



GOBIERNO DE CHILE
SUBSECRETARIA
DE TELECOMUNICACIONES

Undersecretary of Telecommunications

**Chile - A Unique Experience in Using IT
Technologies**

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INTRODUCTION

Chile, one of the longest and narrowest countries in the world is located along the western coast of South America's Southern Cone, between the highest peaks of the Andes Mountains and the Pacific Ocean. Chile's unique shape stretches 4,300 kilometers with an average width of a mere 180 km.

Area

Chile lies in an area of 756,096 sq km that increases by 1,250,000 sq km when including the Antarctic territory.

Population

According to the 2002 census there were 15,500,000 inhabitants in Chile. 7,447,695 males and 7,668,740 females.

Economy

The Chilean economy has gone through a sweeping transformation over the last quarter century. It has been mainly driven by the government's unwavering commitment to market liberalization, transparency, and fiscal accountability. Openness to trade and investment and institutional stability have further buttressed a widely lauded economic model. Economic efficiency remains top priority for the government. However, diligently work is being focused to improve the legal, health and education systems and to promote income equality and alleviate poverty. Perhaps most importantly, Chileans themselves have cemented this economic model through their overwhelming support, grounded firmly in a vastly improved standard of living.

Indicators given by the Finance Ministry's web page

- GDP growth (2005): 5.1%
- Income per capita 2005 (PPP): US\$ 7,089
- The annual average rate of unemployment in 2005 was 8%. The lowest since 1998

IT STATUS IN CHILE

Chile in the world

According to the 2005 - 2006 World Report on Informatization Technologies (by the World Economic Forum, WEF), Chile leads the region on public policy efforts to apply Technologies in order to promote the efficiency of its economy and improve the standard of living of its people. The report places Chile in the 29th spot in the scale of Aptitude for Connectivity, that is, 6 places above from last year's place and far beyond any of the other countries in the region (Brazil is the closest showing the 52nd spot).

The *Report* highlights three important advances showing how Internet has made possible the interaction between government, citizens and the private sector: **1. Internal Revenue Service** (Servicio de Impuestos Internos - www.sii.cl), **2. ChilePurchase** (ChileCompra - www.chilecompra.cl) and **3. Easy Procedure** (Tramite Facil - www.tramitefacil.cl). These systems have been positively praised by the international community. Chile Purchase is perhaps the most outstanding because it allows the government to make all public purchases. The system bases its operations on principles of transparency and efficiency. Currently, ChileCompra is the largest electronic market - B2B – in the country.

According to information published in the “ChileCompra” Web portal, the number of purchase orders issued during the month of May was 109,952. This increment of 20% from the month of April reflects the highest amount of orders registered to date. Furthermore, the total sum of orders accrued during the first 5 months of 2006 reached the 451,451 units, 58,5% more than all units registered for a similar period in 2005.

On the other hand, according to the 2005 ITU World Telecommunications Indicators, by December 2004 Chile took up the 17th place on fixed telephony penetration with 21.5 lines for each 100 inhabitants. This rate is surpassed by countries like Brazil, Argentina and Uruguay in the region. For the mobile telephony industry, Chile reaches the 11th place with 62.1 subscribers for each 100 inhabitants, surpassing countries like the United States, Canada, India, China and few other Latin countries of the sample. In the dispersion of Internet users, Chile reaches a penetration of 27.9 users for each 100 inhabitants. In regards to the other Latin countries of the sample, Chile is the country with the highest amount of Internet users achieving a difference of 7 points with the closet one, Uruguay. In spite of this, there is still a big gap with the more advanced countries; for the example, 7 points with Spain the country with the most similar to Chile - penetration rate

Infraestructure

To December 2005 there were 3.435.888 lines of fixed telephony distributed through 12 concessionaries (Telefónica CTC, CMET, Telsur, CRELL, Entelphone, Manquehue, Telcoy, GTD Telesat, VTR, IFX, RTC, CTR). There is only one Spanish company, Telefónica, having complete national coverage. Conversely, there were 10,569,572 mobile telephony services subscribers with 3 concessionaries, Movistar, Smartcom and ENTEL. The latest is the only company operating completely with GSM technology while the other two are in the process of migrating from CDMA and D-AMPS to GSM.

