Only 25 percent of Chile's workforce belongs to unions. As in other Latin American countries, income distribution is highly skewed, with wealth highly concentrated in a small percentage of the population. The wealthiest ten percent of population accounts for 40 percent of the income, while the poorest 40 percent has access to 15 percent of it.<sup>7</sup>

The degree of government intervention in the economy varies according to the philosophy of the different regimes. A military regime overthrew Allende's socialist government in 1973, and ruled until 1990. The Pinochet government introduced a free market economy, marked by sharply reduced government expenditures, eliminating price controls and launching a wide ranging privatization program of state-owned enterprises. In 1981 the regime adopted a constitution described as a "transition to democracy". It provided for presidential elections and the re-establishment of the legislature. A plebiscite in 1988 ended the military intervention peacefully.

Since then spending on social welfare has rose steadily. Business investment, exports, and consumer spending have also grown substantially in the past few years. Chile's GDP had more than doubled during the 1990s—passing the US\$ 70 billion threshold. Chile's main export markets, as of the turn of the century were, the U.S. (19.9 percent), Japan (14.9 percentage), England (8.9 percentage) and Brazil (6 percentage). Foreign Direct Investments into the Chilean economy rose from an average of US\$ 720 million in the period 1985-89, to an average of US\$ 5'333 million in the period 1995-99.<sup>8</sup>

<sup>6</sup> Chile's north is one of the most arid regions in the world and the south—the Chilean Patagonia—consists of 132,000 square kilometers of islands, canals, fjords, icebergs and glaciers.

<sup>7</sup> CEPAL 2000

<sup>8</sup> During the last five years the main investors in the country have been Spain (30 percent), the United States (25 percent) and Canada (12 percent).

The main industry of Chile is mining. Copper in particular constitutes an essential component of the economy. The industry constitutes up to 35 percent of Chilean exports. Agriculture (fruit and wines), cellulose and fish products are other important industries for the country. Chile signed an association agreement with Mercosur in June 1996, which cut tariffs for most Chilean exports to Mercosur countries.<sup>9</sup> Chile is also a member of the Asia Pacific Economic Co-operation forum (APEC) and signed a bilateral agreement with the European Union (EU) in mid- 1996, the first stage towards further trade liberalization between the partners of the agreement. During 1997 Chile has been accepted as an observer in the OECD trade committee. There are ongoing negotiations with the U.S. to let Chile become the fourth NAFTA member.

Chile's macroeconomic conditions are stable and the country is seen as a relatively "low-risk" country. Chile has often been referred to as a kind of "stepping stone" for entering the Latin American marketplace. Compared to other countries of the region, Chile came to the attention of foreign investors early on, at a time when the economies of the subcontinent were beset by severe economic difficulties. Students of Chile's comparative advantages attribute them to the deep and wide-ranging economic reforms of the 1970s, which were then consolidated with the return to democracy at the beginning of the 1990s.<sup>10</sup>

## 2 Telecommunications in Chile

There were only two dominant companies in the Chilean market until the late 1980s, and both were operating in a monopolistic regime under State control and ownership, through the Corporación de Fomento de la Producción (CORFO). The companies were Compañía de Teléfonos de Chile (CTC), which had a monopoly on local telephony; and Empresa Nacional de Telecomunicaciones (ENTEL), which had a monopoly on long distance services.

In late 1987 telecommunications market reform was embraced with the launching of the first privatisation of a telecommunication company in Latin America—and one of the first in the developing world.<sup>11</sup> Between the time of privatization and 2000 the number of lines per 100 inhabitants increased from 5.3 to more than 21. Most of these lines (57.4 percent), however, are installed in the capital, Santiago.

Market reforms have been largely triggered and managed by the Subsecretaría de Telecomunicaciones (SUBTEL) and its reporting body, the Ministry of Transportation and Telecommunications. Subtel was created in 1977 and its regulatory functions include: granting permissions for certain services, and inform the private sector about applications for the concession of telecommunication services; tariff regulation; spectrum management; elaboration of technical norms; and to apply administrative sanctions. SUBTEL's decisions can be revoked by the courts of justice, the Comisión Antimonopolios (in its scope of jurisdiction) and the Ministry of Transport and Telecommunication (in specific cases which are foreseen by law). SUBTEL has had a close and active co-operation with the industry in recent years, leading to the foundation in 2000 of the Comité Consultivo de Telecomunicaciones (Box 2.1).

In 2000 investments into the telecommunications sector reached around US\$ 1,120 million, representing almost 8 percent of total national investments. Around 40 percent of it accounted for investments into mobile telephone services and further 10 percent into projects related to the development of fiber-optic networks and submarine cables.

<sup>9</sup> Mercosur is the customs union that has been created among Brazil, Argentina, Uruguay and Paraguay.

<sup>10</sup> See Economic Commission for Latin America and the Caribbean (CEPAL) "Foreign Investment in Latin America and the Caribbean 2000", Santiago, Chile, 2001.

<sup>11</sup> Foreign and local investors participated in the process. In January 1988, 50 percent of the social capital of CTC was transferred to the Australian group Bond Corporation. The acquisition by the Australian group surprised many due to the small experience of the investor in the telecommunication's sector. Due to financial problems and difficulties in fulfilling the acquired commitments, Bond had to sell CTC a year later to the Spanish company Telefonica de España—which paid some US\$ 388million for 42.6 percent of the company. As of mid-2001, Telefonica was in control of 43.6 percent of shares and the management of CTC. Until 1989 ENTEL, the long distance service monopoly, was mainly controlled by corporations (33 percent), the Pension Fond (24 percent), and the Chilean company Chilquinta (which controlled 20 percent and the management of the company). Starting in 1989 the company added further private capital. Telefonica de España, bought initially part of its shares but was soon obliged to give away its participation to Telecom Italia, due to competition norms. As of mid-2001, Telecom Italia controls 54.2 percent of shares and the management of ENTEL.

**Box 2.1: Consulting with Industry***Profile and functions of the Comité Consultivo de Telecomunicaciones (CCT)*

After taking office at the beginning of 2000, the new Chilean administration of President Ricardo Lagos created a voluntary telecommunications consultant committee (CCT: Comité Consultivo de Telecomunicaciones), through which 70 industry representatives co-operate with Subtel in the development of telecommunication services in the country. Once a new Task Force (Grupo de Trabajo; GT) is established, the President of CCT invites all representatives to an initial hearing. Interested parties can voluntarily join the Task Force. The GT elects a president who is in charge of the administration of the group. The elected president has to be from the private sector. A representative of Subtel participates as an observer in the meetings of the Task Force. The Task Force prepares a report or position paper that, once ready, is circulated for comments to all industry representatives by the President of the CCT. The report is later handed to Subtel and the Ministry of Transportation and Communication who will take it into account in the preparation of ruling and legislation related to the subject considered by the Task Force.

As of mid-2001 there were nineteen concessions for fixed public telephone services, yet only one company (Telefonica CTC Chile) still controlled some 85 percent of the market. CTC used to be a top-star performer of the Chilean industry. During the period 1995-1998 the company had profits averaging US\$ 290million and investments in the order of US\$ 650million. However, profits turned to losses in 1999 (US\$95million) and 2000 (US\$ 74million until 30 September). While a recent tariff decree<sup>12</sup> might be part of the reason for this, a closer examination reveals that problems in the mobile business are also a contributing factor.

To enhance the supply of fixed communication services, and to increase the competitiveness of the market, the Chilean government recently granted three national and three regional wireless local loop (WLL) licenses. Close to forty companies (including mobile operators as well as broadband provider, or equipment producers) showed interest. Five of them ended up postulating for the final contest. WLL services have been placed in the 3'400-3'700MHz band.

Chile's most dynamic telecommunication services are mobile and Internet (for information on mobile see the next section). The Internet has been growing at sustained pace in spite of a relatively high penetration rate. The number of dial-up accounts, for example, grew in the second semester of 2000 some 23.4 percent, while the number of cable modem and xDSL connections grew by some 223.3 percent in the same period. By the end of 2000 the Internet had reached an estimated 13 percent of the population—this represents the highest penetration in Latin America, along with Uruguay. By the end of 2000 the Internet already accounted for almost 20 percent of the total telecommunications traffic in the country. Internet access was in the hands of 38 Internet Service providers (ISPs), but market share was highly concentrated with more than ¾ of accounts belonging to the two incumbents—Telefonica and Entel. The current administration is strongly backing the development of the Internet. President Lagos considers the Internet as a powerful tool and a unique chance for the country to overcome its geographic isolation by getting integrated into the “digital economy”.<sup>13</sup> The government has been very active in promoting the use of the Internet by the Chilean people through a variety of projects comprised under the umbrella of the “Ventana Unica” (Box 2.2).

With the aim of maintaining regional leadership in the adoption of new technologies and services the regulator has followed in recent years a policy of technological neutrality. Regulatory constraints and requirements have been reduced to a minimum. This policy approach has led to a considerable pluralism in technology. In the mobile market, for example, D-AMPS, TDMA, GSM, as well as CDMA standards have been adopted.

<sup>12</sup> Since August 1999 the Decreto No. 187 regulates fixed line tariffs for a period of five years. The regulation provoked harsh resistance of especially Telefonica, which claims that due to the norm its income is declining for 24.7percent. Given their losses of 1999 and 2000, Telefonica CTC Chile announced that it would not invest more in basic telephony until a new regulation will be introduced. It reduced its investment plan from US\$380 (of which half has been planned to get invested into the mobile market) to US\$300 million.

<sup>13</sup> Ricardo Lagos, President of Chile in a recent speech argued “In the digital world, there are no longer countries at the center and others on the periphery. Some observers have proclaimed the death of distance. Yet at the same time, new challenges have arisen from these technological advances: some people will have access to new technology, while others fall behind. This “digital divide” calls for imaginative responses within our own country, as well as in our country's relationship with the world.” See “The country we want” <http://www.gobiernodechile.cl>.

**Box 2.2: Digital government**

*Initiatives of the Chilean government to promote the use of the Internet in the country.*

In early June 2000 President Lagos set up the Committee of Ministers for Information and Communication Technologies.<sup>14</sup> The Committee is integrated various Ministers and other high level government officials.<sup>15</sup> On 13 June 2000 the Committee started to work on a number of projects that were clustered in five thematic areas: (1) promotion of access; (2) electronic government; (3) new technologies in businesses; (4) human resources development; (5) Information and citizen participation. Each of these areas are led and coordinated by the institution that has a jurisdictional function in government on the area. The promotion of access project, for example, is led by the Subsecretary of Communications (Subtel). In the short term the Committee has been working in the development of policy and concrete projects in the areas of access, government, human resources, and ICT in businesses. On 21 May 2000 the President of Chile announced a number of projects aimed at modernizing the Chilean government and society.<sup>16</sup> Mr. Lagos proposed to:

- \* establish “Infocenters” across the country;
- \* further expand the “Enlaces” program (connecting schools to the Internet);
- \* provide easier access to computers for small businesses and teachers;
- \* pass the digital signatures law;
- \* launch public procurement over the Internet;
- \* establish the “Ventanilla Unica” (Single Window) program
- \* set up the Cultural Links network
- \* promote the development of a “risk capital” industry

As of April 2001 all of these initiatives have been completed or are in the process of being implemented: \* more than 100 “Infocenters” have been set up across the country covering all regions; \* the digital signature law is in Congress to be approved; \* the program of electronic public procurement was launched; \* a number of legal reforms were introduced to enhance the development of risk capital; \* the program to ease the purchase of PCs for small business and teachers in being implemented; \* on March 2001 the Chilean government open an office in Silicon Valley in the USA; the Cultural Links network and the Ventanilla Unica program are being implemented.<sup>17</sup>

**2.1 The Mobile Market in Chile**

The spiraling rise of the mobile phone market in Chile took by surprise—as it did in many other parts of the world—a large number of forecasters and industry experts. Some of the mobile equipment producers that have been operating in the Chilean market, for example, expected that the 410,000 of mobile subscribers that the market had in 1997 would reach the one million threshold by the end of 2000. Yet, it took only one year for the market to almost reach that mark. By the turn of the century there were almost 3.5 million mobile subscribers—product of a market that had been experiencing growth rates of more than 130 percent in the years 1998 and 1999 (Table 2.1).<sup>18</sup>

**Table 2.1: Going mobile**

*Evolution of subscribers to mobile services, number of subscribers per 100 people, and growth rate in Chile, 1991 to 2000.*

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<b>Subscribers</b>	36,136	64,438	85,186	115,691	197,314	319,474	409,740	964,248	2,260,687	3,401,525
<b>Penetration</b>	0.3	0.5	0.6	0.8	1.4	2.2	2.8	6.5	15.0	22.6
<b>Growth rate</b>		78%	32%	36%	71%	62%	28%	135%	134%	50.4%

Source: Subtel 2001

<sup>14</sup> The mission of the Committee is to propose policies and to set up initiatives to: (1) develop information infrastructure, (2) expand further electronic commerce activities, (3) promote content industries, (4) facilitate access to the Internet for all Chileans, (5) increase knowledge on the use of information technologies and networks for social, cultural, and educational purposes.

<sup>15</sup> The Committee is headed by the Minister of Economy, Mining and Energy and integrated by: the Secretary General of Government, the Minister of Works, the Minister Transport and Telecommunications, the Minister of Education, among others.

<sup>16</sup> For further information on each of this projects, see <http://www.modernizacion.cl>

<sup>17</sup> The government announced on 18 July 2001 that will be launching in the near future ten projects to provide public services through information and communication technologies—mainly through the Internet. The projects are part of the “Ventanilla Unica” (Single Window) initiative through which the government is planning to provide a range of services ranging from vehicle licenses to medical licenses and environmental certificates for industrial projects.

<sup>18</sup> Fixed line services were growing at an average of 20 per cent in the first three years of the 1990s but had dropped to 2 per cent in 1999 and 8.2 per cent in 2000.

A reflection of this booming market expansion has been the fact that during 1999 mobile services took the largest share in the Chilean telecommunication investment portfolio (Figure 2.1, left chart).<sup>19</sup> The growth has been so staggering that by the end of 2000 the number of mobile subscribers had exceeded the number of fixed line subscribers (Figure 2.1, right chart). In other words, it took only one decade for cellular to achieve the level of penetration that it took almost a century to fixed line telephony. The current Lagos administration is very proactive in promoting information and communication technologies, and in the area of mobile communications, the goal is to sustain the current growth rate, aiming at a 60 percent penetration by 2010.

This solid market growth has its roots at the end of the 1980s, when the first mobile services were licensed. At that time, first CIDCOM (actual Bellsouth) and then Telefonica CTC Comunicaciones Moviles (ex Startel) were granted licenses to provide cellular services in the 800MHz band.<sup>20</sup>

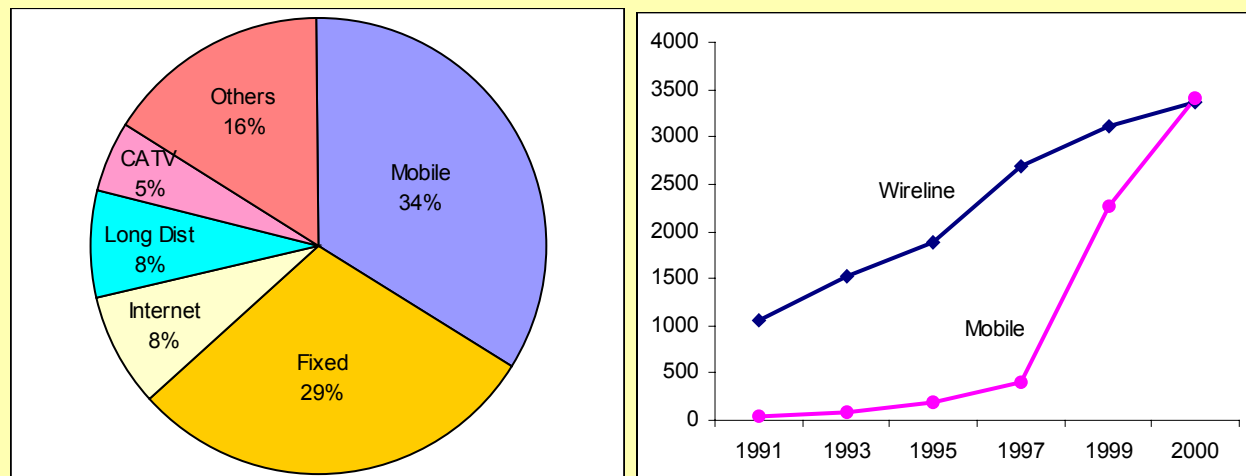
It was argued then that it would only be possible to maintain profitability for new entrants if a duopolistic regime was established. Technical and market size limitations were at the basis of such approach. According to the policy adopted at that moment, the country was divided in two geographical regions: the first, included the metropolitan area (Santiago) and RegionV (Valparaiso north-wards); and the second comprised the rest of the country. Two licenses were granted in each of these geographical areas.<sup>21</sup>

In 1997 three new PCS licenses (in the 1900MHz band) were granted through a beauty contest. ENTEL won two of them and the third one was granted to Chilesat PCS (currently SmartCom). PCS services became available in March 1998.

As of mid-2001 there were four mobile operators in Chile: BellSouth, Entel, Telefonica and Smartcom. Of these, three were managed by European companies (Spain and Italy), and one by an U.S. based firm (Table 2.2). The main providers of mobile telephony equipment were Ericsson, Motorola, Nokia, and Nortel.

### Figure 2.1: Investing in growth

Distribution of investments in communication services in Chile, 1999 (left-hand chart); and growth of wireline and mobile subscribers in Chile, 1991 to 2000 (right-hand chart).



Note: Investment data are CEPAL estimates based on company data and interviews. Others include investments in private communications, customer management systems, billing, Y2K, and advertising.

Source: CEPAL 2000 and Subtel 2001

<sup>19</sup> Kalau vom Hofe, 2000.

<sup>20</sup> The licenses for mobile services in the 800MHz band were granted on a first-come first-serve basis at the end of the 1980s—as a heritage from some radio communication services, which had been operated in the 400MHz band.

<sup>21</sup> In 1999 BellSouth paid US\$ 90 million for a long distance telephone license to be able to provide cellular telephony nationwide. Prior, ENTEL and Telefonica provided long distance telephone service to BellSouth subscribers.

**Table 2.2: The Chilean mobile players**

Profile of the mobile companies operating in the Chilean telecommunications market, 2001.

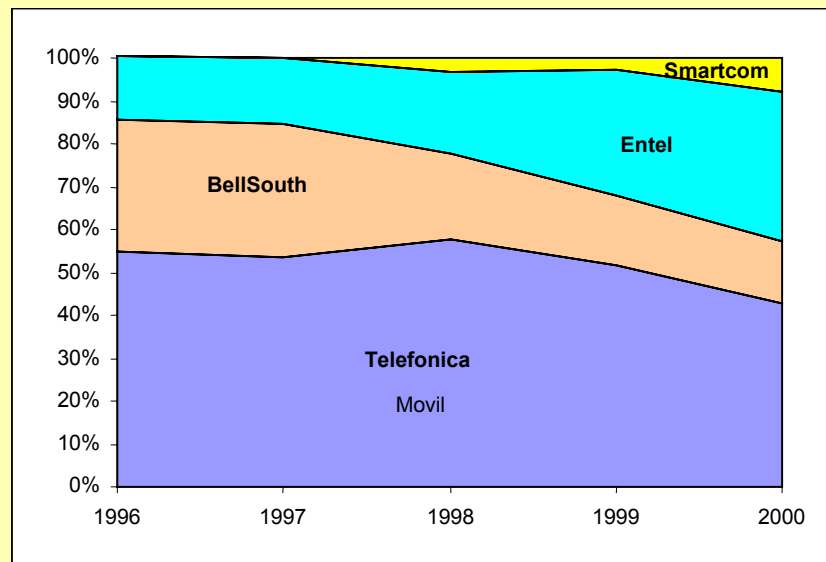
Company	Major controlling investor	Services provided	2G mobile licences	2G main mobile standard
<i>BellSouth</i>	BellSouth Corp. (USA - 100%)	Mobile, paging, long dist., Internet and private nets.	1 licence linked to 25MHz	TDMA D-AMPS in the 800 MHz band
<i>Entel</i>	Telecom Italia (54%); Grupo Luksic (Chile - 14%)	Local, LD, int. & public tel, mobile, Internet, private nets, and VANS.	2 PCS licences linked to 60 Mhz	GSM 1900MHz
<i>Telefonica</i>	Telefónica (Spain - 43.6%); National Pension Fund (Chile); Citibank (USA)	Local, LD, int. & public tel, mobile, Internet, private nets, CATV, VANS, paging and equip.	1 licence linked to 25MHz	TDMA D-AMPS in the 800 MHz band
<i>Smartcom</i>	Endesa (Spain - 100%)	Exclusively mobile telephony	1 PCS licence linked to 30Mhz	CDMA in the 1900 MHz band

Source: BellSouth, Entel, Telefonica, and SmartCom

Since the granting of the PCS licenses in 1997 the market has grown from around 400'000 subscribers to some 3.5 million at the end of 2000. With the rapid growth of the market its share among the four companies has changed at a similar pace (Figure 2.2). SmartCom, for example, which had 78,000 subscribers in early 2000 had reached some 320'000 subscribers by mid 2001—some 396 percent growth from the time it was acquired by Endesa I June 2000.<sup>22</sup> ENTEL—with two PCS licenses—has also increased its market share from 14.5 percent in 1996 to some 35 percent by the end of 2000. Telefonica and BellSouth, instead, have dropped their market share from 55 and 31 percent in 1996 to 43 and 14 in 2000, respectively (Figure 2.3, right chart).