There are 30 Internet access providers offering service through dedicated lines, ADSL, Cable Modem and fixed wireless systems. According to a study carried by the International Data Corporation of Chile (IDC), by December 2005 there were 710,960 broadband Internet connections. This number translates into an increase of 42% in respect to December 2004. Further, by December 2006 Chile is expected to have a further increase of Internet use with a total of 800,000 connections. This may even reach the million marks before 2008.

The Undersecretary of Telecommunications released the 2,400 Ghz – 2,485 Ghz band to replace it for WiFi technology. Also, the 3,400 Ghz – 3,600 Ghz bands for the WiMax and Pre-WiMax. Currently there is a company with approved concessions to start offering the service. This company - Entel - with a well built WLL infrastructure is implementing a WiMax network in the country. This network will provide access to places where it would be unthought-of a few years ago. The project involves 14 cities from north to south with 22 base stations allowing access to wireless broad band up to 2mbps per user with a reach of 15 km around each station that could even be higher depending on the equipment used by the user. The project should be concluded during this year.

Chile leads the region on public policy efforts to apply Technologies in order to promote the efficiency of its economy and improve the standard of living of its people (29 / 115)

Three important advances showing how Internet has made possible the interaction between government, citizens and the private sector

1. www.sii.cl; 2. www.chilecompra.cl; 3. www.tramitefacil.cl

Fixed telephony penetration: 21.5 lines / 100 inhabitants

Mobile telephony penetration: 62.1 subscribers / 100 inhabitants

Internet users penetration: 27.9 users / 100 inhabitants

IT POLICIES AND PROBLEMS

Policies

Chile has its own Digital Agenda as a result of a teamwork initiated in April 2003 with the creation of the Group of Digital Action (Grupo de Acción Digital) headed by the Governmental Coordinator for Informatizational and Communications Technologies. This group includes members of governmental institutions, organizations representing the private sector and the educational sector among other government institutions. The result of this effort is an ample public and private agreement over a comprehensive strategy to be implemented by the year 2010, year of the 200th Chilean Independence Anniversary.

The initial Action Plan for the 2004 - 2006 periods contemplates 34 initiatives with the main objective of contributing to the development of Chile through the promotion and implementation of Technologies of Information and Communication (TIC) to increase competitiveness and equality of opportunities, individual freedoms, quality of life and the efficiency and transparency of the public sector. These initiatives will at the same time enrich the cultural identity of the Nation and its native peoples.

The Digital Agenda encompasses 6 strategic working areas: 1) Massive Access to Technology; 2) Education and Training; 3) E-government; 4) Digital development of the private sector 5) TIC Industry 6) Legal Framework.

The main objectives for these 6 areas are described below:

1. Massive Access to Technology:

By the year 2010 it is expected that Chile would have reached the same level in connectivity as the most advanced countries. This encompasses efforts to habilitate a solid and secure informational broad band infrastructure through the entire country, especially in the Austral zone (southernmost area) that would consolidate the technological convergence between voice, image and data. Massive access is sought to include broad band connection for all small and large companies as well as the public sector, including educational organizations. Likewise, 100% all small business and half of all Chilean homes should have Internet access within the next 4 years.

The telecommunications industry development and the multiple services operating on digital networks are understood as part of an integrated process oriented towards making a more efficient market. This market is composed on the one hand, by access infrastructure providers that offer their clients networks of cooper pair, coaxial cable, wireless, electrical installation and mobile networks. On the other hand, there are countless service providers for content applications like IP telephony, data, added value services and others. These service providers will have adequate market conditions like flat rates for Internet access, network desegregation, etc. Once these conditions are in place, providers will be able to access and utilize the telecommunications infrastructure to offer their services in a very competitive manner.

Initiatives

1. Consolidation of measure that will facilitate individual and community broadband access for all Chileans.
2. Promotion of the development of Infocenters as service centers.
3. 900,000 homes and 150,000 businesses connected to Internet by the year 2006.

2. Education and Training

Permanent education by using digital media constitutes one of the main focuses of public policy for the next few years. There are two main objectives to achieve by the year 2010:

First, globalization of basic digital learning for all Chileans while consolidating world class standardized advanced learning levels for high school students, professionals and technicians.