**Figure 2.2: Taking a slice of the pie**

Evolution of market share in the mobile services in Chile, 1996 to 2000



Source: Subtel, Annual reports of Telefonica CTC and Annual reports of Entel.

<sup>22</sup> In the beginning of 1999, Telex Chile sold its subsidiary Chilesat PCS to Leap Wireless. In November 1999, the new company changed its name to SmartCom. In June 2000 the Spanish company Endesa purchased the Chilean operator for US300 million—as part of its strategy to diversify its business into the telecommunications market.

Some industry analysts argued that ENTEL's constantly increasing market share is a GSM "victory" over d-AMPS TDMA (Telefonica Movil, Bellsouth) and CDMA (SmartCom) networks.<sup>23</sup> Although there might be some truth to the claim, it is also crucial in this development the fact that ENTEL is clearly favored by the abundance of spectrum—60 MHz—associated to its PCS licenses, while its competitors—Bellsouth and Telefonica—are facing a serious bottleneck in market expansion due to a manifest scarcity of spectrum capacity (each company has 25MHz in the 800band for their services). Telefonica, for example, claims that it needed to eliminate 350,000 clients during 2000—which generated minimal traffic—to make spectrum available for new subscribers.<sup>24</sup> Bellsouth argues to be very selective in signing up new clients. Both companies asked to be granted more spectrum associated to a mobile service license, but their request has been turned down by a ruling of the Antimonopoly Commission (Box 3). Following the ruling of the Commission, Subtel is planning to grant three 10MHz PCS licenses in the 1900 MHz band by February 2002.

In spite of tight market conditions new mobile operators have been attempting to enter the Chilean market. Low-key "trunking operators", such as Nextel (a US based trunking service provider), are gaining ground in mobile markets of the region<sup>25</sup>. In an attempt to stop this development, the four Chilean mobile operators (Telefonica Movil, EntelPCS, SmartCom, Bellsouth) through their Association, Atelmo, have launched legal actions to stop Nextel from providing services. Atelmo argues, that mobile services provision is of the exclusive domain of the four licensed mobile operators because they had to participate in an open licensing process for mobile telephony to provide such services, while Nextel has not. A decision on the case is expected before the end of 2001.

The entry of new service providers in the mobile market lead to a sharp decrease in prices—with tariffs dropping by as much as 50 percent. In 1999 "calling party pays" (CPP) was introduced leading to another 30 percent cut in mobile telephony prices. In early June 2001, SmartCom launched a promotional-plan, on which 1000 minutes were sold for US\$22 (for calls to fixed lines or other SmartCom devices), offering a nation-wide minute tariff of US\$ 0.02.<sup>26</sup> The offer is foreseen for two month and, due to its extremely low price, is also entering into direct competition with long-distance fixed line services.

### Box 2.3: Fighting for air

Subtel originally intended to award the spectrum to Telefonica Movil and Bellsouth Chile. The operators met technical norms and could prove a legitimate need for resource (in both cases they have exhausted 25MHz concessions in the 800Mhz band). However, SmartCom PCS filed an injunction with the Antimonopoly Commission in March 2000, to prevent Subtel from handing out the 30MHz, claiming that the regulator could not "change the rules of the game" by moving away from a public process. Neither Telefonica Movil nor Bellsouth could claim "preferential rights" due to the introduction of PCS. Yet, both companies argued that serious competitive imbalances existed in the market due to the imbalance in the distribution of spectrum and requested that a public bidding for the allocation of the spectrum should be disregarded. The Chilean Antimonopoly Commission ruled in favour of a public licensing process. The Commission, however, gave Subtel the freedom to divide the spectrum into homogenous blocks as it sees fit. The ruling of the Commission also excluded from the bidding process those operators that currently have spectrum concessions greater than 30MHz. This effectively bars Entel Chile, from participating. Close to twenty companies—including existing operators and other non-telecom companies, such as the department store-chain Falabella—voiced their interest in acquiring the PCS licences. Four applicants (Telefonica Movil, Smartcom, Bellsouth and Intertel S.A. an official subsidiary of Bellsouth) have presented project proposals for the beauty contest. Following the evaluation of proposals, licenses are expected sometime before February 2002.

<sup>23</sup> ENTEL was the first company in Latin America to implement—in March 1998—a network based on GSM technology. SmartCom is the only company in Chile offering CDMA (IS-95). Bellsouth was the first company in Chile offering the benefits of digital telephony.

<sup>24</sup> However this could not avoid the decline of income of Telefonica's mobile branch, that suffered a drop of 3.3 percent, during the first semester of 2001—compared to the same period of 2000. The Mobile section contributed more than US\$ 30 million to Telefonica's losses in this period (a rise of losses of 43.9 percent from first half of 2000).

<sup>25</sup> After some legal and lobby driven struggles in Brazil, for example, trunking operators are now permitted to offer subscribers unlimited minutes of interconnect traffic, in essence allowing them to offer the same services as cellular and PCS operators. According to Anatel (1999) the trunking market in Brazil will reach 1.9 million in 2005, combined with the Yankee Group market forecast of 64 million (1999), this is giving a 3 percent share. Nextel (a U.S. based trunking provider), for example, is already present in Brazil, Mexico, Argentina and Peru counting for a total of half a million clients in June 2000.

<sup>26</sup> Other mobile operators were charging then an average of US\$ 0.15 per minute in contract plans.

As prices come down and mobility of users increases, international roaming has began to rise. By 2000 some 8'000 subscribers that travel abroad were generating some 200'000 minutes of traffic and leaving Chilean mobile operators around US\$ 280'000 (Table 2.3). And, although operators often mention a number of factors undermining the implementation of international roaming, the four companies continue to expand the number of countries in which they have international roaming agreements—BellSouth, for example, has 90 countries in its list and Entel PCS offers roaming services in 32 countries.<sup>27</sup>

Even though the number of mobile subscribers had surpassed that of fixed line telephony by the end of 2000 (there were 3.4 million mobile subscribers versus 3.3 million fixed line subscribers) the latter still continues to generate most of the traffic—in part due to the lower cost of services.<sup>28</sup> In the first semester of 2000, for example, almost 90 percent of the traffic had been generated by fixed line services, with only 10 percent stemming from mobile services.<sup>29</sup> During that period the average Chilean mobile phone user generated some 74.4 minutes of voice traffic monthly (an estimated 2.04 minutes per call) while fixed line traffic users generated some 656 minutes a month. This is in part due to the introduction of prepaid cards. By the end of 2000, for example, some 67 percent of clients were part of the prepaid system; yet, they generated only 39 percent of the mobile traffic in 2000.<sup>30</sup>

**Table 2.3: Connected from abroad**

*Number of Chilean mobile phone subscribers visiting other countries, minutes used by them, and revenues generated for Chilean mobile operators, 1998-2000.*

<b>Chilean Subscriber visiting other countries</b>			
	<i>Number of subscriber</i>	<i>Minutes used</i>	<i>Revenues generated US\$</i>
1998	6,000	150,000	210,000
1999	7,000	175,000	245,000
2000	8,000	200,000	280,000

*Source:* Kalau vom Hofe, 2000.

Furthermore, all mobile operators in Chile offer consumers subsidized handsets with the idea that what they loose on the handset will be more than made up for in traffic. Not only traffic seems not to have made up for the loss in the subsidy but, unfortunately for some of the operators, their handsets could be easily adapted to technical requirements in neighboring countries where the cost of handsets was much higher than in Chile. This lead to numerous scams whereby individuals bought thousands of subsidized phones and exported them primarily to Brazil where they were sold for a hefty profit. One of the operators has estimated that this problem has cost the company somewhere between US\$ 40 and US\$ 45 million already.

The market keeps growing a sustained pace. The high competition in the Chilean mobile market led to the lowest access prices in the region, and the relatively high penetration created a far developed demand side, which is forcing operators to adopt service innovations (like WAP) rapidly. The most direct and immediate consequence is that mobile operators are facing a difficult time due to high investments and low traffic volumes, decreasing ARPU, and low revenues from subsidized handsets.

During 1999, 2000, and part of 2001 the financial situation of the main mobile operators was quite gloomy. The four companies were loosing money. Entel, for example, reported a loss of US\$1.6 million in the third quarter of 2000, while Telefonica Movil announced a loss of more than US\$ 30 million in the first semester of 2001. SmartCom is not expecting profits before the end of 2002. This rather negative trend is expected to continue during the remaining of 2001 for at least three of the operators.

<sup>27</sup> Some of the problems often cited are: difficulties in the implementation of commercial agreements with foreign operators, quality of service, adequate and especially considerable volumes of fraud.

<sup>28</sup> In December 2000 the minute price of Telefonica CTC for public fixed line service, for example, has been (with 21.5 pesos) 8.4 times cheaper than the mobile service minute price through a contract (181 pesos) and 16 times cheaper for mobile prepaid services (345 pesos). In reduced hours, the difference is even more extreme: 3.5 pesos for public fixed line, 84 pesos for mobile contract services (24 times more expensive) and 160 pesos for mobile prepaid services (45.7 times more expensive) (Subtel, 2001).

<sup>29</sup> Of the total mobile traffic of 2000, 31.3 percent was been purely mobile-mobile, 28.3 percent mobile-fixed line and 40.1 percent fixed line-mobile (0.4 percent was related to long distance traffic).

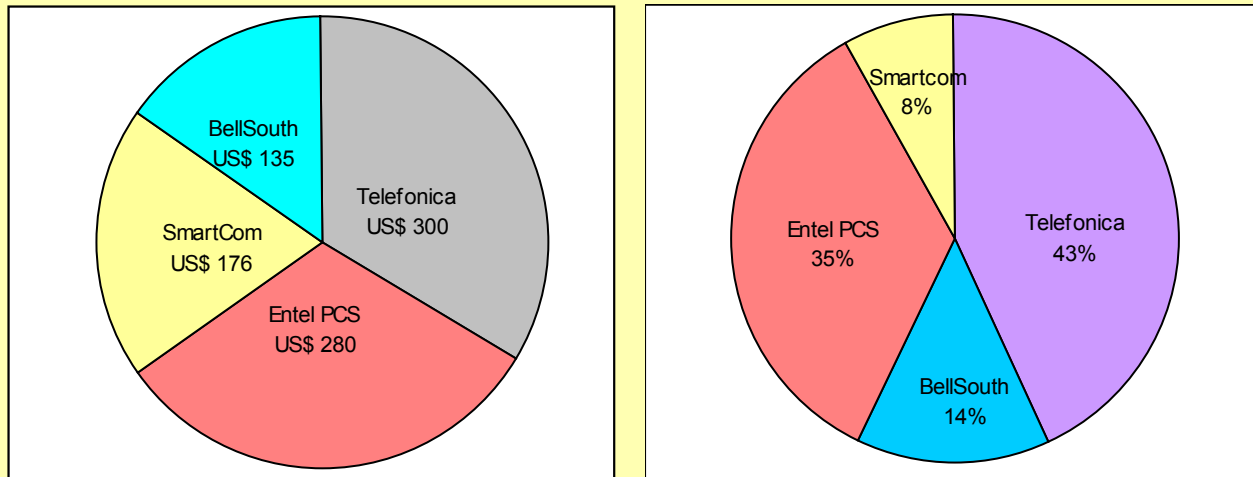
<sup>30</sup> Subtel 2001.



In spite of the rather low rate of return on investments and comparatively low traffic rates on mobile services, local cellular operators seem to be confident of the future of the cellular market in Chile and have invested some US\$ 915 million during 1999 and 2000 (Figure 2.3, left chart). Especially SmartCom and Entel have invested aggressively in building out their 2G PCS (in the 1900MHz band) infrastructure during the last two years.

**Figure 2.3: Confidence in mobile communications**

*Investments in mobile communications in Chile, 1999 and 2000 (left chart) and market share of main Chilean mobile service providers, 2000 (right chart).*



Source: CEPAL, Kalau Vom Hofe, 2000; and Subtel 2001.

## 2.2 Moving towards 3G

Chilean operators have enthusiastically embraced digital 2G services like the wireless application protocol (WAP) or Short Message Service (SMS). With a difference of hours, SmartCom and then Entel PCS launched their first mobile Internet service in November 2000. Bellsouth soon followed suit. Companies like SmartCom have invested heavily in mobile data communication. They argue that 80 percent of their terminals in the local market are WAP-equipped. The number of WAP related Internet services and applications has also grown rapidly. While there were some 21 WAP-portals in the country by the end of 2000, the number had doubled to 44 in the three months to April 2001. Yet, as of mid-2001 there were a very limited number of transactions that could be carried out through WAP based service—mainly some banking transactions and cell-phone reloading.

In an effort to promote technological innovation, the government is supporting the private sector with initiatives in this area. The Chilean e-government and Internet promoting initiatives reached a best practice character in many fields. The Internal Tax Service in cooperation with ENTEL PCS, for example, have set a WAP-site that enables mobile users to access tax information from their mobile phone. The Subsecretary of Telecommunication (Subtel) has also created its own WAP-site through which it provides mobile access to visitors of Subtel in the Internet.<sup>31</sup>

In spite of this growing presence of WAP services in the Chilean market, some analysts have argued that, given the high cost (almost double the price of voice service) and slow speed of services, the introduction of WAP based applications seems to serve more promotional purposes, than to be a serious business model. Following the notion that the technology is not mature yet and therefore aiming at avoiding unnecessary investments and customer deception, companies like Telefonica Movil choose not to introduce the service.

Contrary to the experience of WAP, all four Chilean operators have chosen to provide SMS services. There has been a rapid expansion of demand for the service and all operators are working to improve the service (including, for example, chat or payment applications). Given that SMS offers considerable value for a very low cost, it has been enthusiastically adopted by many prepaid clients, which before only used mobile

<sup>31</sup> See <http://wap.igob.cl>

phones to receive calls. In spite of this rapid growth, further service expansion has been hampered by the fact that currently each company provides services without interconnecting with other operators (i.e., a client can only send messages to subscribers of the same company). This has certainly undermined the possibility of economies of scale and the positive effects of network externalities. The increasing value of the service in the overall business of the companies was leading some of them to review this approach, and, as of mid-2001 were looking for possible interconnection agreements with their competitors.

SmartCom is attempting to move beyond basic SMS and has recently introduced a terminal that has the capability of integrating a Palm Vx device. The so-called Smartphone transmits data at 144 kbps and is expected to run on a IS-95B network until the end of 2001. The service might remain limited in its diffusion in the near future due to the relatively high price of the terminal (around US\$ 500).

### 2.3 The Rise of Third Generation Mobile (3G)

In April 2001 the Subsecretary of Telecommunications, Christian Nicolai, announced that Subtel was planning to have all details of 3G licensing defined by the end of the year. He expected the government will be able to grant licenses during 2002 “when enthusiasm about investments into this technology will show up.”

To achieve this goal the Comité Consultivo de Telecomunicaciones (CCT) created the “3G 01 Task Force” (Grupo de Trabajo 3G 01 (GT3G01)). Representatives of fourteen institutions—including operators, technology and equipment providers—are cooperating with Subtel to define a policy framework for 3G services. The group was expected to have all the required information consolidated by September 2001. Based on this material and through the active cooperation among the institutions involved in the project, the government would be ready to work the final details for the licensing procedures. It is yet unclear at what point of the coming year, the Chilean administration will be ready to launch the licensing process. A number of factors, discussed later on in this paper, seem to be attempting against a fast-track approach.

In the process of getting ready for the licensing of 3G services a number of pending matters have been brought up by the various players in the sector. Issues such as licensing (mode of license granting, number and type of licences, geographical coverage, period of the licence, technical and financial requirements, etc.), spectrum allocation, network sharing, terminal availability and timing are being considered, in order to develop a policy and regulatory framework for 3G.

#### 2.3.1 Licensing

Countries that already allocated 3G licenses have taken two basic approaches: some have chosen auctions (in which bidders determine the value of the spectrum competing with each other in the offering of the highest price), while others have opted for “beauty-contests” (in which the government evaluates proposals from interested parties using certain pre-determined criteria).

In accordance with the valid Chilean law, whenever there are technical factors that put a limit in the number of operator that can provide a certain telecommunication service, the Chilean authority granting licenses through a public contest.

In this situations licenses have been granted in the past through a beauty contest. The winner is determined by the accumulation of points gathered through a certain policy criteria. Traditionally the area of coverage and the schedule of implementation have been the two key factors in gaining points. In this way, the applicant that makes a formal commitment to cover more of the territory in less time receives more points.<sup>32</sup> If two or more applicants offer the same project conditions and the contest ends with a draw of two companies in the first place, the so-called “derecho preferente” (preferential right) is used to choose the winner. A preferential right is a mechanism by which technological innovation should be rewarded. This is aimed at by rewarding a company with the preferential right, if the company requests spectrum for the implementation of a new technology, before the regulator submitted a technical norm about this new technology. If applicants continue to maintain the draw, an auction might follow to choose the winner.<sup>33</sup>

<sup>32</sup> Given that the evaluation of the presentations are based on this rather simple and openly-announced numerical formula, Chile claims to have a highly objective procedure to implement its beauty contest process.

<sup>33</sup> The PCS licensing of 1996 was carried out as a beauty contest based on “excellence of service”—i.e. geographical coverage and implementation schedule. In this contest the calculation of points was based on the amount of coverage achieved every six months, up until the fifth year. The forthcoming PCS licenses will also be carried out following these criteria.

In order to guaranty the timely implementation of the project, “guarantee ticket” (boleta de garantía) is required.<sup>34</sup> The deposit is progressively returned to the operators every six months, as network and services are rolled out as planned. The deposit is retained in favor of the government if the operators fail to meet its targets in any particular semester. Subtel has recently introduced for the WLL and PCS licenses a two-percent “elbowroom” in its beauty contest.<sup>35</sup>

On 26 September 2000, Subtel came up with a technical norm with regard to the “public service for advanced digital mobile telephone services”. The norm set general criteria and leaves room for interpretation and modifications. Rather than specifying details for 3G licensing, the government is trying to push technological innovation in the local market and to prevent existing operators from claiming “preferential right” in the 3G licensing process.<sup>36</sup>

In spite of the fact that a “beauty contest” approach has dominated licensing processes in Chile until now, there are some key players in the market—such as the Ministry of Finance—that are favoring an auction approach. Going for an auction however would require a change in the current legislation. Given the status of the law, a presidential decree would not be enough, and, therefore, the legislative reform would have to be approved by the National Congress. Similar experiences in the past have shown that the time required for Congress approval varies considerably based on the urgency of the matter and the consensus that the government manages to build around its approval—experience indicates that the time can go from a week or ten days to a couple of years or more.

If the government chose to go for a beauty contest, there are still chances that—given the recently introduced rules of the two percent “elbowroom-rule”—the contest would end up in an auction. This alternative is becoming one of the possible ways forward in licensing 3G in the country.

### 2.3.2 License requirements

The granting of communication service licenses— except television of free reception VHF and UHF —falls under the jurisdiction of the Ministry of Transportation and Telecommunication. The Sub-secretary of Telecommunication (Subtel) is the entity in charge of the technically and administrative procedures. It draws up concession terms, and grants the permission services and licenses through its Division of Concession (except for licenses for maritime and aeronautic mobile services). According to the type of service to be provided, license requirements vary. In the case of 3G services the following licensing requirements seem to be emerging.

*Technological requirements:* The Chilean government had adopted a policy of technological neutrality to regulate the development of telecommunication services. This policy approach has brought a diversity of technologies that compete in the provision of various services. This hands-off approach on technology has lent considerable benefits to end users in terms of a rapid technological evolution and lower prices. Following this line of thinking, Subtel, in its 3G technical ruling, states that the technology for 3G services will be digital and free of choice.