Second, spread the use of digital technologies to promote unique learning methodologies that would ensure high quality education and training promoting mainly e-learning as a massive tool for human resource and promotion in IT.

Initiatives

4. Digital literacy for half a million Chileans.
5. Launching of the certification of ICT skills.
6. Promotion of connected and equipped schools.
7. Integration of ICT into curricula.
8. Fostering of technical/professional ICT training.
9. Promotion of world-class content.
10. Command of Basic and instrumental English for all schools.

3. E-government

The main objective for the 2010 is to have an on line public sector serving its citizens with programs based on a digital superhighway with a platform that ensures full coordination among its services at every level in government. These services will be aimed at going beyond producing documents and procedures but to actively interacting with citizens and business in general. Particular attention is given to using digital technologies in Public Health and Regional and Municipal Governments.

Also, work is being done to settle and release technical norms that would allow efficiency and efficacy of electrical transmissions and the interoperation of various electronic documents. All this is supported by a security and confidentiality frame for all transmitted information.

Initiatives

11. Integrated platform of electronic services.
12. Broadband digital network for the public sector (Route 5D).
13. Electronic platform for Chile Solidario and social policies.
14. Development of digital technologies in the health sector.
15. Digital development of regional government and municipalities.
16. Increment in the metrics and efficiency of government IT spending.
17. Improvement of the security of essential information structures for the public sector.

4. Digital development for Businesses

The goal for the year 2010 is to have the totality of large and medium sized businesses and most small companies incorporate within their internal processes advanced use of digital technologies and Internet. This means that all larger companies would have access to a broad band of at least 2Mbps while smaller business will have incorporated Internet use. The next few years are crucial for the consolidation of a critical mass of productive processes - especially for exportation business - by the intensive application of e-commerce and the advanced use of ICT. Likewise, the private sector will be encouraged to have e-accounting processes and to be on line with the public sector by conducting most of its transactions through the web.

Initiatives

18. Widespread use of electronic invoicing.
19. Consolidation and expansion of the use of ChileCompra.
20. Simplification and online installation of business transactions.
21. Electronic billing for fees and online initiation of activities.
22. Development of means of payment for e-trade and consolidation of Payments Portal of the Government.
23. One Stop Shop and foreign trade marketplace.
24. Increased adaptation of Development Instruments.

5. Launch of the TIC Industry

There is a double purpose in this sector. In the first place is the consolidation of a world class critical mass of digital product and service providers around advanced technological applications for the vertical industrial sectors with competitive advantages. In the second place, the creation of a relevant nucleus of high technology foreign investment in the country around on line and off shore services. Hence, in order to provide support to the ICT sector, an innovative national system will be created to actively interact with business, universities and important investments efforts in research and development sectors.

Initiatives

25. Identification of opportunities and focusing of effort for the development of the ICT industry.
26. Quality assurance through company certification.
27. Intensification of the High - Tech Foreign Investment Attraction program.
28. Strengthen the promotion of ICT investigation and development (I+D).
29. Expediting of the ICT industry export process.
30. Financing for the creation and Start-ups.

6. Legal Framework

By the time of the Bicentennial, Chile will have completed a range of legal and institutional reforms that will ensure the deployment of an information society based on freedom, equity, and solidarity. Likewise, all barriers and obstacles to develop a digital economy will be overcome.

Initiatives

31. Elimination of obstacles and promotion for the of electronic documents and electronic signatures use.
32. Legal guidelines for a fast implementation of electronic invoicing.
33. E-trade consumer rights and obligation.
34. Updating of legislation for the protection of intellectual property.

The Undersecretary of Telecommunications has proposed an outstanding initiative in the Fund for Development of Telecommunications (FDT), promoting the enhancement of telecommunication services in rural areas and urban low income zones, especially in areas located in geographically extreme and isolated zones , for which it contemplates public biddings mechanism for giving out concessions and permits for telecommunication services as well as the corresponding subsidies. They all come from the Nation's annual budget and funds are delivered once projects are approved.

As a result, the FDT has subsidized the installation of rural public telephones, Telecenters, Internet access for rural schools and connectivity for isolated regions in the southern part of the country, as it is detailed in the following table.

Service	Objective	Years	Provided Subsidies (US\$)
Rural Public Telephony	Installing approx. 6,000 Rural Public Telephony throughout the Country	1995-2000	21,590,930 (*)
Telecenters	Installing 290 Telecenters throughout the Country	2002	5,430,669
Internet access for rural schools	Connecting 667 rural schools with broad band	2004	6,965,602
Connectivity for isolated regions (Palena Province)	Structural project to provide high-quality connectivity and broad band at reasonable costs to the Palena Province	2004	572,727
Total			34,559,928

(*)Valued at May 2006.

Problems

In a study published by PNUD in 2006, called “Human Development in Chile - The New Technologies: a Jump to the Future?”, the ICT s inside the Chilean economy were analyzed for the years 1999 - 2004 through a report issued by the Undersecretary of Economy. According to the study, the annual production of good and services related to ICT was \$ US 3,199 millions in 2004. This represents the 3.4% of the total national production. This was mostly composed by the telecommunication sector (61%) with ICT services representing 25% and ICT commerce 11%.

If the agricultural sector is excluded of the formula, it is possible to compare the Chilean situation with that of other countries. For example, Finland is the country where the ICT sector is the most important because ICT manufacturing provides 11% of the total GDP and ICT services 4,1%. The importance of the ICT sector in Chile is lower than in the developed countries especially in the TIC manufacturing, representing 0.1% of the non agricultural GDP.

Chile, like its neighbors, depends heavily on the rest of the world for ICT commerce. For example, considering the external commerce numbers shown on the *U.N. Commodity and Trade Statistics database (COMTRADE 2004)*, in the southern cone, excluding Brazil, Chile imports 99% of the all its data processing equipment and it exports only 1%. This contrasts with situations of countries like Brazil and Mexico exporting significantly more in the same sector (20% y 60% of their total commerce, respectively).

In Latin America, Mexico and Costa Rica outstand in the exportation of semiconductors, representing almost 30% of all Mexican and 20% of Costa Rican external commerce. Contrastingly, about 1% of external commerce of diode, transistors y semiconductors of the southern cone (including Brazil) is constituted by these exportations. These divergent numbers inside the region show that in spite of Latin America being generally dependent of the developed world for ICT, there are few countries that have notoriously advanced in the production of technologies.

The absence of ICT production in Chile also extends to the area of technological research and development. This problem is illustrated in an OCDE report over patent subscriptions that consider United States, Europe and Japan as the main large bases.

Chile ranks lower than Argentina, Mexico and Brazil on this issue. The report highlights Brazil’s recent emergence ranking 28th in the world with 0.09% of the total registered patents over the last decade. During the year 2001, there was a total of 112 patent request by residents of Brazil; 6 from

Mexico; 4 from Argentina; 8,198 from the United States; 6,490 from Japan; 4,320 from the EU and none from Chile. In fact, between 1977 and 2001 there were only 10 registered requests from Chile, 2 of which were from the TIC sector. It is very likely that this situation has been reverted due to recent opening of projects dedicated to promote innovation and creativity in various universities.

In spite of some efforts, UN data still shows Chile merely investing in ICT research and development by assigning only 0.5% of its GDP; this is a very low percentage when compared with other nations that invest up to 1.2% of their GDP.

Consequently, Chile has been a good student by incorporating technologies but still needs improvement in being an active part of its generation.

In spite of this, governmental policies are considering these shortcomings developing strategies to overcome them in the Digital Agenda.

Additionally, the current government has considered that technology and competitiveness are fundamental pillars for the growth of the country. The following proposals reflect this line of thought:

1. Incentive for the adoption of new technologies: In August of 2006 a law proposal that standardizes in 15% the tax to import of software, technological patents and technical advising will be sent to Congress.

2.Subsidy to private investment in I+D: In September of 2006 a law proposal that provides 35% of subsidies for I+D investment made by companies and universities with credited research centers will be sent to Congress.

3.Formalization of Innovation: In July of 2006 a Simple Urgency law proposal creating the Fund and the National Council of Innovation will be described.