*Financial requirements:* There are two financial requirements of some relevance that need to be met to participate in the licensing process.<sup>37</sup> First, in order to underline the participant’s seriousness in the process, potential licensees need to pay some “participation guarantee ticket” (in recent licensing contests around US\$ 300’000). This amount is getting returned if the participant stays in the contest. Second, once the license is granted, a “implementation guarantee ticket” has to be deposited by the winner with the government

<sup>34</sup> In the PCS licensing there was a requirement of US\$ 50 million as the “guarantee ticket”.

<sup>35</sup> The ruling grants the same number of points to the companies that have a two percent difference in their geographical coverage or roll-out schedule—i.e., a company that is offering to cover 100 percent of the territory gets the same number of points than the one that offers to cover 98.1 percent. In the recent WLL contest this ruling was not applied due to the clearly differing conditions in the projects presented. One of the reasons for the ruling is the fact that Chile has a very diverse geography and there is margin for measurement mistakes—that might lead to an unjust allocation of points. Furthermore, beyond 80 percent national coverage the marginal cost for covering every further percentage point increases exponentially due to the difficult geographical conditions.

<sup>36</sup> A company can obtain preferential right if it requests spectrum for the implementation of a new technology, before the regulator submitted a technical norm about this new technology.

<sup>37</sup> Besides these two, there is a third, but minor, financial demand that is associated with the purchasing of the “base” (or “pliego de condiciones” is the document in which the conditions and requirements to be granted the license are laid out), which costs around US\$1000. The “base” is often purchased by companies who are interested in learning about the terms and conditions of the licensing process.

(in recent licensing contests it has ranged from US\$ 16 to US\$ 50 million). The guarantee is reimbursed progressively (generally every six months) as the terms and conditions of the license are fulfilled by the operators.

*Geographical coverage:* Following the ruling of Subtel on 3G it has been decided that there will be four licensees operating in the same geographical area. This will be possible if the current spectrum allocation of four blocks for Frequency Division Duplex (FDD) transmissions; and four for Time Division Duplex (TDD) transmissions remains unchanged.

Chile is a highly urbanized country with some 85.7 percent of the population living in urban centers. Santiago, the capital, has some 39 percent of Chile's population and around 57 percent of the country's GDP.<sup>38</sup> Due to the high concentration of population and wealth it is easy to reach a large percentage of the national market with a minimum network rollout. It is estimated, for example, that with 30 to 40 antennas an operator would be able to provide WLL (wireless local loop) services to the whole of Santiago, whereas for the entire country it would need some 350 antennas. This means that a company would require some 10 percent of main infrastructure investments to reach 39 percent of the country's population. Certainly this sets in a considerable incentive for cream skimming and selective service provision.

In an aim to avoid this and other related problems, the Chilean administration has set in its ruling (Article 5<sup>th</sup> of the Technical Norm for 3G) that the service should cover the entire national territory and the service area has to be designed to allow communication during 90 percent of the time, in 90 percent of the locations.

*License period:* In Chile, up until 2001, licenses were granted for 30 years. It is quite likely that the new 3G licenses will follow this or a similar time frame.<sup>39</sup>

### 2.3.3 Spectrum allocation

In its Resolution of 26 September 2000, Subtel identified the 1710–1850 MHz band (in accordance with the extension of WRC-2000) and the 2110–2170 MHz band (in accordance with WARC'92) for the "public service of advanced digital mobile telephony".<sup>40</sup> As already mentioned, the norm set general criteria and leaves room for interpretation and modifications. The bands for Frequency Division Duplex (FDD) are divided in 4 blocks, each two times 15MHz. Each FDD block will have associated for Time Division Duplex transmissions (TDD) the use of 5MHz blocks (Table 2.4).<sup>41</sup> Guard band regulations have not been specified yet.

One of the reasons for choosing this particular spectrum band allocation for 3G is the fact that in Chile, as in other countries in Latin America, operators provide PCS (Personal Communication System) services in the 1850-1990 MHz bands—overlapping with the up-link of the "UMTS-core-band", as used in Europe or Japan.<sup>42</sup>

Subtel, however, has announced that it could still alter or add individual bands, within the 1710–2170MHz band, depending on technological evolution and recommendations from the international telecommunications organizations.<sup>43</sup> The regulator has also highlighted the fact that current spectrum selection for 3G services does not prevent the use of the 1850–1990 MHz band for providing the same type of services (which effectively allows the current CDMA operator to evolve to cdma2000).<sup>44</sup>

<sup>38</sup> Santiago also has 56 percent of the country's Internet user, 57 percent of Chile's fixed-line telephones, 58 percent of its mobile phones and roughly 80 percent of the national e-commerce revenue.

<sup>39</sup> The licenses operating in the 800 MHz band have not used up even half of this period yet.

<sup>40</sup> Resolución 1.144 "Fija norma técnica para el servicio público de telefonía móvil digital avanzado". Santiago, Chile 26/09/ 2000.

<sup>41</sup> FDD spectrum is more suited to wide area, outdoor mobile applications, whereas TDD spectrum is more suited to high-density indoor applications.

<sup>42</sup> Among the largest economies of the region Argentina, Colombia, Mexico are facing similar challenges.

<sup>43</sup> For the time being resale or sub-leasing of spectrum is not allowed. Only complete concessions could be rented, sold or given away. According to the regulator this could change, depending on international trends of handling the issue.

<sup>44</sup> In an official position paper to the Inter-American Telecommunication Commission (CITEL) Subtel argues that the actual Chilean allocation will on one hand allow the gradual evolution to 3G in existent bands, as well as it would allow to open "new business and investment options, in the new bands".

**Table 2.4: A piece for each***Spectrum allocated by Subtel for frequency divisional duplex transmissions (FDD).*

	<b>transmission frequencies of mobiles</b>	<b>transmission frequencies of base stations</b>
Bloque A	1.785 - 1.800 MHz	2.110 - 2.125 MHz
Bloque B	1.800 - 1.815 MHz	2.125 - 2.140 MHz
Bloque C	1.815 - 1.830 MHz	2.140 - 2.155 MHz
Bloque D	1.830 - 1.845 MHz	2.155 - 2.170 MHz

*Spectrum allocated by Subtel for time divisional duplex transmissions (TDD).*

	<b>transmission frequencies of mobiles</b>
Bloque A''	1.765 - 1.770 MHz
Bloque B''	1.770 - 1.775 MHz
Bloque C''	1.775 - 1.780 MHz
Bloque D''	1.780 - 1.785 MHz

Source: Subtel, 2001.

If the proposed spectrum allocation is adopted it would require the migration of some existent services that have been already granted to some telecommunication companies (i.e., TransAm, Chilesat). These companies are in general carriers service providers and have no network installed yet. Current legislative criteria determine that if a license for services to end users is granted and requires those spectrum bands existing service providers moved and compensated.<sup>45</sup>

The technology neutral approach of the Chilean Subtel and the technology heterogeneous mobile market in the country, however, is leaving the final combination of band usage open to the individual operator. PCS operators could—if they obtain part of the 2100 MHz band for the downlink of 3G services—use the 1900 MHz band already allocated to them as an uplink, to provide 3G services in the “UMTS-core-band”.<sup>46</sup>

The Chilean approach is based on the hope that the U.S. would tilt in favour of the 1700MHz band for the up-link, in combination with the commonly used downlink in the 2100 MHz (Box 2.4). It happens that, differing from regions like Europe, mobility in Latin America is still relatively low and roaming is not a decisive factor. But, economies of scale in hardware and services are strongly required for prices to be low, services affordable, and a 3G market viable. This has lead several countries in the region to shift their attention to the current and forthcoming policy choices made by industrialized nations in this new mobile communication service. The hope of some Latin American countries, like Chile, is that transnational equipment producer will standardize 3G equipment to support uplink communications in both the 1900 MHz and 1700 MHz bands and downlink in the 2100 MHz band. If that were to be the case, developing countries that are having difficulties in allocating spectrum for uplink communication (like Chile), could still expect low hardware prices due to large economies of scale in equipment production.

Spectrum choice also affects the strategy of the main mobile operators - in the Chilean market. Telefonica de España and Telecom Italia have both purchased 3G licenses in Europe.<sup>47</sup> The choice of the Chilean government will either provide them with savings (due to economies of scale if the European approach is followed); or increased costs if a significantly different arrangement is adopted.<sup>48</sup>

<sup>45</sup> This procedure already took place without major obstacles when the first PCS license was granted.

<sup>46</sup> This approach would, however, require further investments to move PCS subscribers that are currently using the band for their services.

<sup>47</sup> Telefonica purchased 3G licenses in Germany, Austria, Spain and Italy. Telecom Italia will start operating 3G in Spain and Italy.

<sup>48</sup> Both companies also have investments in a number of other Latin American countries where governments have not embraced any particular spectrum allocation policy yet.

## 2.4 Forthcoming market and policy issues

There are a number of policy decisions by both public and private actors in the telecommunications market that will affect the rise and evolution of 3G services in Chile. The following paragraphs provide a summary of some of the main elements in the 3G policy equation in Chile. These are certainly not unique to the case of Chile and could or should be taken into account in considering policy choices in most developing nations with socio-economic features similar to those of Chile.

### 2.4.1 Timing of 3G licenses

The timing of the licensing process is an essential element in the success of the new service in the local marketplace. The timing will be largely determined by a number of factors that work in favour or against of a rapid deployment of the technology. In the case of Chile, there are basically two main actors, driven by their policy agenda, promoting the launching of 3G services.

#### Box 2.4: A pending matter

One key issue for several countries of Latin America in the building of 3G policies has been the decision of the United States in relation to spectrum allocation. The Bush administration postponed in mid-2001 a decision on the matter and has chosen to carry on further studies on possible strategies to allocate spectrum for 3G services by commercial providers. The difficulty facing the USA is that unused spectrum to accommodate such services in the proposed IMT-2000 bands is currently not available. The Department of Defense (DOD) is the predominant user of the 1755-1855MHz band; but, there are also other thirteen Federal agencies operating fixed and mobile systems in this band.

A recent report, the FCC and NTIA found that “regardless of funding, vacating the band could not be accomplished for most DOD non-space systems until 2010 and beyond.”<sup>49</sup> Three sharing and segmentation options were considered in this report. The last one would consider migrating Federal users out of at least the 1710-1755MHz band “in the long term”, and pairing this with spectrum in the 2110-2150MHz and 2160-2165MHz bands. Nevertheless, considerations of reimbursement (estimated at US\$ 2’192million) and appropriate time lines would need to be set.

There is also the possibility that 3G services could be implemented in the 800MHz band. The U.S. introduced a footnote to WCR-2000 suggesting the 806MHz-960MHz bands for 3G services. This would allow U.S. operators to migrate their systems in the 800 MHz and 1.9GHz PCS bands to provide 3G.

There is concern among Chilean government officials that the choice of spectrum of the US administration may not provide an approach that can be harmonized with most other countries in the Americas.

The first and most important of these actors is the Chilean administration. There are two key players among government agencies that would like to see 3G services being provided to the Chilean population at large. The most directly involved in the matter is Subtel, whose drive for 3G is rooted in its tradition of technical innovation and market development. The Chilean government has been at the forefront of market reform and technological adoption, and has no desire to be left behind with the emergence of this new and powerful technology. Subtel was originally hoping to license 3G services by the end of 2001 or first quarter of 2002, yet current conditions in the domestic and global market would probably delay the process. In more general terms, the Chilean government at large has launched a nationwide campaign to promote the use of the Internet. As—in terms of its diffusion—the cell-phone is the most important information and communication technology (ICT) in Chile and mobile access to the web is a decisive part of the overall approach that the government has taken to integrate Chile into the worldwide information society.

<sup>49</sup> U.S. Department of Commerce, National Telecommunications and Information Administration (NTIA), “The potential for accommodating third generation mobile systems in the 1710-1850 MHz band: Federal Operations, Relocation Costs and Operational Impacts”, Final Report, March 2001. <http://www.ntia.doc.gov/ntiahome/threeg/33001/3g33001.pdf>.

Equipment and application providers are also strong backers of an early adoption of 3G services and technology. Most of the equipment producer with branches in Chile hope that the rise of a new service, such as 3G, would turn around the rather gloomy days that the industry is living—both in developed and emerging markets.<sup>50</sup> These drivers of a “fast-track” deployment of 3G services, however, face a number of counterbalancing forces.

An important factor in this regard is the aim of the Chilean government to make a policy choice that keeps certain harmony and integration with the likely choice of the U.S. administration. The complicated spectrum scenario that the U.S. government face in its attempt of bringing commercial 3G services to the country has delayed a U.S. decision on the matter. This, in turn, is affecting, the possibility of a final decision in Chile and other countries of the region.

The global decline in the volume of telecommunication investments and the reluctance of venture capital to explore business opportunities in emerging markets is also a factor to be considered. The Chilean administration is hoping to use 3G licensing to increase the number of competitors and investments in the mobile marketplace. Yet, given the decline of foreign direct investment in the country since its high in 1999, there are doubts about the possible outcome of such licensing process if launched in the short term.<sup>51</sup>

Furthermore, in the case of Chile and in some other countries in the region, mobile operators have recently committed a considerable amount of capital to build PCS systems and to upgrade existing ones. This is naturally leading to a certain resistance on the side of mobile operators to move to a new technology that would require further investments—when the most recent ones have not been recovered yet. Yet, if the government decides to go forward with the granting of 3G licenses, it would be almost impossible for existing mobile operators to opt out of the process.<sup>52</sup>

Aside from the money drain produced by investments in 2G networks, mobile operators in Chile have been experiencing a sharp decline in revenues and profits in recent times. Companies such as Telefonica claim losses US\$95 million in 1999 and US\$74 million in 2000 (until 30 September). Furthermore, as of the second half of 2000 the country had one of the lowest average revenue per user in the region in absolute terms (Figure 2.4, left chart), and the lowest of the major economies, if measured in relation to GNP per capita (Figure 2.4, right chart). Based on this rather poor performance of the mobile market, some of the main players are arguing that the entry of new operators with new services and technologies in the Chilean mobile market can only increase the vulnerability of existing operators and pose into question the long term viability of mobile services to large numbers of the population.

#### 2.4.2 Potential 3G operators

Some players in the Chilean market see the rise of the 3G market as a unique opportunity not only to diversify and enhance the menu of mobile services, but also as a wedge to be used to introduce new players and further competition in the local marketplace. With the allocation of four 15MHz spectrum blocks, Subtel has explicitly mentioned in Article 3<sup>rd</sup> of its Technical Norm that in the same geographic area up to four 3G operators will be allowed to provide services.

In spite of this “opportunity” that the 3G market seems to provide, it is quite likely that the new services will be dominated by existing mobile operators with the possibility of one or two new operators. Virtual Network Operators (VNO) are not of great concern in Chile until now, since operators are used to a highly competitive market and experience in fixed line services shows complementarity and co-operation between virtual and real operators, rather than competition. None of the present VNOs is buying and reselling minutes. Rather minutes are bought, value is aggregated, and services are sold, as complement to the services of traditional network operator. Currently there is no regulatory framework that deals with interconnection between Internet and mobile networks.

<sup>50</sup> Alcatel, the largest equipment producer in the world, reported a loss of more than US\$ 7 billion in first quarter of 2001. Similar situation is faced by other large equipment suppliers—such as Lucent, Siemes, Motorola, Ericsson, etc.

<sup>51</sup> Foreign investments rose from US\$ 4.6 billion in 1996 to some US\$ 9.2 billion in 1999, but it dropped drastically to US\$ 3.7 billion in 2000. For further information see CEPAL 2001.

<sup>52</sup> For this reason local analysts expect that mobile companies currently in the market would look for a slow move toward 3G services, but once the licensing process is in motion they will go along with it.

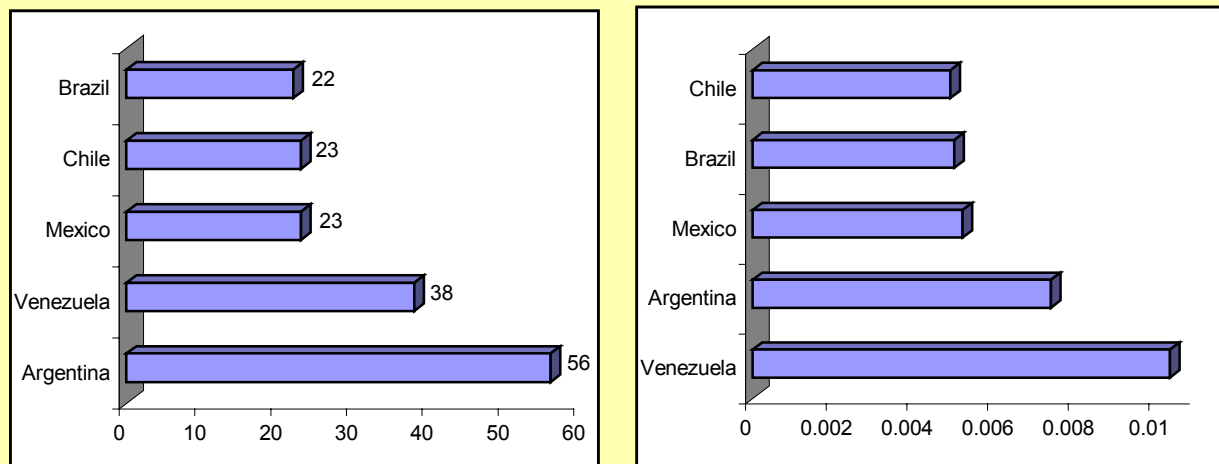
Most Internet Service Provider (ISP) in the local market do not believe that 3G services will be emerging in the near future.<sup>53</sup> The introduction of this type of service lies outside their business plans that currently concentrate in adjusting business practices to a fast changing Internet world.

### 2.4.3 Technology

In spite of progress in some fronts, there are concerns among mobile operators about the future availability and affordability of 3G equipment for a small market like Chile. The worries of local mobile service operators are based on the experience they have had with WAP and in the delays experience in some European markets due to the lack of adequate hardware. In the case of WAP in Chile, the network was ready to support WAP traffic in early 2000, yet the launching of the service had to wait for more than nine months due to delays in the supply of adequate handsets.

**Figure 2.4: Lots of not very profitable customers**

*Average revenue per users (ARPU) in selected Latin American countries, 2000 (left-hand chart) and average revenue per user in relation to GNP per capita, 2000 (right-hand chart).*



Source: Yankee Group, 2000

### 2.4.4 Services

Some observers of the Chilean mobile market have speculated over the possibility that, in the near future, the move towards full 3G services goes first through applications such as those that have made the Japanese i-mode a great success. Although there is always the possibility that this kind of scenario unfolds in the future, it is more likely that Chilean operators would lean more on open systems like WAP 2.0 over GPRS, or on advanced SMS applications. It is expected that GPRS will be available before the end of 2001 and EDGE should presumably follow sometime at the beginning to mid-2002.<sup>54</sup> Until then it is quite unlikely that any further advanced mobile Internet applications will reach the mass market.

Content for these applications is not yet seen as an issue of concern for some of the main players in the content business. Chilean content providers consider that 3G services will not be introduced in the local market for quite some time and they still consider that the current 3G business-models are too fuzzy to raise serious opportunities for content provision. Most likely content will be produced for 2.5G applications that are emerging in the region, while 3G applications will be waiting for the experience of Japan and Europe to then explore possible offers on a regional basis.

<sup>53</sup> In the same way that voice is expected to remain as the driving force in mobile telephony, fixed line Internet services are expected to stay the focus of most Internet Service Provider strategy in the next few years.

<sup>54</sup> The introduction of EDGE is considered by some local analysts to be a lucrative alternative for mobile operators who are reluctant to move straight to "pure" 3G.



# Venezuela



Venezuela is located in the North of South America. It borders with Colombia to the West, with Brazil to the South-East, with Guyana to the East and the Caribbean Sea to the North. Its 912'050 sq km are marked with contrasts. The snowcapped peaks of the Andes in the west; Amazonian jungles in the south; the Gran Sabana plateau, with its flat-topped mountains, in the east; and 3000 km of beaches lining the Caribbean coast, along with 314 islands.

With a growth rate of 2.15 percent during the last ten years, the Venezuelan population reached 24 million in 2000—making it the 6<sup>th</sup> largest country in Latin America.<sup>55</sup> The country has a young population with more than 34 percent of

it younger than 15 years old. Urbanization reached 87.4 percent and the percentage of urban population continues to grow. Illiteracy is at around 7 percent and constantly falling. Similar to most Latin American countries, Spanish is the official language, but more than 30 indigenous languages still survive.