Chile has its own Digital Agenda as a result of a teamwork initiated in April 2003

The Digital Agenda encompasses 5 strategic working areas: 1) Massive Access to Technology; 2) Education and Training; 3) E-government; 4) Digital development of the private sector 5) TIC Industry 6) Legal Framework

The initial Action Plan for the 2004 - 2006 periods contemplates 34 initiatives

The policies of the Digital Agenda include clear objectives to surpass 2 great problems: 1) Not enough resources allocated for Innovation and Development (I+D); 2) Low ICT manufacturing.

INTERNATIONAL COOPERATION IN THE ICT FIELD

There are various organizations in Chile responsible for generating international relationships on cooperation matters. The Undersecretary of Telecommunications has multiple agreements with diverse countries and there are also ongoing programs being supported by international cooperation.

World Bank

This UN specialized institution was created with the objective of decreasing poverty through low interest loans, no bank interest credits and economic support to all 184 UN members. Thanks to the sponsorship of the World Bank, the Undersecretary of Telecommunications developed the study “Bringing Broadband Internet to Chile’s rural areas” with the purpose of identifying business models that would improve the penetration of broadband access to isolated areas using FDT subsidies and other incentives in order to have a substantial positive effect on rural targeted populations. A developed business model was built on an analysis of Internet connectivity of rural areas in Chile, previous experiences using FDT subsidies, new BB technologies, Internet signal transport technologies and the search of best practices used worldwide in regards to politics to encourage broad band usage.

According to the results, the conditions by which the broad band service provision business could be positive indicate that with a subsidy of US \$15 million an operator would be in full competence to offer the BB service to close to 1,000 rural communities; with a ROI of 12% in a 6.6 year recuperation of investment period. This is understood to be an excessive time for the telecommunication sector. However, due to the subsidy guaranteed income and the relatively certain demand of some government agents like rural schools, the risk is limited when compared it to other investments in the same area. In this manner, in a period of 10 years, operators would have invested US \$39 million y connected about 24 thousand rural client to BB technology

Additionally, one of the programs managed by the World Bank is the Information for Development Program (InfoDev), created in 1995 with the purpose of aiding countries with developing economies to obtain all benefits of modern informational systems.

The Undersecretary of Telecommunications has developed the following case studies in conjunction with the InfoDev through the Fund for Developing Technologies (FDT).

- a) Systematization of information for the process of implementing Community Telecenters in Chile.

The research exposed in a systematic manner the course of one of the most important public programs oriented towards fostering the growth and social coverage of TICs. This is the National Program of Community Telecenters and is managed by the SUBTEL trough the FDT. In the same way, the study showed other models of public access in the country including those not operating under the FDT subsidies (Infocenters).

The study was focused in both achieving the systematization of the entire process of implementing Community Telecenters (TLCC) and analyzing and documenting this initiative for public access to ICTs. To do so, a methodological design was ideated entailing the revision of secondary sources and the application of a mixed quantitative and qualitative research techniques. SUBTEL key players and functionaries of other programs for public access where interviewed as well as 12 operators for Telecenters from 6 different regions. Additionally, there were 14 studies of this topic and an online interview to TLCC and Infocenters operators and users. In all, a diverse access models under which Infocenters operate were considered, together with the participation of 206 operators participated and 457 users from all regions in the country.

The analysis of generated information through scrutiny matrix, software of statistical analysis and SWOT methodology allowed for the establishment of important conclusions oriented towards the detection of good practices and learned lessons that would ultimately improve the control management, fiscalization and coordination function of SUBTEL for the National Network of Infocenters.

- b) Designing of a monitoring mechanism for the National Infocenters Network that group close to 800 Internet access points.

Conversely, there have been other government institutions developing Internet access centers; not with the same service standards like the Telecenters subsidies by the FDT, but always sharing the same objective of providing TIC access to the different communities. Hence, in order to manage all institutions supporting this project the National Coordination of Infocenters (CONI) has been created. This organization is supported by the Presidential Instructive that sets objectives and operating guidelines to oversee the evolution of the network.

In fact, is due to one of these requirements that the monitoring mechanism for the National Infocenters Network was instituted. The Presidential Mandate helps define a set of critical elements to be examined and build on them the creation of indicators to measure its compliance in four key management areas: finance area, customer satisfaction, internal processes, and innovation and learning. Besides, sources of information and data collection mechanisms were also identified as useful data and tools to set and measure indicators.

All described works were finished in 2004 and published in the web page of the Undersecretary of Telecommunications, (www.subtel.cl), Sociedad de la Información / Documentación / Estudios link.

United States Agency for Trade and Development - USTDA

The USTDA provides economic support for planning infrastructure development projects in Latin America and other regions in the world. The USTDA works together with the US Commerce Department, the US Importation and Exportation Bank (Ex-Im Bank), the Office for private Investment in Commerce (OPIC) and other government agencies. The cooperation comes as monetary grants and the provision of feasibility infrastructure studies in transport, energy telecommunication, mining development, health protection areas. Many of these studies have been crucial in determining the technical, financial and economic viability of projects.

Currently, the Chilean government has an agreement with the USTDA for contributions for up to US\$250.000 channeled through the Undersecretary of Telecommunications. This fund is intended to finance the cost of good and services needed for the feasibility study of rural connectivity.

The study has been designed to follow the following stages:

1. Demand study

The objective of this need-targeting study is to determine the demand added by access to Internet and to PCs in a rank of prices and on given time. (ie. expected increase in market penetration). The study will have two components: study of the residential demand and study of nonresidential demand (schools, Internet coffees, facilities of government).

2. Seminars for potential operators, subscribers, equipment providers, monitoring personnel, international organizations and advisors.

The objective of this seminary is to collect comments and observations of potentially involved parties or those who will have an informed opinion about some of the aspects of the project. The collected information will sharpen technical, operative and commercial assumptions that will be

use as basis for the design of the project, particularly, the business model developed in the pre-feasibility study “Bringing Broadband Internet to Chile’s rural areas”. Although the objective key group of attendants is active operators in Chile, efforts should be made to encourage participation of all interested parties and above mentioned groups.

3. Project design, capital investment resulting from operation costs.

The objective of this task will be to develop more accurately the estimation of the networks design and the resulting capital expenses as well as the operation costs. The data base that has been made available by the Undersecretary of Telecommunications will be reviewed in order to elaborate a list of the locations of all potential localities (1000) and subscribers (including nonresidential) that are expected to receive Internet access. An approximate design of network of concessions will be generated, including transmission and distribution of hardware.

4. Evaluation of VoIP as a source of income and additional benefits for concession operators.

Using information collected during the study a set of steps will be taken as follows: a) to recommend the most appropriate technology to allow VoIP service to be annexed to rural networks, in the terms in which one hopes that these are configured and equipped as resulting from the implementation of the Project; b) to consider capital and operation costs for providing VoIP service; c) to estimate final tariffs by which the VoIP service could be provided and to compare these tariffs with those current ones provided by the telecommunications mobile operators in rural areas of Chile; d) to consider the participation of resulting market for the demand of VoIP services; e) to find, identify and comment any potential legal, regulatory and/or commercial barriers (ie. the competitive reaction of the existing mobile service providers) to this introduction of VoIP service.

5. Validate the logic and assumptions used in the business model of “Bringing Broadband Internet to Chile’s Rural Areas”

A review of the study from the viewpoint of its businesses logic and their mathematical foundation will be conducted in order to comment on the degree of reasonability of the commercial assumptions sustained, especially the return on investment (ROI) pursued.

6. Calculate new estimated values for the amount of subsidies to be requested by participants.

Calculate new estimated values for the amount of subsidies to be requested by participants by using the business model of the study, with the possible changes derived from tasks 1, 3 and 4, and applying new resulting values of demand of task 1, calculate new values of subsidy for each concession.

The company that is going to make the study has already been selected. However, USTDA’s approval is expected to provide notice and begin tasks.

Subtel Technology Transfer Laboratory - UIT Chilean Chapter for the Center for Excellency

The Telecommunication International Union (UIT) is the oldest and perhaps most specialized entity of the UN that works together with governments and the private sector to plan and coordinate worldwide telecommunications networks and services for everyone. Its main objective is to maintain and expand cooperation activities in telecommunications worldwide providing technical and policy assistance to developing countries in concordance with actions undertaken by member states.