The economy has been facing some difficult times in recent years. Venezuela's GDP expanded from below US\$ 50 billion in 1990 to over US\$ 100 billion in 1999, representing 6 percent of Latin America's GDP. Yet, unemployment, which is one of the highest in the region, had reached 16 percent by the end of 2000. Only 11.3 percent of the workforce work is in professional, technical or related jobs, while clerical work makes up for almost 30 percent. Wealth is unevenly distributed, with the poorest 40 percent of the population having access to 15 percent of the national income, and the richest 10 percent controlling almost 35 percent of it.<sup>56</sup> Petroleum and petroleum products make up for 70.6 percent of Venezuela's exports.<sup>57</sup> All "transport, storage and communication" activities together represented only 9 percent of the Venezuelan domestic economic activity in 1998. Agriculture accounts for a small part of all economic activities (only 5 percent).

In December 1998 Venezuelans signaled their impatience with then current government, electing Hugo Chávez, to the presidency with the largest vote margin in 40 years. Just six years earlier, Chávez a military leader, had attempted a coup against the government and had spent two years in jail. After introducing a new national Constitution in 1999, Chávez was re-elected for a six-year term by a comfortable margin again in 2000.

### 3 Telecommunications in Venezuela

The national company CANTV (Compañía Anónima Nacional Teléfonos de Venezuela) was privatized in 1991. The company was sold retaining a period of exclusivity on the basic services market that ended on the 27 November 2000, with the opening of the market to unlimited competition. The opening of the market was preceded by the enacting of a new Telecommunications Act (Ley Orgánica de Telecomunicaciones), which

<sup>55</sup> After Brazil, Mexico, Colombia, Argentina and Peru.

<sup>56</sup> CEPAL 2000

<sup>57</sup> Since its discovery in the 1910s oil has played an important role in the country's economic and political life. By the late 1920s Venezuela had become the world's largest oil exporter.

came into force on June 2000. The new law updates the legal framework of the telecommunication sector, superseding the former Act, which dated back to 1941.<sup>58</sup> The privatization of CANTV was accompanied by the creation of the national regulatory agency CONATEL (Comisión Nacional de Telecomunicaciones). CONATEL's mission is to "regulate the telecommunication's sector, to promote its strengthening and development." CONATEL carries on its mission based on a vision of its role in the sector, that is: "to consolidate itself as a regulator and promoter of the sector, with the intention to convert Venezuela in a regional leader of telecommunications" (Box 3.1).

**Box 3.1: The Venezuelan regulator**

*Institutional profile and functions of Comisión Nacional de Telecomunicaciones (CONATEL)*

Comisión Nacional de Telecomunicaciones (CONATEL) was created in 1991 under the Ministry of Transportation and Telecommunication. Due to a recent institutional restructuring in the government CONATEL was as of mid-2001 operating autonomously under the Ministry of Infrastructure. CONATEL is responsible for Spectrum management, numbering, approval of tariffs, interconnection fees, homologation, quality standards and control, license fees, universal service, resolution of controversies, and other legal functions. The Infrastructure Minister delegates to the director of CONATEL the power to grant, revoke or suspend administrative authorizations and concessions. The Ministry of Infrastructure sets the policies, plans and general rules that apply to the telecommunications sector. CONATEL is a collegiate body integrated by five members appointed by the President of Venezuela—headed by a Director General—that have part time dedication to their jobs. Members of the Board are generally from the Ministry of Infrastructure or government officials from other entities in government. They hold their positions for an undetermined period of time and the President or the Parliament can remove them from their functions. The entity has 400 employees. CONATEL's budget is based on government allocation and is approved by the President of Venezuela in the Council of Ministers. The regulator can collect fees but cannot create any new fees nor set amount of the existing ones.

Since the opening of the market the number of companies has been growing steadily.<sup>59</sup> The new companies have expanded and diversified the market investing in various services and technologies.<sup>60</sup> In this context of competition and service diversification the basic service market has not performed as well as the mobile service market. As of late 2000 teledensity stood at 10.43 main lines per 100 inhabitants.<sup>61</sup> Most of main lines (some 75 percent of them) are installed in residential areas of urban centers. The number of public phones, however, has been growing. By the end of 2000 there were some 3.3 public phones for every 100 residential fixed lines installed. Digitization of the public switched telephone network (PSTN) has been growing in recent years, reaching 85 percent of the network by the end of 2000. Traffic over the public switched network has been growing at an annual rate of 12.5 percent during 1999 and 2000. In spite of a larger market and increasing competition, costs for basic telephone services are high. CANTV's basic rent almost doubled for non-residential clients between 1996 and 2000, and quadrupled for residential clients.<sup>62</sup> Fixed line service tariffs are some 40 percent lower per minute than mobile telephone tariffs.<sup>63</sup> The cost of international calls fell drastically during 2000 (in most cases more than half), but they are still one of the most expensive in Latin America.<sup>64</sup>

The Internet industry in Venezuela is very small. A penetration rate of around 2-3 percent shows that the net has not yet been received with the euphoria with which it has been embraced in other countries of the

<sup>58</sup> The telecommunications Act created the Universal Services Fund and the Telecommunication Research and Development Fund. All companies licensed to conduct business in Venezuela's telecommunication sector have to pay 1 percent of gross revenues into the Universal Service Fund and 0.5 percent to Telecommunication Research and Development Fund.

<sup>59</sup> Aside from CANTV there are a wide range of companies providing a variety of services, including: cellular services (2), paging (60), satellite services (5), rural telecommunications (3), conventional radio communications (372), value added services (71), data services (8), private network services (59), vehicle localization services (5), and others.

<sup>60</sup> In 2000 investments in the sector represented 0.84 percent of GDP. Operational income was 2.99 percent of GDP.

<sup>61</sup> In 1997 it reached 12.31 main lines per 100 inhabitants, but then it dropped to the current 10.4 percent.

<sup>62</sup> For non-residential clients, however, the basic rent is still three times higher than for residential clients.

<sup>63</sup> Comparing CANTV and Movilnet, end of 2000.

<sup>64</sup> The cheapest 5-minute call from Venezuela to the USA is two times more expensive than the same call from Chile to the USA—it is also 51 percent more expensive than from Mexico, 32 percent more than from Brazil, and even 8 percent more than from Argentina where the population has a GDP per capita that is double that of Venezuela (ECLAC, 2001; based on calculations made on 16.02.2001).

region—in Chile, for example, the estimated penetration rate stands at 13 percent.<sup>65</sup> With a growth of 69 and 55 percent in 1999 and 2000 respectively, Internet host growth rates in Venezuela have been clearly below the Latin American average (136 percent in 1999).

The situation with regard to e-commerce is not much better. While Venezuela is contributing more than 5 percent to the Latin American GDP, it accounts for less than 2 percent of the Latin American e-commerce transactions. Of the US\$ 194 million e-commerce revenues in Latin America in 1999, Venezuela accounted for only US\$4 million.<sup>66</sup> Less than 20 percent of the roughly 422,000 Venezuelan surfers have ever made a business transaction over the web.<sup>67</sup>

Several reasons seem to be affecting the low level of Internet connectivity and activity on the web. An obstacle often cited to the spread of the Internet is the low penetration rate of fixed-lines the country (10 per 100 people, compared to 21 per 100 people in Chile). The cost of access is also hindering growth. While in mid-2000 15 hours online in Chile amounted to US\$ 15, in Venezuela the same time online demanded from the user some US\$ 26. Furthermore, surveys and data gathering show that public awareness about range of possibilities that open up through the Internet is low and trust into the new technology is almost completely missing.

Contrasting with the relatively poor performance of basic services and the Internet, the mobile market in Venezuela experienced an incredible boom during the late 1990s.

### 3.1 The mobile market

Venezuela was one of the first countries in the world where, as early as 1998, mobile subscribers had already outnumbered fixed line subscribers. After four years of impressive growth rates mobile penetration reached some 4.1 million people in the country (see Table 3.1). By the end of 2000 the country was—along with Chile—the country in Latin America with the highest mobile penetration, showing a strong 22.23 subscribers to mobile services per 100 inhabitants (Figure 3.1, right chart). In terms of teledensity it took cellular services only four years what it had taken fixed lines services decades to achieve. The success of mobile services in Venezuela is so impressive that as of 1998 fixed lines subscribers began to disconnect themselves from fixed telephony services while the number of mobile subscribers was growing at an annual average of 182 percent.<sup>68</sup>

**Table 3.1: Fascination with mobile communications**

*Evolution of subscribers to mobile services, number of subscribers per 100 people, and growth rate in Venezuela, 1996 to 2000.*

	1996	1997	1998	1999	2000
<b>Subscribers</b>	499,116	1,102,948	2,009,757	3,756,711	4,169,744
<b>Penetration</b>	2.2	4.8	8.6	16.0	22.2
<b>Growth rate</b>		221	182	188	142

Source: Conatel, 2001

This impressive market development had its birth more than a decade ago when in 1988 the (at this time) state-owned telecommunications company (CANTV) introduced the first AMPS-network (800MHz band) in the country—and in Latin America. High prices and limited attention and investment kept the services for some years as the exclusive domain of small and selected group of the Venezuelan population. In 1991 another national AMPS license in the 800MHz band was auctioned. Private Telcel acquired the license. This

<sup>65</sup> In the Economist Intelligence Unit/Pyramid Research e-readiness rankings, Venezuela has been ranked as number 47 out of 60. From all Latin American countries only Ecuador, that has been placed 50, ranks behind. Also the often-cited e-readiness ranking of McConnell (based on connectivity, e-leadership, information security, human capital and the e-business climate) gives Venezuela in all variables (except human capital) the lowest grade. See also ECLAC 2001.

<sup>66</sup> EIU, 2000

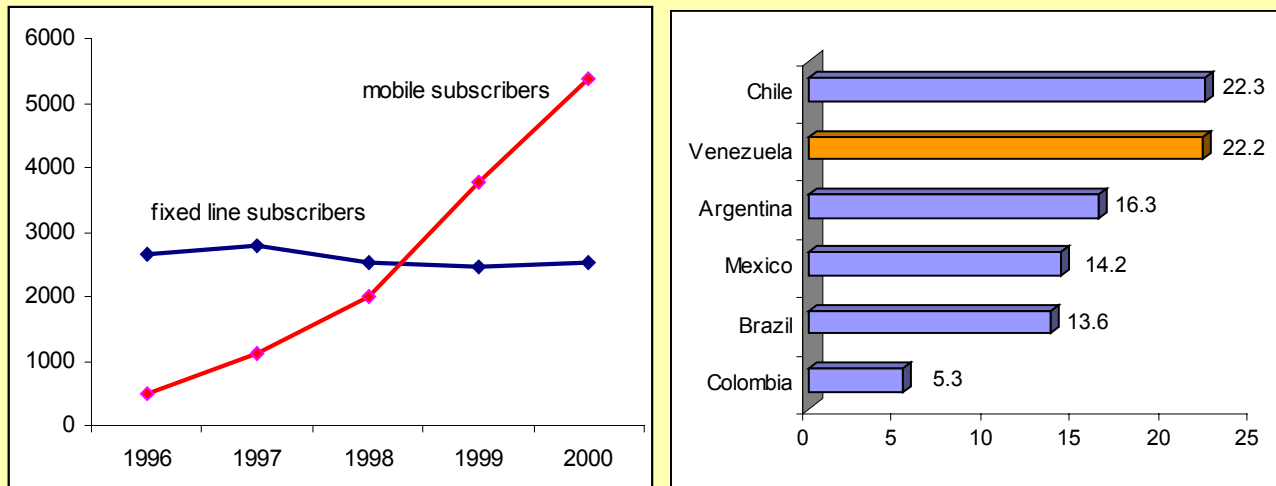
<sup>67</sup> CaveCom-e, 2000; Conatel, 2001

<sup>68</sup> Given the per capita income, the highly skewed distribution of that income, the mobile teledensity in countries around the world with similar socio-economic profile, and the high ARPU of the Venezuelan mobile market, some analysts have argued that—unless services become cheaper—the local mobile market will be reaching saturation very soon.

event marked the introduction of competition in the Venezuelan telecommunications market.<sup>69</sup> The licenses of both CANTV and Telcel had requirements that demanded coverage of the 40 largest cities (reaching at least 100,000 subscribers) in the three years following the concession. However demand largely exceeded these requirements.

**Figure 3.1: Substituting fixed**

*Number of fixed line and mobile subscribers in Venezuela, 1996 to 2000; and number of mobile subscribers per 100 inhabitants in selected Latin American countries, 2000.*



Source: CONATEL, 2001 and ITU.

The mobile operators as well as the established fixed line operator however concentrated most of its networking efforts in urban centers, and rural areas were being largely neglected. The government, in an effort to bring universal services nationwide, decided to grant three new mobile licenses. For that purpose the country was divided into three regions. In 1997 a beauty-contest took place (based on technical, economic, and legal criteria) providing three new companies with a multi-concession. The winners—Digitel, Infonet and Digicel—received a license that allows them to provide basic residential and public telephony in rural communities—defined as those with 5'000 inhabitants or less. Within their area of concession they can also provide mobile telephony, paging, private networks, data and value added services, satellite communications, vehicle localization, and telemedicine.

Digitel started operations in 1998 and by the end of 2000 it had covered 75 percent of its territory. Infonet has the advantage that by covering 25 percent of its designated region it can reach 80 percent population located in its territory. Digicel is starting operations in mid-2001. Although the company is providing services in the region with the least favored combination of vast territory and non-concentrated population, it has the advantage of including in its region the most popular tourist attractions (Angel Falls, Isla Margarita, Los Roques, etc.).<sup>70</sup>

As of mid-2001 Venezuela had five mobile operators, two holding nationwide licenses and three with regional licenses. All the companies had a considerable participation of foreign capital. The three new operators—each of which had been granted 7 MHz of spectrum to provided their mobile services—have chosen GSM as their underlying standard (Table 3.2).

The entry of new operators in the Venezuelan market—probably due to the fact that they are restricted to certain regions of the country and are competing with established operators that have nationwide licenses—have not had the impact on market share that the entry of the two additional operators has had on the Chilean market (SmartCom and Entel). In the case of Venezuela market share has remained relatively stable, with

<sup>69</sup> To establish a level playing field, CANTV mobile (later Movilnet) was required to pay the same amount of money just spend by Telcel for the mobile license.

<sup>70</sup> Operating the wide-spread GSM technology, roaming is expected to become an important part of Digicel's revenue.

almost 96 percent of the market being shared by Telcel (63.6 percent) and Movilnet (31.7 percent).<sup>71</sup> Among the new carriers Digitel had grabbed 3.7 percent of the market in later 2000, while Infonet market share stood at 1 percent (Figure 3.2).

**Table 3.2: Telecommunication start performers**

*Profile of the two national and regional mobile operators of the Venezuelan mobile market.*

Company	Major controlling investor	Services provided	2G Mobile licences	2G Main mobile standard
<i>Movilnet</i>	Verizon, Telefonica España, Consorcio Mercantil, AES [43%]; Investment Fund [6%]; employees [11%]; private investors [40%]	Mobile telephony, private networks, and value added services	1 national license linked to 25MHz in the 800 band	TDMA in the 800MHz band
<i>Telcel</i>	BellSouth Corporation (United States) [78%]; Venezuelan group	Mobile, paging, long distance fixed wireless, public phones, Internet and private networks	1 national license linked to 25MHz in the 800 band	CDMA in the 800 MHz band
<i>Digitel</i>	Telecom Italia [57%], Venconsul [16%]; BBO [10%]; BSCH [6%];	Basic wireless telephone services (fixed and mobile)	1 regional license [9 States in Central Venezuela] linked to 7MHz in the 900 band	GSM 900 MHz
<i>Infonet</i>	Telecom Venture [60%]; Tica [40%]	Basic wireless telephone services (fixed and mobile)	1 regional license [8 States in West Venezuela] linked to 7MHz in the 900 band	GSM 900 MHz
<i>Digicel</i>	Cartera Central [48%]; Cavetel [32%]; Banco Santander [20%]	Basic wireless telephone services (fixed and mobile)	1 regional license [8 States in East Venezuela] linked to 7MHz in the 900 band	GSM 900 MHz

Source: Movilnet, Telcel, Digitel, Infonet, and Digicel, 2001.

Differing from the Chilean experience, revenues among Venezuelan operators are positive and high. Mobile operators in Venezuela have one of the highest mobile tariffs in the Americas region. Comparing similar plans during 2000, the Chilean minute price for example, has been some 50-70 percent cheaper than the Venezuelan minute price on average.<sup>72</sup> While Chile has around the same mobile phone penetration than Venezuela, during the last three years the average revenue per user (ARPU) in the latter has been around 60-70 percent higher than the former (for precise comparative data see Figure 2.4 in the Chile section).

Differing also from the Chilean experience, the two national mobile operators in Venezuela do not subsidize equipment. This is only being done for promotional reasons or at special occasions. The three regional operators are more likely to subsidize their equipment, due to competitive reasons. No subsidies on handsets have saved Venezuelan operators the kinds of concerns and problems faced by Chilean mobile carriers. Otherwise the problem could have had significant dimensions also in Venezuela, given that some 85 percent of the mobile subscribers are part of prepaid plans.<sup>73</sup> The prepaid system was introduced in 1997 and boosted mobile service by some 221 percent that year. Calling party pays, which has had a profound impact in other Latin American markets, was introduced in Venezuela in the early 1990s and did not affect market growth in the way it did it in some of its Latin neighbors.

### 3.2 Moving towards 3G

Venezuelan mobile operators began to introduce mobile data services into the market in the late 1990s and have progressively expanded and enhanced these services following international trends. Movilnet, for example, launched in 1997 a service that allows mobile users to send and receive messages through CDPD

<sup>71</sup> Telecel subscribers are equally distributed between digital and analogue service provision; however, 70 percent of the traffic is generated by digital service subscribers. Movilnet services are almost completely digitized and the number of analogue subscribers is very small.

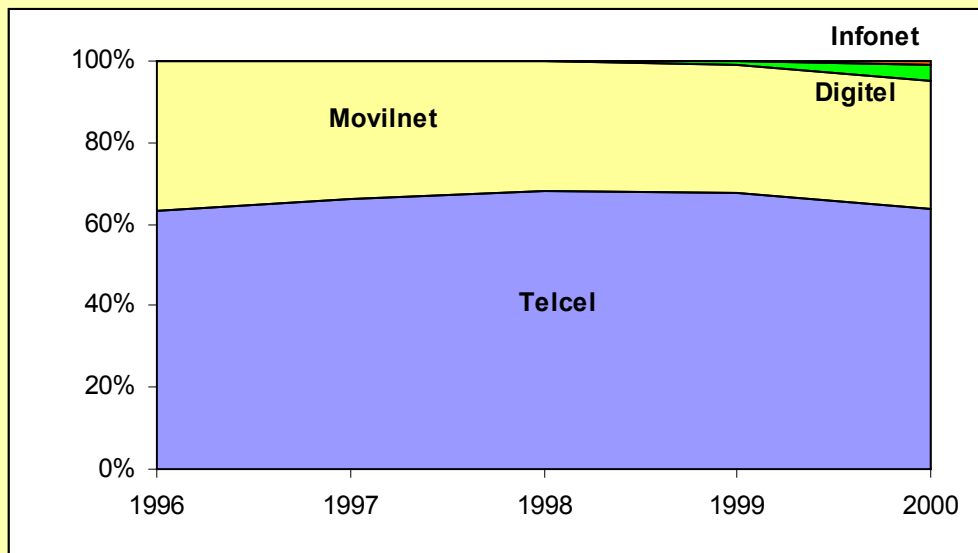
<sup>72</sup> During peak hours the average cost of a minute in Chile is US\$ 0.22, while in Venezuela stands at around US\$ 0.33. During off-peak hours the average cost of a minute in Chile is US\$ 0.15 while in Venezuela stands at around US\$ 0.26 per minute. These prices do not include basic rent.

<sup>73</sup> The low percentage of contract plans is in part due to the fact that operators generally require the possession of a credit card. Yet, due to a recent history of banking-fraud less than 20 percent of the Venezuelan population have credit cards. The Latin American average of credit card penetration is 20 percent. In the United States each person has 1.8 credit cards in their possession.

(cellular digital packet data) at a speed of 19,2 Kbps.<sup>74</sup> The service has been enhanced by enabling clients to subscribe to different “mobile-mailing lists” on various topics (news, sports, jokes, etc.).<sup>75</sup> The subscriber receives short messages in a predetermined sequence. It is estimated that the service will remain as it is in the future and will be up-graded with a different technology. Telcel also began its digital services with a system—the North American Mobitex system—that allows slow-speed text transmission.

**Figure 3.2: A small slice of the pie**

*Evolution of market share in the mobile services in Venezuela, 1996 to 2000*



Note: Digicel starts operations in July 2001.

Source: CONATEL, 2001.

At the beginning of 2000 Telcel launched its WAP services, becoming the first operator in the country to provide such service. Movilnet followed six months later with its own WAP service. Services are provided at a flat rate of US\$ 7 to 8 a month. Given this non-minute based pricing it was expected that the service would grow rapidly. The market, however, has reacted very poorly.<sup>76</sup>

All five Venezuelan operators provide short message services (SMS). Here the regional operators took leadership, equipping their GSM networks as well as terminals with SMS right from the first day of operations. The service, however, was launched on a commercial basis at the end of 1999. Similar to WAP, the SMS service is provided on flat tariff that ranges between US\$ 3 to 6, depending on the operator. Differing from the poor performance of WAP, SMS services have had a good reception among the Venezuelan population. Infonet, for example, claims that 50 percent of its subscribers are using SMS, while Digitel claims to have an average of seven SMS per terminal daily. Movilnet introduced two-way SMS in October 2000 and has reached some 10 percent penetration among its subscribers. Telcel introduced the service in May 2001.

### 3.3 The rise of 3G in Venezuela

In the Telecommunications National Plan, CONATEL states that the “operation of 3<sup>rd</sup> Generation cellular services” is a mid-term goal to be achieved within the next 6 years. With the licensing of 3G services the Venezuelan government aims at a number of economic and social goals.

<sup>74</sup> CDPD runs on a separated frequency, next to that of voice telephony services.

<sup>75</sup> See <http://www.tun-tun.com>

<sup>76</sup> A number of factors seem to underlie the poor performance of WAP, including poor content provision, scarcity of terminals, probably also a yet poor culture of web usage.

**Box 3.2: Seeking public opinion**

*Proposals made by CONATEL in its public consultation document "The Introduction of 3G in Venezuela"*

\* CONATEL plans to issue 4 spectrum licences of 2X15 MHz (FDD) plus 5 MHz (TDD) of IMT-2000 spectrum per operator.

\* It is proposed to offer additional GSM1800 spectrum as part of the 3G licence package to a new entrant and a smaller amount of GSM1800 spectrum to one existing operator, in the band 1710-1730 MHz paired with band 1805-1825 MHz.

\* It is proposed to start the preparations for the public offering in the last quarter of 2001 and to open the auction in the 1<sup>st</sup> quarter of 2002.

*Questions posed by CONATEL in its public consultation document "The Introduction of 3G in Venezuela".*

**Assignment of 3G Mobile Spectrum:** \* Do you agree with the proposed assignment of spectrum to 3G mobile licences? Please detail. \* Do you have any alternative suggestions on how the 3G mobile spectrum should be assigned? \* Do you agree that incumbent operators and new operators that obtain 3G mobile spectrum should receive equal amounts of 3G mobile spectrum? \* Is it appropriate that TDD spectrum is assigned at the same time as FDD spectrum? \* What considerations should be taken into account when assigning TDD spectrum? \* How should the spectrum in 1885-1900 MHz and 2010-2025 MHz bands be assigned?

**GSM1800 spectrum assignment:** \* Do you agree with the proposed assignment of 2X15 MHz of GSM1800 spectrum bundled with the IMT 2000 spectrum, to a new market entrant? \* Do you agree with the proposed assignment of 2X5 MHz of GSM1800 spectrum, bundled with IMT-2000 spectrum, to one existing operator or new operator? Please detail, outlining the advantages and disadvantages of each proposal.

**Guard bands:** \* Do you support the incorporation of guard bands within the licensed spectrum assignments? \* Do you agree that the spectrum assignments should be independent of the choice of IMT-2000 standard? (please provide supporting argument if you do not agree) \* Do you support the requirement for bidders to declare their chosen radio access network standard at the pre-qualification stage of the auction (i.e. before the auction commences)?

**Spectrum licenses:** Will the Venezuelan mobile market sustain 4 national operators? \* Is there room in the Venezuelan mobile market for new entrants? Will a new entrant stimulate greater competition? \* Is it a more efficient use of spectrum to assign it nationally? \* Should some of the licences be regional? \* Should one licence be reserved for a new operator? \* Should existing and new operators be treated equally with regards to the assignment of licence. Please detail, outlining the advantages and disadvantages of each proposal.

**Timing for the auction of 3G spectrum allocations:** \* Do you consider these timescales to be feasible? \* Do you consider it to be the right moment to introduce 3G into the Venezuelan market?

**Network rollout obligations:** \* What population and geographic requirements do you consider to be reasonable for 3G operators in Venezuela and within what timeframe? \* What population and geographic requirements do you consider to be reasonable for the new GSM1800 network operator in Venezuela and within what timeframe? \* Should a minimum data rate be specified for the 3G-coverage requirement and if so, do you have a view on what this should be? \* What other requirements (if any) should be considered?

**Standards:** \* Should each individual operator choose the standard it will deploy for 3G or should CONATEL mandate a single 3G standard for the Venezuelan market? \* Should the standard of at least one of the spectrum licences to be awarded be predetermined? \* If CONATEL mandates a single 3G standard, what would be the implications for the existing operators given that there are multiple standards in play for 2G? \* Should the standard(s) deployed be one of those approved by the ITU in order to ensure compatibility with 3G networks in the rest of the world?

**Roaming:** \* If a new entrant is granted GSM1800 frequencies, are there any outstanding issues concerned with national roaming? \* Are there any other requirements that CONATEL should make with regard to national roaming, for example in the case of a new operator with no GSM1800 spectrum. \* How important is international roaming for 3G operators? \* What are the main issues in your view with regards to international roaming on 3G networks?

**Services:** What services and applications guarantee success of 3G networks? \* What level of asymmetry is likely for 3G traffic? Is there likely to be significantly more downstream (network to terminal) traffic than upstream (terminal to network)? \* Who will be the users of 3G services? \* Will 3G become a mass-market service and if so in what timeframe? \* What conditions need to be in place to allow greatest possible access to 3G services in Venezuela? \* What type of services will really distinguish 3G networks from the services that are offered on 2G networks? \* What regulatory incentives could CONATEL provide to make offering new services on 3G networks more attractive. Have you undertaken any market research to assess demand for these services? Are you willing to share any of the results with CONATEL?

**Numbering:** \* Under which circumstances should telephone numbers issued to customers in the GSM1800 and IMT2000 bands be in a different numbering range? \* Are there other considerations to take into account for the Venezuelan numbering scheme? \* What considerations should be made with regard to the evolution towards the IP protocol in mobile networks?

**Number portability:** \* Are there any special requirements that should be taken into account for the implementation of number portability on 3G networks?

**Mobile Virtual Network Operators (MVNO):** \* Is it necessary to establish specific regulation with regard to the operation of MVNOs? \* Please detail your arguments.

**Infrastructure:** Do you think that the sharing of infrastructure should be mandated, encouraged or prevented? What are the arguments for and against the sharing of infrastructure? \* Do you believe that infrastructure sharing will limit competition in the Venezuelan market? \* Do you think that there are further issues to consider, other than those established in Article 126 of the Telecommunications Law of Venezuela, which relate to the "Vias Generales de Telecommunication"<sup>77</sup> (rights of way)?

<sup>77</sup> In Article 126 of the law, "Vias Generales de telecomunicaciones" are the elements which allow one to install the necessary physical means to offer telecommunications services, conforming with the requirements in the respective regulation.

**Terminal availability:** \* Will 3G terminals be available in time for 3G network launches? \* What multi-mode and multi-band terminals will be required and when will these terminals become available? \* What will be the 3G terminal requirements of the Venezuelan operators given that there are several 2G standards in play operating on two different spectrum bands, 800 MHz and 900 MHz? \* Which services, voice, data, video etc, will be developed for 3G and within what timeframe will the terminals be available to support these services? \* Are you aware that terminals to meet your own specific requirements will be available? \* What conditions are necessary to encourage the installation of mobile terminal production facilities or other mobile equipment in Venezuela for use on 3G networks?

*Note:* For further detail on some of the proposals see Annex A.

CONATEL has identified the following, in order of priority:

1. assist Venezuela's entry into the Global Information Society, facilitating the early introduction of 3G systems, in agreement with the National Plan for Telecommunications
2. facilitate higher levels of wireless penetration across Venezuela, by ensuring the timely availability of sufficient radio spectrum, and that Venezuelan operators are in a prime position to offer both voice and data services
3. attract new players in the mobile arena to provide applications, content (local/Spanish language) and services
4. enable part of the revenues accrued from the 3G auction process to be re-invested in specific projects. For example, projects to facilitate and accelerate 3G network rollout; projects that require 3G infrastructure for efficient delivery of services; development of 3G applications and content. These projects could relate to emergency services and security, tele-medicine and tele-education.
5. provide the platform to facilitate advanced mobile services in the market
6. maintain Venezuela's leadership in mobile communications in Latin America
7. encourage the production in Venezuela of mobile equipment for use on 3G networks
8. benefit from economies of scale derived for the process of globalization of 3G.

In the process of developing rules and regulations to grant licenses for a new service, CONATEL is required by law to carry out a public consultation. With the aim of fulfilling this commitment CONATEL issued in May 2001 a consultation document targeted at local and international parties with direct interest in the forthcoming licensing of 3G services. The document takes apart the 3G licensing problem and calls for comments on 14 different items, ranging from "Assignment of 3G Mobile Spectrum" to "Number portability". With the document, the regulator is seeking the "opinions from interested parties in the telecommunications sector in order to gain a greater understanding of the implications of 3G and prepare for the introduction of 3G in Venezuela." (Box 3.2). This Public Consultation process is not subject to the established legal process set for standard rulings of CONATEL. It has, therefore, a different legal status than other legal procedures of the regulator and, for this reason, the document or the comments submitted by private parties are not binding for CONATEL.

By 15 June 2001 CONATEL had received 23 written answers, from different operators, equipment producers, and various organizations and associations (UWCC (Universal Wireless Communications Consortium), CDG (CDMA Development Group), GSM Association, etc.).<sup>78</sup> Response to the consultation covered more than three quarter of the issues raised by CONATEL.<sup>79</sup> In the months following the public

<sup>78</sup> Additional fifteen days were provided to comment on the 23 answers which had been sent to CONATEL. By the deadline additional six comments had been received. For further information see Respuestas al documento de consulta pública "Introducción de los sistemas móviles de tercera generación (3G) en Venezuela" in <http://www.conatel.gov.ve>

<sup>79</sup> Some of the highlights and general trends on the replies are that, there is support among respondents for the assignation of the proposed spectrum and wide agreement that at least one of the standards should be in accordance with those approved by the ITU. Yet, there is a majority of respondents (57 percent) that consider that early 2002 is not "the right moment to introduce 3G into the Venezuelan market." In spite of their disagreement with the timing, some 52 percent of the respondents consider the "timescales" proposed by CONATEL "feasible". On other matters, there is wide disagreement on the issue of reserving a license for a new operator. There is also a divergence of opinion on whether the Venezuelan mobile market will "sustain 4 national operators" and on whether a new entrant will "stimulate greater competition". The timing for the allocation of TDD spectrum has also generated divided camps. Half of the respondents believe TDD spectrum should be granted along with FDD spectrum, while the other half considers the opposite.



consultation CONATEL will work with the support of ASETA<sup>80</sup> (Association of Telecommunication Enterprises of the Andean Community) and a consultancy firm in the preparation of a report with policy recommendations for the licensing of 3G.<sup>81</sup> It is expected that by the end of 2001 the policy-making process would have (will be?) concluded and the government would be ready to license 3G services by the first quarter of 2002. CONATEL considers this timetable adequate and necessary due to the fact that there are capacity problems on 2G networks and there is demand for further allocation of mobile spectrum.<sup>82</sup>

### 3.4 Licensing

The new Telecommunication Act (Art. 76) enables CONATEL to handle out concessions either through public offer or direct adjudication.<sup>83</sup> Furthermore, in the case of a public offer the Law determines (Art. 84) that it can be carried out either through an auction or a “beauty contest”. The decision on which procedure to follow is on the hands of the regulatory authority that has to base its decision on the situation of the local market at the moment of the licensing and has to consider the mechanism that offers the higher degree of transparency in the process. For the case of 3G licenses and the allocation of the spectrum required to provide the services, CONATEL has chosen to grant the licenses through a public auction.<sup>84</sup> The decision has been formalized through a Resolution published in the Official Gazette on 4 July 2001.<sup>85</sup>

Although the selected is an auction, the Venezuelan regulator has set a pre-qualification process in which potential candidates to the auction have to show that they meet a number of technical, legal, and economic conditions. Those that meet the conditions established in this first selection round can move to the second round where they will compete in an auction for the licenses and its associated spectrum.

#### 3.4.1 License features and requirements

With the auction vs. beauty contest very much settled, the licensing 3G debate in Venezuela has turned to the issue of licensing requirements. That is, should the regulator set in the licenses any minimum requirements with regard to the implementation of 3G services? To grant licenses, CONATEL customarily requires information on technical plans, economic feasibility of the business, financial support for the venture, and rollout and coverage plans. The regulator often establishes its own requirements in relation to technology, financing, and geographic coverage. In relation to 3G licensing several of these matters are still unsettled.

*Technology:* Opinions with regard to regulation of the pending 1800MHz band are very heterogeneous (also here confusing: which pending 1800 MHz band?). While some claim that both technology and capacity should be free of choice, others claim that at least a minimum transmission speed should be required from the new 1800MHz network. Where there is a considerable consensus is on the fact that, although the Venezuelan government should not mandate any particular 3G standard to the forthcoming operators, it should nevertheless aim at having at least one of the 3G service providers with standards approved by the ITU, so that global roaming for Venezuelans traveling abroad becomes viable.<sup>86</sup>

*Geographical coverage:* As of mid-2001 CONATEL had not made any decision yet as to whether it would require any precise schedule of network rollout. Traditionally requirements of coverage and rollout schedules have been relatively conservative in Venezuela. In the case of 3G, given that licenses will be granted through an auction process, it is quite likely that there will be no network rollout requirements (or that they would be

<sup>80</sup> Asociacion de Empresas de Telecomunicaciones de la Comunidad Andina

<sup>81</sup> CONATEL will be considering (but not rating) the comments. A special Commission (Comision de Oferta Publica), usually integrated by engineers, economists and lawyers evaluates the feasibility of the projects.

<sup>82</sup> Furthermore, given that Venezuela is at the forefront of mobile telecommunications in the Andean region and CONATEL aims to maintain this position, the timing seems adequate and feasible.

<sup>83</sup> See Capitulo II del procedimiento para la concesión de uso y explotación del espectro radioeléctrico– Artículo 76. The new Telecommunications Act also states that CONATEL, when granting telecommunication concessions, is “subject to the principles of equality, transparency, publicity, efficiency, rationality, plurality, competition, technological development and incentives for the initiative, as well as protection and guarantee for the user.”

<sup>84</sup> The recent auction for Wireless Local Loop (WLL) services collected slightly over US\$20 million.

<sup>85</sup> See Resolution Nro. 37.233.

<sup>86</sup> More than 80 percent of the respondents to the public consultation supported the notion that the regulator should require that at least one of the operators adopts one of the ITU-approved standards to facilitate global roaming.

very light).<sup>87</sup> As to the geographic coverage of the license CONATEL has proposed to offer licenses to provide services across the country. National licenses, according to the regulator, make greater commercial sense because: (1) market demand is generally for national coverage; (2) 3G may not be rolled out in some areas where the business case is not sustainable but 2G will generally be available, possibly with enhanced capabilities approaching those of 3G; and (3) it is economically efficient to market a service on a national level.<sup>88</sup>

*Finance:* To be able to participate in the 3G auction interested parties would have to purchase an application form that details the technical, legal, and economic conditions required to qualify for the auction. The cost of the form has not been established yet—in the case of the WLL license it was around US\$ 11,000. Candidates would also have to deposit a bank guaranty that will assure their seriousness in participating in the process until the completion of the auction process.

Although most of the details on the financial issues surround the licensing of 3G are still pending, some of them, such as the license fee that will be required is in part settled. Venezuela requires a license fee for most of the communications services that are provided in the local market, and, in all the cases the fee ranges from 4.3 to a maximum of 4.8 of the operator's annual gross income.<sup>89</sup> In the case of 3G services it has been established that operators would have to pay a fee of up to 4.8 of their gross annual income.

*License period:* In Venezuela all licenses are granted for a maximum period of 25 years.<sup>90</sup> Once expired the license can be renewed in the terms and conditions established by the law. Although the Telecommunications Law does not set a time limit for the concessions to those that use the radio spectrum to provide services, CONATEL has applied the same principle in an equal manner for all players. Hence, it is quite likely that in the upcoming licensing for 3G services the period for which the license is granted will remain the same or similar.

### 3.5 Spectrum allocation

With regards to the allocation of spectrum for 3G services, Venezuela is free of the constraints that undermine 3G policy-making in other countries of the region. The UMTS “core-band” is unoccupied.<sup>91</sup> This freedom of choice is based on the fact that Venezuela did not introduce PCS. In accordance with its “National Plan for Telecommunications” the government decided to “enter 3G without passing by PCS”. Hence, the Venezuelan administration has decided to immediately introduce 3G services by adopting the bands identified at WARC'92.<sup>92</sup>

In its 3G public consultation document CONATEL proposed handing out 4 licenses of 2X15 MHz (FDD) plus 5 MHz (TDD) of spectrum per operator.<sup>93</sup> The current proposal links two of the forthcoming 3G licenses to 2X5MHz in the 1800MHz band for an existing or new operator and 2X15MHz in the same band for a “new market entrant” (Table 3.3).

<sup>87</sup> Venezuela is covered by two national networks, and three regional ones. It took five years (1991-1996) to cover the territory where 80 percent of the population is settled. Mobile operators argue that, based on current market demand, it would take three years in order to reach the same geographic coverage (roughly 25 percent of national territory).

<sup>88</sup> As supporting evidence CONATEL argues that: “in the US market there has been a high level of market consolidation since the award of regional PCS licenses in the mid 1990s. Operators have identified national coverage as a key differentiator in their service offering and have established strategies to achieve this through mergers and acquisitions as well as national roaming agreements.”

<sup>89</sup> Basic local and long distance telephony, as well as Internet and cable television services pay in license fees up to a maximum of 4.3 of their annual income. WLL, mobile, paging, satellite services have to pay up to a maximum of 4.8 of their annual income.

<sup>90</sup> See Art. 21 of the Telecommunications Law.

<sup>91</sup> 2X60 MHz of paired FDD spectrum (1920-1980 MHz and 2110-2170 MHz) plus 20 MHz of unpaired TDD spectrum (1900 - 1920 MHz) are available in the UMTS core-band.

<sup>92</sup> The decision was made public on the ITU-CITEL Regional Seminar on IMT-2000, in Caracas, August 2000.

<sup>93</sup> In its selection of spectrum for 3G services, CONATEL only refers to terrestrial 3G mobile spectrum and not to satellite spectrum.

The possibility to evolve and exploit their existing networks, through the addition of spectrum in the 1800MHz band is highly welcomed by existing operators. However, constraints imposed in the access to spectrum in the 1800 MHz band created confusion among respondents to the public consultation.<sup>94</sup> CONATEL argues that it is offering the spectrum “in order to level the playing field between incumbent operators and new entrants.” With this approach the regulator aims at achieving the following objectives: (1) avoid mandating national roaming and the issues that arise in a multiple standard environment; (2) attract new investment to the Venezuelan mobile market (by ensuring at least one new entrant); (3) increase competition in both the 2G and 3G markets.<sup>95</sup>

**Table 3.3: Air pieces for advanced communication services**

*CONATEL's proposed assignment of GSM1800 and 3G spectrum*

Bidder status	3G spectrum	GSM 1800 spectrum
Existing operator or new operator	2x15 MHz + 5 MHz	0
Existing operator or new operator	2x15 MHz + 5 MHz	0
Existing operator or new operator	2x15 MHz + 5 MHz	2 x 5 MHz
New market entrant	2x15 MHz + 5 MHz	2 x 15 MHz

Source: CONATEL

There are some authorized point-to-point links that still occupy part of 3G mobile spectrum.<sup>96</sup> In order to remove these links and make the entire spectrum available for 3G services CONATEL will implement the Telecommunications Law of Venezuela, which stipulates spectrum migration for new technologies and services.<sup>97</sup>

Part of the debate in Venezuela is also related to the allocation of TDD. Since TDD technology is not a well-developed yet, some parties claim that its licensing should be postponed. Given that TDD spectrum could be used to deploy advanced PCS services—which is operated in most countries of Latin America—some advocate against the allocation of TDD spectrum in the near future. Others, finally, are calling for the allocation of the spectrum, but leaving its usage open to the determination of market forces.