The Center for Excellency (CdE) is in reality a UIT program created to smooth the transition for the constant changes in telecommunications. For example, the CdE provides support for the use of new technologies and design of new services, convergent technologies, competition, separation of regulation and operational functions for the provision of services, etc. The CdE is formed as a network scheme by which each participant entity constitutes a unique chapter. There are 5 CdE worldwide and 14 chapters in the Americas like in Argentina, Colombia, Peru, Costa Rica and Chile among others.

The International Telecommunications Union (UIT) and the Undersecretary of Telecommunications (SUBTEL) signed a participation agreement in the Network for Excellency in the Americas towards the end of 2003, creating the Chilean chapter in the SUBTEL Technology Transfer Laboratory. Through this chapter, Chile offers telecommunication training programs related to regulation, strategic management and business, radio electronic spectrum and new technologies. At the same time, the Informatics Platform for distance learning is being applied by combining distance with on site training and web conferencing or any new available technology. Its main working factors are simplicity and economy because users require only one computer with Internet access and search engine.

There are various organizations in Chile responsible for generating international relationships on cooperation matters. The Undersecretary of Telecommunications has multiple agreements with diverse countries and there are also ongoing programs being supported by international cooperation:

World Bank, Infodev, United States Agency for Trade and Development and UIT

INTERNATIONAL COOPERATION AND RELATIONSHIP WITH SOUTH KOREA

Chile - Korea ICT Cooperation Center, ITCC

There is a TIC Cooperation Center between Chile and Korea. This Center is supported with a million dollars grant provided by the Korean government. Conversely, the University of Chile (Universidad de Chile) supports the Center with a similar amount in funding including training and infrastructure.

The Korean Cooperation Program is scheduled to end this coming September 2006, with high possibilities of extending its work to the future.

The objectives of the cooperation center are:

- To establish a Cooperation Base Center to reciprocally exchange information, knowledge and technological experiences to build an informative society like e-Government, e-Economy, among others.
- To develop group businesses to increase international competitiveness by means of integrating the IT in the Government, Industry, Education, Medicine and Sciences.
- To continuously expand a Base Center of Cooperation in the informative industry offering standardization of technology, advising and educational information.
- To improve the IT industry with the increment of exchange and reciprocal investment in the IT area, especially between Latin America, the Caribbean Asian countries.

The principal activities of the cooperation center are:

- To expand exchange of IT businesses.
- Research and develop joint projects in the IT area of and standardize them.
- Support e-Government technology and share information.
- Support technology for the digital development of the companies in order to strengthen industrial competitiveness.
- Consultancy and education.

To date, the Chile - Korea ICT Cooperation Center, ITCC (www.itcc.cl), have worked in seven research projects: E-Learning, RFID, Web Search (Chilean - Korean searcher), Grid Computing, Open Source for Small and Medium Sized Business, E-government and Digital Home.

E-Learning

The project has two objectives: to generate an administration content software for courses and to generate a course for massive use, through Chilean libraries.

This project combines efforts towards supporting e-learning by developing teaching material and tools. Along these lines, over the last 5 years, a group of researchers has been developing and improving the Courseware-CBCD methodology.

CDS (Courseware Development System) uses reusable learning material from repositories to build multimedia courseware. It is based on the Component-Based Courseware Development (CBCD). CBCD is a methodology considering the instructors and assistants as the people in charge of the development process. CBCD has been tested in three different universities in Latin America, the obtained results are encouraging.

- Executable file (on Java Virtual Machine): Function currently disabled
- Source code (Java class files and XML files): Function currently disabled
- Demonstration video: Function currently disabled

This strategy will help the courseware developments be more predictable and will improve the quality of E-Learning process. The use and impact of the new courseware will be compared with those obtained in the E-Lane effort.

Among the results is the generation of software and its application through courses that are being implemented in their pilot phases with testing real users. Also, there is the idea to incorporate sensors, to fortify the courses through remote laboratories (remote instruments).