Some actors in the local market argue that if Venezuela pushes ahead at this time with spectrum allocation, it could find itself out of sync with other countries in the region that are operating PCS in the 1900MHz band and are looking at the possibility of allocating 3G services in the 1710-1850 and 2110-2170MHz bands for 3G. Other are of the position that, Venezuela finds itself in the unique circumstance of being totally independent from the decision of its neighbors, and could leapfrog directly into the European/Asian approach to 3G, benefiting from large economies of scale in hardware and service development. Given the current schedule that the government has set up for itself, the dilemma should be settled by early next year at the most.

### 3.6 Forthcoming market and policy issues

As in the case of Chile, in Venezuela there are a number of issues that are progressively being resolved and are turning the 3G policy and market picture increasingly clearer.

<sup>94</sup> Some respondents advocate giving all applicants the possibility of acquiring further spectrum in the 1800MHz, in order to evolve mobile services to more advanced 2.5G applications. Telcel managers argue that the company does not necessarily depend on new spectrum at this stage, since the adopted technology (CDMA) would allow them to gradually evolve to more advanced services in the same spectrum they have currently. New spectrum, however, is always welcome. With additional spectrum the operator could provide 2.5G services, without the need of reallocating existence TDMA-subscribers in the 800MHz band. The company therefore suggests a spectrum allocation, which leaves the operator the choice of purchasing licenses given out in the 1700MHz/1800MHz band, or different blocks in the 1900MHz band—reserved partly for PCS (in accordance with many other countries in the region, such as the neighboring and most important Latin American trading partner Colombia) or 3G services. Given current uncertainties, Movilnet has not decided yet to which technology will it evolve its services.

<sup>95</sup> The current law does not allow the subleasing of spectrum.

<sup>96</sup> In the 1700MHz band there are currently some microwave services operating.

<sup>97</sup> See Article 74 of the Telecommunications Law at [http://www.conatel.gov.ve/ns/marco\\_legal3.htm](http://www.conatel.gov.ve/ns/marco_legal3.htm)

### 3.6.1 Timing of the license

CONATEL is planning to start the preparations for the public offering in the last quarter of 2001, and to open the auction in the first quarter of 2002. The private sector involved—in particular the existing mobile operators—would rather postpone the process for another year. They argue that current uncertainties in technology, unclear market demand for advanced mobile services, and the fact that 2.5G services have not been adequately exploited yet, lead to the need to open the 3G market later than planned.

### 3.6.2 Potential 3G operators

CONATEL has suggested in its consultation document that it plans to grant licenses to four operators of 3G services. For the Venezuelan government 3G licensing is seen as a golden opportunity to introduce further competition in the domestic mobile market (where a relatively high ARPU seems to indicate a relatively low level of effective competition). Hence, the regulator is exploring the possibility of reserving a license exclusively for a new entrant. Given the relatively high cost of deploying a 3G network, it is commonly expected that the new entrant would be associated to an international operator. Yet, of the 23 written contributions to the public consultation on 3G carried on by CONATEL, only one new international operator and one foreign regulator submitted comments. On the other hand, almost 30 percent of the respondents to the public consultation process have already undertaken market research to assess the demand for 3G services in the Venezuelan market.

Aside from the possibility of a new player, it is quite likely that the two main national mobile operators will be participating in the auction of 3G licenses. Both of them are currently enjoying a comfortable economic situation. Revenues have been good over the last few years, a national 2G network has been established and has been long amortized, and a critical mass of subscribers has been achieved. Financial liquidity and credibility should not become an obstacle for them to move forward with the 3G opportunity.

Different is the situation of the three regional operators who have just recently started to build out their networks. Without fresh capital, it does not seem economically feasible for the emerging operators—which together hardly control less than 5 percent of the market—to invest large amounts of money into rolling-out new 3G networks as early as 2002. CONATEL, however, is governed by a principle that requires the regulator to “ensure the ... protection of private enterprise.”<sup>98</sup> This might lead the government to find ways to shelter the three regional operators from the possible harsh competition that will pose new 3G services. There are signs that the three regional operators have started to cooperate on a national basis.<sup>99</sup> Yet, contrary to what some observers might have expected, the regional operators have not made any serious moves towards merging their businesses.

The other potential candidates to participate in the 3G market are mobile virtual network operators (MVNOs). Yet, as of mid-2001 there were no stand-alone MVNOs providing services in Venezuela. There was a time in which there was an attempt by independent companies to enter the market as resellers. Movilnet contracted in 1996 the services of a MVNO to run a prepaid system. After two years of cooperation Movilnet bought the MVNO and integrated its services completely, leaving the market with no operator other than the licensed ones. Some actors in the local market are of the idea that, given that they do not have access to radio spectrum (The current law does not allow the subleasing of spectrum), the government should not set up any particular policy in regard to MVNOs (???not clear this sentence- what's the point?). Yet, its consultation document CONATEL seems to lean in favor of market solution.<sup>100</sup> Furthermore, some 48 percent of the respondents to the public consultation considered it “necessary [for CONATEL] to establish specific regulation with regard to the operation of MVNOs (only 14 percent were against regulating MVNOs presence in the market).

<sup>98</sup> CONATEL, 2001a

<sup>99</sup> Infonet and Digitel, for example, have set up a national roaming agreement for post-paid customers.

<sup>100</sup> In reviewing arguments in favour and against MVNO regulation, CONATEL states that “in the case of 3G spectrum, it is feared that incentives to invest may be diminished if operators are obliged to provide network access to MVNOs.” The document also points to the reluctance of European regulators to oblige 3G operators to share capacity with MVNOs and to the case of Hong Kong where the requirements of 30 percent capacity sharing has been challenged.

### 3.6.3 Technology and infrastructure

Aware that the high cost of 3G infrastructure rollout—coupled with the potentially high cost of auctioned licenses—might hinder the quick deployment of services, CONATEL has been trying to define through its consultation process if it should allow infrastructure sharing or not. The regulator is concerned with the fact that network sharing might lead to some type of collusion among operators and undermine effective competition in the 3G market.<sup>101</sup> The majority of respondents to the consultation (52 percent) consider that infrastructure sharing should be encouraged, while 19 percent believe that it should be mandated. Only 24 percent of those that responded believe that infrastructure sharing will limit competition.

As in the case of Chile, the Venezuelan administration is concerned with the availability of 3G terminals in the near future.<sup>102</sup> Given the diversity of standards currently available in the Venezuelan market and considering that most likely current operators will also participate in the 3G market, integrating their current 2G services with forthcoming 3G systems, it is not clear what kind of terminals will be available at reasonable prices and required quantities at the time of 3G launch in the country. Aside from the short-term concern related to terminal availability the Venezuelan administration is looking into the possibility of developing policy to attract investments in terminal production. With this aim in mind it is currently consulting with industry to identify possible components of an industrial policy to attract 3G equipment producers to the country.

### 3.6.4 Services

The possibility of 3G licenses in early 2002 has given rise to a debate on the nature and scope of services in the Venezuelan mobile market. The controversy has centered on the issues of whether it makes sense for Venezuela to go first to 2.5G services or to leapfrog directly into 3G services.

Under a gradual approach scenario economies of scope could be exploited by progressively evolving 2G services, over to 2.5G services and only at a later stage to 3G. Those in favor of a slower adoption process argue that this path would not only provide the required time for the technology to mature, but it would also grant content provider time to evolve adequate business models. There is little activity in the country in relation to the production of adequate local content for advanced data services. Compared with other countries in the region, partnerships for content provision in Venezuela is very scarce and almost all observable initiatives are spill-over effects from international cooperation.

Going slow would also give users the adequate time frame to assimilate and adopt the new services. Those in favor of a “fast-track” approach argue that Venezuela is currently enjoying the unique possibility of leapfrogging directly to 3G and with this bring the country closer to the global information society. Yet, advocates of a speedier process acknowledge the difficulties that might trigger poor awareness among the population about the benefits of advanced data communication systems.<sup>103</sup>

Government authorities, in particular, are aware of these problems, and have suggested that a significant part of money collected from spectrum auctions will be invested to help develop a digital industry and culture and to create confidence and trust in the use of new information and communication technologies and services. The Ministry of Science and Technology, for example, has recently launched a program to promote content production, and is implementing a national campaign to raise awareness of the potential of new digital communication technologies.

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<sup>101</sup> CONATEL points in this regard to the fact that, “the antitrust chief for the European Union has argued that infrastructure sharing will need to be examined on a case by case basis. Competition could be limited by such agreements and this will depend on the number of operators in each market and the level of co-operation between the operators.”

<sup>102</sup> The majority of respondents to the public consultation are instead optimistic in this regard and believe that terminals will be available at the time of the launching of 3G services in the country.

<sup>103</sup> Some 52 percent of the respondents to the public consultation considered that it is not possible to determine what services and applications guarantee success of 3G networks. Those that made some kind of forecast seemed to be replicating the forecasts made by documents published by the UMTS-Forum.

### 3.7 Conclusion

The rise of 3G mobile networks and services is offering new opportunities but also posing at the same time unprecedented challenges for regulators, industry, and users. These challenges seem to be particularly acute in the case of developing countries given that most of them have strongly embraced mobile telephony but are not all that sure if they should be making the jump to 3G mobile systems or not. The situation is a bit different in Europe and part of high income Asia where the transition to 3G services seems more natural. Hence, timing of licensing in emerging markets like Chile and Venezuela appears as a crucial element in the whole process of introducing 3G services to the local market.

In most developing country markets—and in particular in Chile and Venezuela, due to their advanced status in mobile services—governments are eager to push forward with the introduction of 3G services. In both Chile and Venezuela the local administration hopes to be licensing 3G services sometime in the first quarter of 2002. Existing operators, however, are a bit more reluctant to a “fast-track” approach. Yet, if government decides to call for the licensing of 3G, they will not have a choice other than to apply for a license. They cannot afford the luxury of letting go a license of this nature and putting into risk their existing business and market share.

Reluctance among operators to 3G licensing in the short term is, however, different in Venezuela than in Chile. In the latter, operators have recently invested considerable amounts of money in the upgrading and expansion of networks while facing at the same time a sharp decline in profits and a very low average revenue per user (ARPU). In the former country, instead, operators have been enjoying both a health flow of incomes and a relatively high ARPU. This leads to the fact that while in Chile operators do manifest their preference for a delay in the introduction of 3G, in Venezuela they are rather indifferent to the timing of licenses.

In Chile reluctance of existing operators is not the only factor that might delay in the licensing process. It happens that Chile—as several other countries in Latin America—have recently licensed personal communication systems (PCS) operators in the bands internationally identified for 3G services. Given that the move of existing PCS services to another band is extremely expensive, the Chilean administration is grappling with alternative options and waiting for some of the big players in the region (such as the USA) to define their spectrum for 3G and move forward with the licensing process. Venezuela, instead, does not face this challenge because it did not get to the point of licensing PCS services. The current administration has decided that it will “leapfrog” directly into 3G services without licensing PCS.

In spite of its decision, the Venezuelan administration is consulting with industry, the public, and the international experience on the right timing for the licensing. A number of factors are calling for a cautious approach: will hardware and services be ready for markets like Venezuela in the near future? Is there a market for more sophisticated and expensive services in a relatively low-income country like Venezuela? Are there enough investors and carriers out there at this time willing to fight for a 3G license in the Venezuelan market? Should Venezuelan operators evolve first to 2.5G services? Are there risks of undermining 3G services through deception if there is little demand or not enough operators willing to enter the market? These are some of the numerous questions that developing country officials, such as those in Venezuela, are asking themselves on the eve of 3G licensing.

On the demand side both countries seem to be well positioned to launch 3G services soon—they both have the highest mobile density in Latin America (over 22 subscribers per 100 inhabitants). Yet, given that 3G services are not so much about voice as they are about non-voice applications, Chile seems to be better positioned to move to 3G services in the short run. The country has embraced the Internet with enthusiasm. With 13 percent of the population logging in regularly to the Net—compared to 2-6 percent in most other countries of the region—Chile has become the country with the highest Internet penetration in Latin America. The country has also for a high percentage of e-commerce transactions in the region (although it accounts for 4 percent of the Latin American GDP, it carries on some 8 percent of the e-commerce transactions in the region). In Venezuela, instead, the digital culture of the Internet has not hit the local population yet. A penetration rate of around 2-3 percent shows that the Internet has not yet been received with the euphoria with which it has been embraced in other countries of the region. The situation with regard to e-commerce is also in its early stages. While Venezuela is contributing more than 5 percent to the Latin American GDP, it accounts for less than 2 percent of the Latin American e-commerce transactions.

This latter is one of the main reasons that has led the Venezuelan administration to choose “auction” as the preferred mode of licensing 3G services. The government is planning to use the revenues from the auction process to promote the use of the Internet and to expand the digital culture and the daily practices of the information society among the Venezuelan people. Given the way in which the Venezuelans have embraced technological innovations, like mobile communications, the government is confident that it will not take long for the local population to be immersed in the world of advanced digital communications.

For these reasons (among others) CONATEL—the body in charge of licensing 3G services—has decided that it will go for an auction of the spectrum with a pre-qualification process to select those candidates that fulfill certain technical, economic, and business capabilities. Current legislation clears the way for the regulator to take this road. In the case of Chile, instead, the country has traditionally granted licenses through “beauty contests”. So, if they decide to go for an auction—which is currently being discussed among high government officials—then they would have to change the law. If the legislation goes to Congress with an “urgent” status it might go through in just a week—if there is not manifest opposition in Congress, if not, it is quite unclear how long it will take for the new legislation to be approved.

If Chile decided to follow its tradition of a “beauty contest” the process should be safe from the critiques that it has faced in other parts of the world. The Chilean “beauty contest” is based on points accumulated by the competitors for the licenses. The points are gained based on very clear and transparent criteria related to measurable objectives of geographical rollout of the network and timing in the deployment of services. No one in Chile has raised any complaints or criticisms against what it appears as a solid mechanism of comparative selection.

There are a number of issues in which both countries face similar challenges. The choice of 3G standards, for example, is a matter that raises concerns among operators and government. The region has adopted in recent years a range of mobile standards. Yet, TDMA systems dominate the mobile Latin American landscape. In the world, on the contrary, GSM seems to be gaining predominance with CDMA emerging as a strong contender. Given that Europe and part of Asia—which have traditionally adopted GSM or CDMA—are moving first, early movers in Latin America will have to carefully choose their 3G standards to avoid a shortage of equipment and possible difficulties with regional and international roaming in the future.

Both countries are looking at 3G licensing as an opportunity to increase competition in the local market. Yet, the competitiveness of each of these markets and their ability to incorporate further effective competition seems to be rather different at this stage of market development. In Venezuela with only two national operators, hefty profits, and an ARPU of US\$ 38, there seems to be room for other players without risking the viability of the market. In Chile, where most of the five national mobile operators are losing money (in part due to a very low ARPU of US\$ 23) the room for other new mobile service providers seems rather limited. Yet, given the dynamism of the telecommunication markets and rapid cycles of expansion and contraction of national economies, the situation can change in both markets in the near future.

Finally, it is worth highlighting the positive experience that national administrations are having in the 3G policymaking process. Both countries show a high degree of cooperation between the private and public sector. In both countries this mode of decision-making in the policy process is rather new. Yet, both administrations are finding it highly effective and productive. Public consultations on issues related 3G licensing are in progress in both countries and participants of the process believe that satisfactory solutions can be found.

Policymaking for 3G mobile services is on the move in most countries of the Americas region. Chile and Venezuela offer two valuable yet contrasting experiences on the formation of 3G policy. Although decisions are being made and the licensing process is moving forward questions related to the market itself will remain an answered puzzle for quite a while. Will 3G services be a luxury for the rich of the region? Or, will they become, as mobile telephony did, a working tool for those that struggle every day in the streets of Latin American cities to make a living? It seems that these kinds of questions will be settled in the complex interaction that often exists between unrestricted market forces and sound government policies. Only with the passing of time we will know which path will 3G mobile services take in Latin America.

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## ANNEX A

**Fija norma técnica para el servicio público de telefonía móvil digital avanzado****República de Chile****Ministerio de Transportes y Telecomunicaciones****Subsecretaría de Telecomunicaciones**Santiago, 26<sup>th</sup> Septiembre 2000**A.1 Vistos:**

- a) La ley N° 18.168, Ley General de Telecomunicaciones;
- b) El decreto ley N° 1.762, de 1977, que creó la Subsecretaría de Telecomunicaciones;
- c) El decreto supremo N° 15, de 1983, del Ministerio de Transportes y Telecomunicaciones, que aprueba el Plan General de Uso del Espectro Radioeléctrico, y
- d) La resolución N° 55, de 1992, cuyo texto refundido, coordinado y sistematizado fue fijado por la resolución N° 520, de 1996, ambas de la Contraloría General de la República.

**A.2 Considerando:**

- a) Que es necesario establecer la norma técnica para el servicio público de telefonía móvil digital avanzado;
- b) Que en diversos países desarrollados ya se han entregado concesiones de este tipo de servicio, conocido internacionalmente como servicios móviles de tercera generación o IMT-2000, y
- c) La atribución de la banda 1710 - 2290 MHz prevista en el Plan General de Uso del Espectro Radioeléctrico; y en uso de las atribuciones legales, dicto la siguiente

**A.3 Resuelvo:**

Fijase la siguiente norma técnica para el servicio público de telefonía móvil digital avanzado.

**Artículo 1°.** Se destina las subbandas 1.710 - 1.850 MHz y 2110 - 2170 MHz para el servicio público de telefonía móvil digital avanzado, en adelante el servicio.

**Artículo 2°.** La distribución de bloques de frecuencias, para transmisiones dúplex por división de frecuencia (FDD) es la siguiente:

**Figure A.1.1: Proposed assignment of FDD spectrum**

	Frecuencias de transmisión móviles	Frecuencias de transmisión bases
Bloque A	1.785 - 1.800 MHz	2.110 - 2.125 MHz
Bloque B	1.800 - 1.815 MHz	2.125 - 2.140 MHz
Bloque C	1.815 - 1.830 MHz	2.140 - 2.155 MHz
Bloque D	1.830 - 1.845 MHz	2.155 - 2.170 MHz

Además cada bloque tendrá asociado el uso de los siguientes bloques para transmisiones dúplex por división temporal (TDD):

**Figure A.1.2: Proposed assignment of TDD spectrum**

	Frecuencias de transmisión móviles
Bloque A''	1.765 - 1.770 MHz
Bloque B''	1.770 - 1.775 MHz
Bloque C''	1.775 - 1.780 MHz
Bloque D''	1.780 - 1.785 MHz

La presente distribución de frecuencias no impide el uso de las frecuencias de la banda 1850 - 1990 MHz para ofrecer el presente servicio. La distribución de frecuencias y cantidad de operadores para el servicio, en la banda 1710 - 2170 MHz, podrá modificarse o agregarse nuevas bandas, dependiendo de la evolución tecnológica y recomendaciones o acuerdos de organismos internacionales de Telecomunicaciones.

**Artículo 3°.** En una misma área geográfica el servicio podrá ser suministrado hasta por cuatro concesionarias. La zona de servicio de cada concesión podrá abarcar todo el territorio nacional.

**Artículo 4°.** La zona de servicio debe calcularse de modo que en su interior la intensidad de campo permita, al menos, comunicaciones durante el 90% del tiempo, en el 90% de los emplazamientos.

**Artículo 5°.** La tecnología será digital y de libre elección.

Anótese y publíquese en el Diario Oficial.-

**Christian Nicolai Orellana,  
Subsecretario de Telecomunicaciones.**

Lo que transcribo para su conocimiento.- Saluda atentamente a Ud.,

**Edgardo Mimica Miranda,  
Jefe División Política Regulatoria y Estudios.**

## ANNEX B

### The Introduction of 3G in Venezuela

#### A public consultation document

Caracas, 14<sup>th</sup> May 2001

#### B.1 Legal status

The Venezuelan decree on telecommunications, clearly establishes the principles, grounds and procedures, that ensure the development of telecommunications as an economic activity in an environment of free competition, economic liberty and protection of private enterprise.

In particular, the Telecommunications Law and the Regulation on Administrative Requirements and Concessions for the Use of and Exploitation of Radio Spectrum, contain in detail the general regime governing concessions for the use and exploitation of radio spectrum and for the award of administrative licences, regulated by the Comisión Nacional de Telecomunicaciones (CONATEL), to establish and exploit networks, for a period of time that does not exceed twenty five years, in order to provide telecommunications services.

In order to conduct these processes transparently with the open participation of different sectors in the country, CONATEL, has developed the procedures of “Oferta Pública” (Public Offering), designed to award the right to use and exploit radio spectrum for the implementation of new technologies, within the framework of the process of deregulating telecommunications, in agreement with the Telecommunications Law and the National Plan for Telecommunications.

In light of these principles, CONATEL is submitting to public consultation the document, “**Introduction of 3G systems in Venezuela**”, targeted at interested parties in the telecommunications sector, in the national and the international arena, in order to obtain responses derived from a question/answer process, and via these means examine, evaluate and analyse in a preliminary way the implementation of this type of system in Venezuela.

This Public Consultation is not subject to the established legal process for “normativo” acts dictated by CONATEL, in agreement with the Telecommunications Law and the Resolution which sets out the Mechanisms of Previous Public Consultation. Therefore, the document submitted for discussion by the interested parties, as well as the responses formulated by the interested parties, do not bind CONATEL in any way, as they do not receive a formal status as found in judicial procedures.

The Public Consultation will be undertaken in agreement with the specific terms established for this particular case, following the timeframe established for it. In addition, opinions submitted by interested parties in the framework of this procedure will be published electronically, in their entirety, in order to guarantee transparency in the development of the procedure.

If there are conflicts in translation between the Spanish version and the English version of this document, the Spanish version will take precedence.

#### B.1.1 Introduction

Over the last year, a number of countries have allocated new spectrum for 3G services, and some of the auctions of spectrum have attracted international attention because of the high prices paid during the auctions. The successful operators plan to use the new spectrum for a new group of radio technologies (collectively called 3G or IMT-2000). The prices paid for the spectrum reflect the views of the operators about the potential of this spectrum, combined with emerging global 3G mobile standards, to support the new 3G services over mobile networks, such as fast internet, video and games over mobile, and a new breed of services focussed on exact location of the mobile customer.

The Venezuelan mobile market has grown significantly in the last two years and competition has increased. There are two national 2G licence holders, Telcel and Movilnet, operating CDMA and TDMA 800 MHz networks (824-849 MHz and 869-894 MHz) respectively and three regional operators, Digitel, Infonet and Digicel, operating GSM900 networks (908-915 MHz and 953-960 MHz). The regional operators were licensed in 1997 with the objective of providing subscriber lines in towns with less than 5,000 inhabitants,

that were not being covered by the incumbent operator in its period of exclusivity. In compensation, they received a multi-concession which included mobile telephony, GSM900, in their respective regions and trunked mobile radio amongst other services. Mobile penetration reached 21.8% of the Venezuelan population at year-end 2000 (*Source: CONATEL*).

With a view to accelerating growth in the mobile market and developing the market further, CONATEL plans to offer 3G spectrum licences. To maintain an open and transparent approach to the process, CONATEL is consulting the telecommunications sector on relevant issues surrounding the allocation of 3G spectrum and award of 3G licences.

**The Comisión Nacional de Telecomunicaciones of Venezuela (CONATEL) would like to request opinions from interested parties in the telecommunications sector in order to gain a greater understanding of the implications of 3G and prepare for the introduction of 3G in Venezuela.**

## **B.2 Objectives of CONATEL**

CONATEL has identified a number of objectives that should be achieved through the licensing of 3G spectrum. They are, in order of priority:

- assist Venezuela's entry into the Global Information Society, facilitating the early introduction of 3G systems, in agreement with the National Plan for Telecommunications
- facilitate higher levels of wireless penetration across Venezuela, by ensuring the timely availability of sufficient radio spectrum, and that Venezuelan operators are in a prime position to offer both voice and data services
- attract new players in the mobile arena to provide applications, content (local/Spanish language) and services
- enable part of the revenues accrued from the 3G auction process to be re-invested in specific projects. For example,
  - Projects to facilitate and accelerate 3G network rollout
  - Projects that require 3G infrastructure for efficient delivery of services
  - Development of 3G applications and content.

These projects could relate to emergency services and security, tele-medicine and tele-education.

- provide the platform to facilitate advanced mobile services in the market
- maintain Venezuela's leadership in mobile communications in Latin America
- encourage the production in Venezuela of mobile equipment for use on 3G networks
- benefit from economies of scale derived for the process of globalisation of 3G.

## **B.3 Consultation**

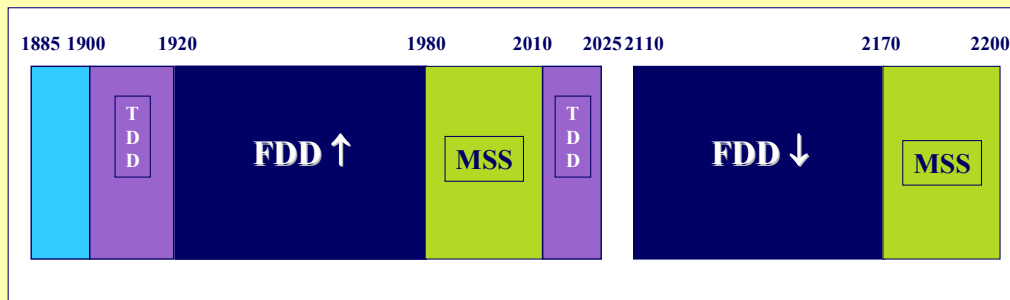
### **B.3.1 Assignment of 3G Mobile Spectrum**

Spectrum for 3G mobile services was originally designated at the 1992 World Administrative Radio Conference (WARC-92) and was intended to be a global allocation catering for both terrestrial and satellite delivered 3G services. 3G mobile has since been given the designation IMT-2000 (International Mobile Telecommunications 2000) by ITU. The ITU designated the frequency bands 1885-2025 MHz and 2110-2200 MHz for IMT-2000 at the WARC-92 and has since designated additional bands in the WARC-2000. This spectrum includes allocations for both terrestrial and mobile satellite services (MSS).

Terrestrial 3G mobile spectrum has been further split into paired, frequency division duplex (FDD) spectrum and unpaired, time division duplex (TDD) spectrum, reflecting the ITU's proposals for harmonisation of IMT-2000 spectrum. In broad terms, FDD spectrum is more suited to wide area, outdoor mobile applications (akin to GSM), whereas TDD spectrum is more suited to high density indoor applications, akin to cordless telephones. **This public consultation document only refers to the terrestrial 3G mobile spectrum and not the satellite spectrum.**

Figure B.3.1 shows the IMT-2000 spectrum allocation at WARC-92.

**Figure B.3.1: Spectrum allocation for IMT-2000 as designated by the ITU at WARC-92**



Source: ITU

The UMTS Forum<sup>104</sup> recommended a minimum of 2X15 MHz of paired spectrum (FDD, Frequency Division Duplex) plus 5 MHz of unpaired spectrum (TDD, Time Division Duplex) to provide adequate spectrum for conflicting requirements of high mobility and low density usage and low mobility, high density usage. In some mature European markets with established high density GSM networks, existing operators have been licensed 2X10 MHz, on the basis that some of the 3G traffic can be carried over their existing GSM networks. However, in most cases, the UMTS Forum's recommendations have been adopted.

### B.3.1.1 Available spectrum for IMT-2000 in Venezuela

In Venezuela, in line with the global IMT-2000 spectrum identified by ITU, 2X60 MHz of paired FDD spectrum (1920-1980 MHz and 2110-2170 MHz) is available plus 20 MHz of unpaired TDD spectrum (1900 - 1920 MHz). The public consultation and the subsequent 3G auctions exclude the satellite spectrum and only deal with the terrestrial IMT-2000 spectrum.

In addition, spectrum bands 1885-1900 MHz and 2010-2025 MHz are available. In Europe the 1880-1990 MHz band is used for DECT systems and the 2010-2025 MHz band has been identified for private, self coordinating 3G mobile systems. On the other hand, in Brazil, the 1885-1900 MHz band has been provisionally selected for TDD 3G mobile services.

There are some authorised point- to- point links that still occupy part of 3G mobile spectrum in Venezuela. In order to remove these links and make all of the spectrum available for 3G services CONATEL will implement Article 74 of the Telecommunications Law of Venezuela, which stipulates spectrum migration for new technologies and services.

#### B.3.1.1.1 Proposal

CONATEL plans to issue 4 spectrum licences of 2X15 MHz (FDD) plus 5 MHz (TDD) of IMT-2000 spectrum per operator.

<sup>104</sup> The UMTS Forum is a global organisation comprising 240 member organisations from the operator, supplier, regulatory, consultant, IT and media communities, whose goal is to promote the successful introduction and development of UMTS/IMT-2000 systems. UMTS is a 3G mobile technology based on the W-CDMA air interface and GSM core network standards

### B.3.1.2 Consultation

*Do you agree with the proposed assignment of spectrum to 3G mobile licences? Please detail.*

*B.3.1.2.1 Do you have any alternative suggestions on how the 3G mobile spectrum should be assigned?*

*B.3.1.2.2 Do you agree that incumbent operators and new operators that obtain 3G mobile spectrum should receive equal amounts of 3G mobile spectrum?*

*B.3.1.2.3 Is it appropriate that TDD spectrum is assigned at the same time as FDD spectrum?*

*B.3.1.2.4 What considerations should be taken into account when assigning TDD spectrum?*

*B.3.1.2.5 How should the spectrum in 1885-1900 MHz and 2010-2025 MHz bands be assigned?*

### B.3.2 GSM1800 spectrum assignment

At present no spectrum for the operation of GSM1800 networks has been assigned in Venezuela, and the issue of 3G spectrum provides an opportunity to make use of this resource, since it is widely accepted that 3G mobile networks will be operated in conjunction with 2G networks to provide a full range of mobile services.

#### B.3.2.1 Spectrum for a new operator

National Roaming (between operators) allows a new operator to provide a national service before it has built out a complete network. National roaming also allows new 3G entrants to access the existing 2G network(s) of incumbent operator(s), thus levelling the playing field between incumbents and new entrants.

In Europe it has been possible to mandate national roaming for a new entrant due to the homogeneity of standards (all existing 2G networks are based on GSM). Therefore, a new entrant will be able to benefit from GSM coverage on the existing networks of other operators until it has built out its UMTS network. All 3G terminals are expected to be dual-mode, providing access to both GSM and 3G networks. Therefore, all existing operators are able to provide a national roaming service to a new entrant.

In those markets where multiple standards are in play, such as in Venezuela, it is a more complex issue to provide national roaming. Depending on the standard deployed by the new entrant and the availability of dual or multi-mode terminals, only some of the existing operators may be able to provide national roaming facilities. This may limit competition in national roaming by restricting roaming to existing operators whose network standard is compatible with that of the new entrant. It could also result in higher costs for the new entrant unless there is some form of regulatory control over the charges applied for national roaming.

#### B.3.2.2 Spectrum for existing operators

The existing national and regional operators, who use spectrum in the 800/900 MHz spectrum range, are likely to be facing congestion problems in some areas over the next few years. They may need additional spectrum in order to meet demand from their customers, particularly for new data services, to facilitate lower usage tariffs or to comply with coverage obligations (in the case of the regional GSM operators).

#### B.3.2.3 Proposal

In order to level the playing field between incumbent operators and new entrants, it is proposed to offer additional GSM1800 spectrum as part of the 3G licence package to a new entrant and a smaller amount of GSM1800 spectrum to one existing operator, **in the band 1710-1730 MHz paired with band 1805-1825 MHz**. Hence the 3G spectrum licences would comprise the spectrum specified in figure B.3.2, depending on the status of the bidder:

**Figure B.3.2: Proposed assignment of GSM1800 and 3G spectrum**

Bidder status	3G spectrum	GSM 1800 spectrum
Existing operator or new operator	2x15 MHz + 5 MHz	0
Existing operator or new operator	2x15 MHz + 5 MHz	0
Existing operator or new operator	2x15 MHz + 5 MHz	2 x 5 MHz
New Market Entrant	2x15 MHz + 5 MHz	2 x 15 MHz

The objectives of this approach are threefold:

- avoid mandating national roaming and the issues that arise in a multiple standard environment
- attract new investment to the Venezuelan mobile market (by ensuring at least one new entrant)
- increase competition in both the 2G and 3G markets.

### B.3.2.4 Consultation

*B.3.2.4.1 Do you agree with the proposed assignment of 2X15 MHz of GSM1800 spectrum bundled with the IMT-2000 spectrum, to a new market entrant?*

*B.3.2.4.2 Do you agree with the proposed assignment of 2X5 MHz of GSM1800 spectrum, bundled with IMT-2000 spectrum, to one existing operator or new operator?*

Please detail, outlining the advantages and disadvantages of each proposal.

### B.3.3 Guard bands

Some provision has to be made with regard to guard bands. In Europe, the guard bands are accommodated within the licensed spectrum blocks, so long as there is at least 4.8 MHz between adjacent carrier frequencies assigned to different operators. It is considered that this approach should enable any of the IMT-2000 standards to be deployed. However as there may be slight differences in the adjacent channel co-ordination requirements for the different standards, it is proposed that bidders should declare their chosen standard at the pre-qualification stage, so that bidders can take proper account of adjacent channel co-ordination requirements in determining their bids.

#### B.3.3.1 Consultation

*B.3.3.1.1 Do you support the incorporation of guard bands within the licensed spectrum assignments?*

*B.3.3.1.2 Do you agree that the spectrum assignments should be independent of the choice of IMT-2000 standard? (please provide supporting argument if you do not agree)*

*B.3.3.1.3 Do you support the requirement for bidders to declare their chosen radio access network standard at the pre-qualification stage of the auction (i.e. before the auction commences)?*

### B.3.4 Spectrum licences

To date, those countries that have already assigned 3G spectrum have opted for national licences rather than regional licences. National 2G networks have set the precedent for national 3G networks in most European and Asian markets. National 3G licences have been considered efficient in these markets and makes greater commercial sense because:

- market demand is generally for national coverage (networks that have launched on a regional basis -e.g. One2one in the UK took longer to achieve national coverage)
- 3G may not be rolled out in some areas where the business case is not sustainable but 2G will generally be available, possibly with enhanced capabilities approaching those of 3G
- it is economically efficient to market a service on a national level.

In the US market there has been a high level of market consolidation since the award of regional PCS licences in the mid 1990s. Operators have identified national coverage as a key differentiator in their service offering and have established strategies to achieve this through mergers and acquisitions as well as national roaming agreements.

#### **B.3.4.1 Number and type of licences in Venezuela**

In Venezuela there are two national 2G operators and three regional 2G operators. Therefore, in each region there are three operators competing. In addition to providing mobile GSM services, the regional operators have coverage obligations which include provision of fixed subscriber lines and payphone services in rural areas, in villages with less than 5,000 inhabitants.

#### **B.3.4.2 Proposal**

In order to simplify the licensing procedure and ensure a level playing field for operators in the 3G services market, CONATEL proposes to tender 4 national IMT-2000 allocations.

Spectrum licences will be assigned according to figure B.3.2 and for the purpose of this public consultation, existing operators are: Movilnet, Telcel, Digicel, Digitel and Infonet.

#### **B.3.4.3 Consultation**

*B.3.4.3.1 Will the Venezuelan mobile market sustain 4 national operators?*

*B.3.4.3.2 Is there room in the Venezuelan mobile market for new entrants? Will a new entrant stimulate greater competition?*

*B.3.4.3.3 Is it a more efficient use of spectrum to assign it nationally?*

*B.3.4.3.4 Should some of the licences be regional?*

*B.3.4.3.5 Should one licence be reserved for a new operator?*

*B.3.4.3.6 Should existing and new operators be treated equally with regards to the assignment of licence?*

Please detail, outlining the advantages and disadvantages of each proposal.

#### **B.3.5 Timing for the auction of 3G spectrum allocations**

In Europe a timetable was established by the European Commission for the allocation of IMT-2000 spectrum and the subsequent launch of 3G networks. Most member countries have been able to meet these requirements.

Outside Europe, the timing for the allocation of IMT-2000 spectrum is decided by individual countries and depends to a great extent on market conditions. For example, Japan has always been at the forefront of mobile telecommunications and has reached a significant level of penetration as well as gaining significant expertise in the area of mobile data communications. In addition, there have been some capacity issues with regard to spectrum constraints on 2G networks. A combination of these issues has led to proposed early launches of 3G.

On the other hand, 3G network rollout in Japan has been delayed and due to high levels of debt which some operators have incurred in Europe, network rollout there may also be delayed.

#### **B.3.5.1 Proposal**

In Venezuela, there are capacity problems on 2G networks and there is demand for a further allocation of mobile spectrum. Venezuela is at the forefront of mobile telecommunications in the Andean region and CONATEL aims to maintain this position. It therefore proposes the following timetable for the allocation of 3G spectrum:

- Start the preparations for the public offering in the last quarter of 2001
- Open the auction in the 1<sup>st</sup> quarter of 2002.



### **B.3.5.2 Consultation**

*B.3.5.2.1 Do you consider these timescales to be feasible?*

*B.3.5.2.2 Do you consider it to be the right moment to introduce 3G into the Venezuelan market?*

### **B.3.6 Network rollout obligations**

It is important to establish a series of network rollout obligations for 3G networks in order to achieve effective use of the spectrum and ensure fair competition. This prevents excess spectrum from being bought and hoarded. The most important requirement is that of population coverage where all 3G operators are obliged to provide a specific level of population coverage within a specified timeframe. However, to encourage the provision of innovative new services it may also be appropriate to specify a minimum data rate provision to differentiate the service from existing GSM and other 2G services.

#### **B.3.6.1 Consultation**

*B.3.6.1.1 What population and geographic requirements do you consider to be reasonable for 3G operators in Venezuela and within what timeframe?*

*B.3.6.1.2 What population and geographic requirements do you consider to be reasonable for the new GSM1800 network operator in Venezuela and within what timeframe?*

*B.3.6.1.3 Should a minimum data rate be specified for the 3G-coverage requirement and if so, do you have a view on what this should be?*

*B.3.6.1.4 What other requirements (if any) should be considered?*

### **B.3.7 Standards**

The ITU has approved 5 standards for the 3G-air interface. In Europe where the GSM standard is dominant most operators have so far opted for the W-CDMA air interface standard and maintain the advantage of a homogenous standard which facilitates national and international roaming. In the Americas and the Pacific Rim it is probable that a number of different upgrade paths will be adopted, including W-CDMA, EDGE and cdma2000, depending on individual operators' current technology platform.

#### **B.3.7.1 Standards in Venezuela**

There are three 2G mobile standards in operation in Venezuela, namely TDMA, CDMA and GSM. Movitel chose TDMA as its digital standard while Telcel opted for CDMA. Movitel and Telcel also both operate national first generation analogue networks using the AMPS standard (800 MHz). Regional licences have been awarded to three rural operators (Digitel, Digicel and Infonet), who are deploying GSM technology in the 900 MHz band. Roaming agreements have already been established between Digitel and Infonet. In this respect, the Venezuelan market mirrors the US market: multiple 2G standards and operators, in some cases, using the spectrum that was initially allocated for analogue services to deliver 2G services.

#### **B.3.7.2 Consultation**

*B.3.7.2.1 Should each individual operator choose the standard it will deploy for 3G or should CONATEL mandate a single 3G standard for the Venezuelan market?*

*B.3.7.2.2 Should the standard of at least one of the spectrum licences to be awarded be predetermined?*

*B.3.7.2.3 If CONATEL mandates a single 3G standard, what would be the implications for the existing operators given that there are multiple standards in play for 2G?*

*B.3.7.2.4 Should the standard(s) deployed be one of those approved by the ITU in order to ensure compatibility with 3G networks in the rest of the world?*

### **B.3.8 Roaming**

National roaming (between operators) has been mandated in most European countries in order to ensure fair competition for new entrants that do not operate a 2G network. This has been covered in the section on spectrum assignment. (2.0)

### B.3.8.1 Consultation

*B.3.8.1.1 If a new entrant is granted GSM1800 frequencies, are there any outstanding issues concerned with national roaming?*

*B.3.8.1.2 Are there any other requirements that CONATEL should make with regard to national roaming, for example in the case of a new operator with no GSM1800 spectrum.*

Operators generate significant revenues through the provision of international roaming services and this will continue to be an important revenue stream on 3G. Initially, the migration to 3G was considered to be an important step in reaching a single homogenous standard that would allow for roaming on a global level. However, the emergence of a number of different 3G standards means that operators are faced with the same interoperability constraints as they experience on 2G. It is not yet clear if and when roaming will become available across all 3G standards.

### B.3.8.2 Consultation

*B.3.8.2.1 How important is international roaming for 3G operators?*

*B.3.8.2.2 What are the main issues in your view with regards to international roaming on 3G networks?*

### B.3.9 Services

The recent surge in text messaging is encouraging for the mobile industry as it confirms to some extent that mobile telephony lends itself to messaging and should lead to the adoption of more sophisticated messaging services such as mobile email and unified messaging services.

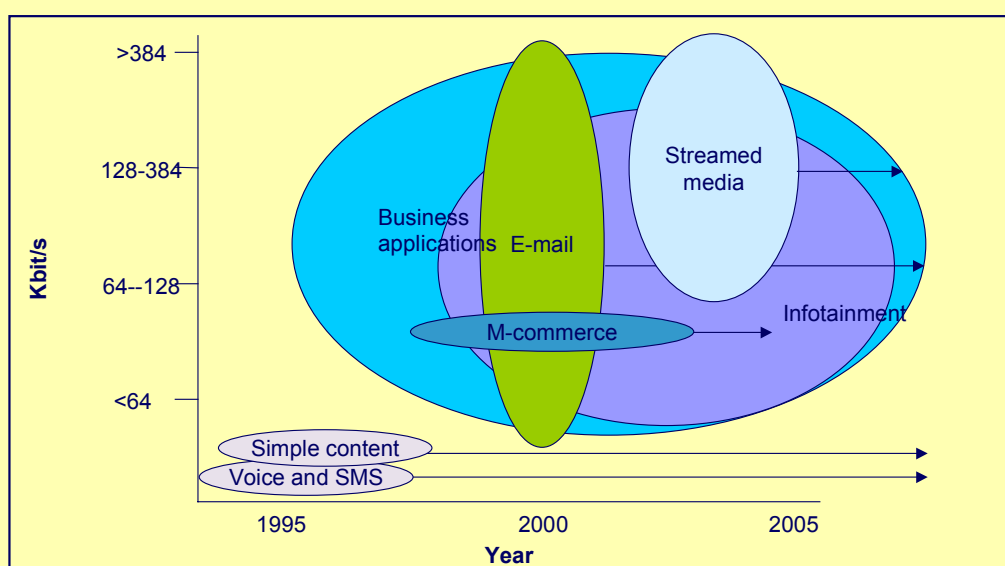
WAP initially suffered from a high level of industry hype and bad press but NTT DoCoMo's packet switched I-Mode service indicates that a sound, well-planned business model is key to ensuring user adoption. The wider rollout of packet-switched networks should also provide an enhanced user experience and help drive adoption.

However, there is still a great deal of uncertainty surrounding future uptake of high speed, bandwidth-hungry services. Demand is not proven and willingness to pay for the services is unknown.

On the other hand, fixed line services and fixed wireless services have advanced significantly with regard to bandwidth availability. Expectations of mobile telephony subscribers will be based more and more on fixed line capabilities and will demand the same class of services on their mobile terminals.

Figure B.3.3 shows the type of services that will become available and the corresponding data rate requirements.

**Figure B.3.3: 3G services and bandwidth requirements**



Source: Ovum

### **B.3.9.1 Consultation**

In order to facilitate CONATEL's plans for the introduction of 3G, the regulator requests that the industry provides responses where possible to the following questions.

- B.3.9.1.1 What services and applications guarantee success of 3G networks?*
- B.3.9.1.2 What level of asymmetry is likely for 3G traffic? Is there likely to be significantly more downstream (network to terminal) traffic than upstream (terminal to network)?*
- B.3.9.1.3 Who will be the users of 3G services?*
- B.3.9.1.4 Will 3G become a mass-market service and if so in what timeframe?*
- B.3.9.1.5 What conditions need to be in place to allow greatest possible access to 3G services in Venezuela?*
- B.3.9.1.6 What type of services will really distinguish 3G networks from the services that are offered on 2G networks?*
- B.3.9.1.7 What regulatory incentives could CONATEL provide to make offering new services on 3G networks more attractive.*
- B.3.9.1.8 Have you undertaken any market research to assess demand for these services? Are you willing to share any of the results with CONATEL?*

### **B.3.10 Numbering**

The Venezuelan numbering plan indicates mobile numbers by the leading digit 4, followed by 2 digits for each operator.

It is important for mobile subscribers to maintain the same number for both 2G and 3G services in order to benefit from a seamless service.

However the increased demand for 2G and 3G services may result in a shortage of numbers. The use of IP protocol for mobile networks may create a strong demand for additional IP addresses, also resulting in a shortage.

#### **B.3.10.1 Consultation**

- B.3.10.1.1 Under which circumstances should telephone numbers issued to customers in the GSM1800 and IMT2000 bands be in a different numbering range?*
- B.3.10.1.2 Are there other considerations to take into account for the Venezuelan numbering scheme?*
- B.3.10.1.3 What considerations should be made with regard to the evolution towards the IP protocol in mobile networks?*

### **B.3.11 Number portability**

Number portability – the ability for customers to keep their telephone numbers when they change operators – is due to be introduced in June 2003 for both mobile and fixed networks, according to the law established in Article 219 of the Telecommunications Law of Venezuela. CONATEL is developing a model for number portability and its respective regulation, in which the mechanism for implementation will be defined as well as the timetable for fixed and mobile services.

#### **B.3.11.1 Consultation**

- B.3.11.1.1 Are there any special requirements that should be taken into account for the implementation of number portability on 3G networks?*

### **B.3.12 Mobile Virtual Network Operators (MVNO)**

The emergence of a MVNO was pioneered by Sense Communications in Scandinavia (Sweden, Norway, Denmark). Sense attempted to negotiate access to airtime from the existing operators, which were reluctant to grant it – particularly because Sense insisted on using its own mobile network code and SIM cards. The company appealed to the national regulators but filed for bankruptcy before a decision was reached.

The lack of available radio spectrum for mobile services is one of the key factors that may limit competition in some markets. The concept of mobile virtual network operators offers the possibility of introducing new players that will stimulate innovative services, improved quality and price competition.

In markets where 3<sup>rd</sup> and 4<sup>th</sup> operators have struggled to gain market share, these operators are seriously considering the possibilities that a wholesale solution to provide airtime to MVNOs can offer. One2One in the UK has established a successful business model to provide MVNO services to Virgin Mobile, for example. More importantly, the extra capacity that has been and will be made available through the award of 3G spectrum has prompted some operators to investigate the MVNO business model.

However, in those markets where operators are struggling to provide high quality services at competitive prices due to a lack of spectrum capacity, operators are naturally reluctant to allow MVNOs access to a network that is already operating to full capacity. In the case of 3G spectrum, it is feared that incentives to invest may be diminished if operators are obliged to provide network access to MVNOs.

In Europe to date, regulators have conducted research into this area but have been reluctant to oblige operators to provide these services. Instead, in most cases, it will be decided by the market for commercial agreements to be negotiated between interested parties.

In Hong Kong, however, the regulator has stipulated that the operators awarded 3G licences must open up at least 30% of their 3G network capacity for use by non-affiliated companies to operate as MVNOs. This has been contested by some of the operators, which claim that a MVNO could potentially end up with more spectrum capacity than a national operator.

### **B.3.12.1 Consultation**

*B.3.12.1.1 Is it necessary to establish specific regulation with regard to the operation of MVNOs?*

*Please detail your arguments.*

### **B.3.13 Infrastructure**

The high licence fees that some operators have incurred through 3G spectrum auctions coupled with the high costs of 3G-network rollout are threatening to delay the original roll-out plans of many European operators. Add to this the global economic downturn and the uncertainty surrounding technology stocks and the reasons for allowing infrastructure (transmission sites and apparatus) sharing amongst operators become apparent.

The Commission of the European Communities issued a document in March 2001 which outlined the way forward for 3G operators and included its plans to launch a dialogue with the member states as well as with the mobile telecommunications sector. The dialogue would deal with the network infrastructure sharing issue that is mainly seen as a positive route to alleviating the financial burden on operators.

In addition to sharing of some of the physical 3G infrastructure, European operators are also discussing possibilities to share transmission masts and the base station sites. Environmental groups and the press have given considerable coverage recently to the environmental impact of the growing number of cell sites which is set to increase with the advent of 3G networks. In addition, the cost of negotiating contracts with land owners for cell sites is costly and time consuming and shared sites could represent a significant cost-saving.

Conversely, the antitrust chief for the European Union has argued that infrastructure sharing will need to be examined on a case by case basis. Competition could be limited by such agreements and this will depend on the number of operators in each market and the level of co-operation between the operators.

### **B.3.13.1 Consultation**

*B.3.13.1.1 Do you think that the sharing of infrastructure should be mandated, encouraged or prevented? What are the arguments for and against the sharing of infrastructure?*

*B.3.13.1.2 Do you believe that infrastructure sharing will limit competition in the Venezuelan market?*

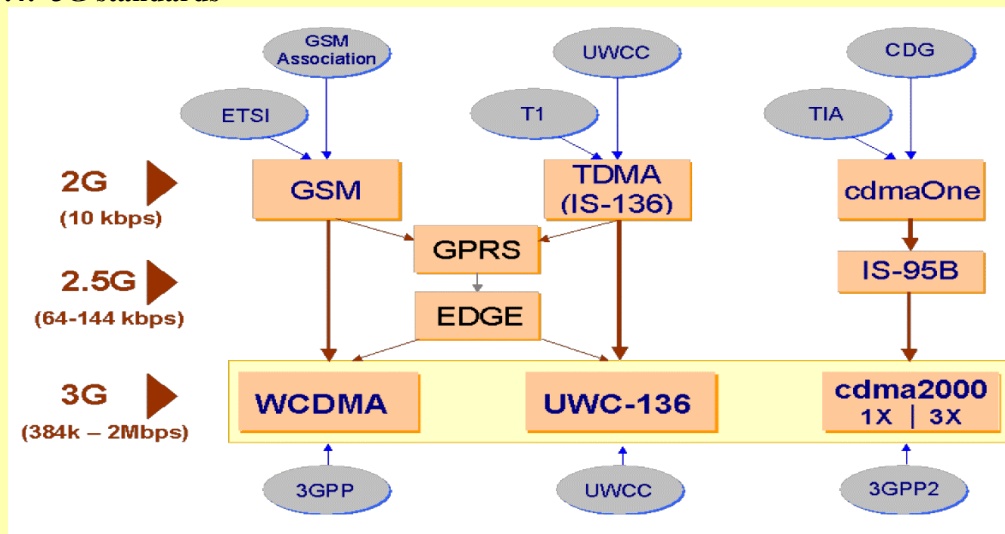
B.3.13.1.3 Do you think that there are further issues to consider, other than those established in Article 126 of the Telecommunications Law of Venezuela, which relate to the “Vias Generales de Telecommunication”<sup>105</sup> (rights of way)?

### B.3.14 Terminal availability

The availability of user-friendly, affordable terminals is paramount to the speed of adoption of new technologies. It is critical at this stage to gain a clear understanding of vendor plans with regards to multi-mode and multi-band handset supply for 3G services. Backwards compatibility with existing 2G and 2.5G networks is key to the success of 3G. The upgrade from GSM to UMTS and the availability of dual-mode handsets is confirmed as are the terminals for CDMA and CDMA 1X.

However, there is a great deal of uncertainty surrounding demand for the various multi-mode and multi-band possibilities. There are essentially three main “camps” as far as 3G standards are concerned. These are shown in Figure B.3.4.

Figure B.3.4: 3G standards



Source: ITU

#### B.3.14.1 Consultation

B.3.14.1.1 Will 3G terminals be available in time for 3G network launches?

B.3.14.1.2 What multi-mode and multi-band terminals will be required and when will these terminals become available?

B.3.14.1.3 What will be the 3G terminal requirements of the Venezuelan operators given that there are several 2G standards in play operating on two different spectrum bands, 800 MHz and 900 MHz?

B.3.14.1.4 Which services, voice, data, video etc, will be developed for 3G and within what timeframe will the terminals be available to support these services?

B.3.14.1.5 Are you aware that terminals to meet your own specific requirements will be available?

B.3.14.1.6 What conditions are necessary to encourage the installation of mobile terminal production facilities or other mobile equipment in Venezuela for use on 3G networks?

<sup>105</sup> In Article 126 of the law, “Vias Generales de telecomunicaciones” are the elements which allow one to install the necessary physical means to offer telecommunications services, conforming with the requirements in the respective regulation.

## ANNEX C

## Links to Related Websites

**C.1 Government Sites Chile**

Government at	<a href="http://www.gobiernodechile.cl">http://www.gobiernodechile.cl</a>
State at	<a href="http://www.estado.cl">http://www.estado.cl</a> (Spanish only)
Ministry of Public Works (service), Transport and Telecommunication at	<a href="http://www.mop.cl/">http://www.mop.cl/</a> (Spanish only)
Project of Reform and Modernization of the State at	<a href="http://www.modernizacion.cl/">http://www.modernizacion.cl/</a> (Spanish only)
Citizen Service Site at	<a href="http://www.tramitefacil.gob.cl">http://www.tramitefacil.gob.cl</a> (Spanish only)
Subsecretary of Telecommunications (Subtel) at	<a href="http://www.subtel.cl/">http://www.subtel.cl/</a> (Spanish only)

**C.2 Government Sites Venezuela**

Government at	<a href="http://www.gobiernoenlinea.ve">http://www.gobiernoenlinea.ve</a> (Spanish only)
Presidency at	<a href="http://www.venezuela.gov.ve/">http://www.venezuela.gov.ve/</a> (Spanish only)
Ministry of Science and Technology at	<a href="http://www.mct.gov.ve/">http://www.mct.gov.ve/</a> (Spanish only)
National Commission of Telecommunications (CONATEL) at	<a href="http://www.conatel.gov.ve/">http://www.conatel.gov.ve/</a> (Spanish only)

**C.3 Mobile Operators in Chile** (Spanish only)

Telefonica Movil at	<a href="http://www.tmovil.cl">http://www.tmovil.cl</a>
Bellsouth Chile	<a href="http://www.bellsouth.cl/">http://www.bellsouth.cl/</a>
SmartCom PCS at	<a href="http://www.smartcom.cl/">http://www.smartcom.cl/</a>
Entel PCS at	<a href="http://www.entelpcs.cl/">http://www.entelpcs.cl/</a>

**C.4 Mobile Operators in Venezuela** (Spanish only)

Movilnet at	<a href="http://www.movilnet.com.ve">http://www.movilnet.com.ve</a>
Telcel at	<a href="http://www.telcel.com.ve">http://www.telcel.com.ve</a>
Digicel at	<a href="http://www.digicel.com.ve">http://www.digicel.com.ve</a>
Digitel at	<a href="http://www.digitel.com.ve">http://www.digitel.com.ve</a>
Infonet at	<a href="http://www.infonet.com.ve">http://www.infonet.com.ve</a>

**C.5 Other relevant Websites**

Telcel.Net at	<a href="http://www.mipunto.com/telcelnet/">http://www.mipunto.com/telcelnet/</a> (Spanish only)
Tun-Tun Movilnet at	<a href="http://www.tun-tun.com">http://www.tun-tun.com</a> (Spanish only)
Ericsson at	<a href="http://www.ericsson.com">http://www.ericsson.com</a>
Lucent Technologies at	<a href="http://www.lucent.com">http://www.lucent.com</a>
Nokia at	<a href="http://www.nokia.com">http://www.nokia.com</a>
Alcatel at	<a href="http://www.alcatel.com">http://www.alcatel.com</a>
Nortel Networks at	<a href="http://www.nortelnetworks.com">http://www.nortelnetworks.com</a>
GSM Association at	<a href="http://www.gsmworld.com">http://www.gsmworld.com</a>
CDMA Group at	<a href="http://www.cdg.org">http://www.cdg.org</a>
Universal Wireless Communication Consortium at	<a href="http://www.uwcc.org">http://www.uwcc.org</a>
UMTS Forum at	<a href="http://www.umts-forum.org/">http://www.umts-forum.org/</a>
International Mobile Telecommunications (IMT) at	<a href="http://www.itu.int/home/imt.html">http://www.itu.int/home/imt.html</a>
UN Economic Commission for Latin America and the Caribbean (CEPAL) at	<a href="http://www.eclac.cl">http://www.eclac.cl</a>

**ANNEX D**

**Interviews, Chile- Venezuela**

**CHILE**

**Subsecretaria de Telecomunicaciones [SUBTEL]**

Rosella Cominetti, Head Economic Regulation Department

Claudio Pezoa, Head Engineering and Administration of the Radioelectric Spectrum Department

Juan Luis Pérez, Head Regulatory Affairs Division

Leonardo Mena Coronel, Head Internet Infrastructure Unit

**Ministry of Finance**

Jaime Gré, Head Information and Communication Technology Division

Christian Ocaña, Internet Projects Coordinator

**BellSouth**

Ricardo Muñoz, Manager Technical Division

**Entel PCS**

Alfonso Pino, Manager Technical Division

**Telefonica CTC**

Raymundo Beca Infante, VicePresident Strategic Planning and Regulation

**Telefonica Movil**

Héctor Jiménez, Manager Services and Technology Division

**SmartCom PCS**

Jaime Gross, General Manager

William Salamanca, Manager Technical Division

**Motorola**

Roberto Holtheuer, Manager Mobile Telephony 3G Development

**A TELMO (Asociation of Mobile Operators)**

Guillermo Pickering, President

Marcial Santelices, Advisor on Technology

**Cellstar**

Hugo Cortéz, Business Manager

**ChileWap**

Mario Toro Longueira, Manager Business Development

Cristian Muñoz Valdés, Manager Commercial Division

**FEDERACHI (Federation of Radio Amateurs)**

Fermín Sáenz de Tejada, President

**Lucent**

Claudio Monasterio, Sales Manager

**Nextel**

Eduardo González, VicePresident and General Manager

Guillermo Constanzo Gálvez, Manager Operations and Ingeenering

**VTR**

Blas Tomic, General Manager  
Matías Pizarro, Internet Manager

**Ericsson**

Karl Forsselius, 3G Manager  
Lylian Contreras, Manager Government Relations and Regulatory Affairs

**CEPAL (UN Economic Commission for Latin America and Caribbean)**

Michael Mortimore, Head Investment and Businesses Strategy Unit  
Alvaro Calderon, Researcher, Investment and Businesses Strategy Unit

**ACTI (Chilean Association of Information Technology Companies)**

Fernando Banaos, President

**National University of Chile**

Samuel Varas, Professor, Industrial Engineering Department



**VENEZUELA****CONATEL**

Mikhail Marsiglia, Spectrum Management Division  
José Vilera, Licensing and Service Management Division  
Jesús Rivera and Antonio Delgado, International Relations Division  
Yosmari García, Legal Division  
Julio Arias, Statistics Division

**Telecel**

Haydee Cisneros de Salas, VicePresident  
Carlos Sanoja, Manager Regulatory Affairs Division  
Carlos Urbina, VicePresident Engineering  
Carlos Borges, Coordinator Regulatory Affairs Division

**Movilnet**

Ignacio Angulo, Vice-President, Operations and Systems  
Carlos Lau, Manager Network Evolution  
Pedro Gutierrez, Manager New Projects  
Marianella Bonilla, Manager Business Development  
Carlos Montes, Vice-President of Business Development

**Digitel**

Edgar Millán, General Manager of Business Development  
Nicolás Solórzano, Vice-President of Operations  
Adela Vivas, Vice-President Regulatory Affairs

**Digicel**

Manuel Suená, General Manager  
Elvira Mezas, Interconnection Manager

**Infonet**

Horacio González, President  
Efren Velázquez, Manager  
Ivan Romero, Manager

**Ericsson**

Olle Ulvenholm, President  
Edgar Gómez, Manager Regulatory Affairs  
Guillermo Saavedra, Manager Mobil Telephony  
Abelardo Rodríguez, Manager Business Development

**Lucent**

Ilona Vega, Director Government Relations  
Raimundo Villar, Regional Manager Technology and Solutions

**Nokia**

Miguel Iglesias, Business Development Manager  
José Bazán, Product Marketing Manager  
Oswaldo Paz, Product Marketing Manager  
Pasi Ala-Mieto, System Marketing Manager

**Universidad Central de Venezuela**

Freddy Brito, Professor, Communications Department  
Francisco Valera, Professor, Communications Department  
Zeldivar Bruzual, Professor, Communications Department  
Bartolomé Cusati, Professor, Communications Department