RFID

This pilot project has been designed to implement RFID labeling on all most used book in the Main Library (~20,000). This requires a fixed type RFID reader for every borrowed book that will be installed in the entrance door for segmenting books and a sensible held RFID for the managing of books.

The pilot installation of RFID technology will be conducted in most libraries of the Science Physics and Mathematics (Universidad de Chile) that have more than 40,000 books, journals, CDs and tapes.. The faculty has another 8 departmental libraries with about 40,000 supplementary books and journals that will be managed by a centralized informatics system. In a second stage, the program will be extended to include more readers, labels and additional university libraries.

The equipment for the Faculty library has just arrived to customs. Hence, there are no results to date.

Digital Home

The objective is to have a showroom with appliances connected between each other and capable of interacting with the environment and sharing information through a network of distinct communication protocols. Part of the initial objective is to understand the different technologies to be applied and developed for automatization, security and energy saving projects.

Currently, a showroom with Korean technology is operative with plugs, hourglasses, doors, gas keys and alarm sensors, all controlled by computer used wireless networks.

Bilingual E-Government Web Search Engine

This project aims at developing linguistic technologies to generate an Korean – Spanish Web search engine that would allow for a bilingual search and response. A search engine prototype is being developed. Hence, it is expected that the Free Trade Agreement with Korea will encourage Chileans and Koreans to search for commercial, touristy and cultural information about each other.

The prototype web search is operative in both languages and a demo can be seen in <http://quintay.dcc.uchile.cl/korea>.

Grid

This project seeks to develop improvements to the communication traffic of the cellular telephony network. A software is being developed that would allow for the organization, administration and decision making on the AOP (Aspect-Oriented Programming) communication paths based or developed in JAVA.

“Grid Computing” represents an attempt to make computation massively parallel on thousand of computers connected to Internet in replacement of the most expensive super-computers from previous years. AOP is an approach of high level programming for complex systems. The project explores the application of a mixture of both technologies.

An experimental operative platform exists to date, however, it must be validated with greater challenges.

Open Source (Sme's)

This project was financed in order to generate a client management platform (business model oriented towards breaking barriers that prevent small business from adopting new technologies) through an open software generated by “Humano2” (interesting company because its General Manager is the ex- general manager of Microsoft Chile).

The result was an operational platform, however it didn't have the expected impact. That is why work has not been continued with that line.

Korean Programs

It is important to highlight that Chile actively participates in the exchange of knowledge by taking advantage of the learning opportunities provided by Korea and also locally hosting volunteer students for the IT field such as the programs organized by KADO, (a specialized government subsidiary that provides comprehensive support for narrowing domestic and international digital divide).

Another important contribution is the IT Technology Program (ITTP - ittp.icu.ac.kr), sponsored by the Korean government that offers a customized master's and doctoral degree program for government officials, employees of public institutions or senior-level researchers at national research centers working in the IT fields of foreign countries. All the students receive scholarships, up to 2 years for master degree students and 3 years for doctoral degree students.

There is a TIC Cooperation Center between Chile and Korea, with seven ongoing research projects using state of the art technologies

E-Learning, RFID, Web Search (Chilean – Korean searcher), Grid Computing, Open Source for Small and Medium Sized Business, E-government and Digital Home.

CHILEAN EXPERIENCE OF KOREAN POLICIES OR PRODUCTS

Unlike Korea, Chile does not have a clearly promoted strategy such as the IT839. However, work is being done in the areas of Service, Infrastructure and Growing IT Engines. Likewise, advances are being done in the service areas such as RFID, IP telephony and wireless Internet use.

The Chilean government is pursuing continuous efforts to modernize the public service sector and improve its infrastructure. By following on the Korean experience, it has worked for the creation of a Connectivity Network for Communications (Government Intranet). The main objective is to create a base for the exchange of diverse types of information that would allow related organizations to share data bases and therefore, every public institution to offer citizens multiple services with the new informational technologies with the BB and a scheme of high availability.

The Chilean government plans to build, in conjunction with the private sector support (private networks), a data network that runs the country from north to south, similar to the one done in Korea. This network would run parallel to the main highway (Route 5), is for this reason that the route of data has been called Digital Route 5 or “Route 5D”. This network will provide services to the health sector requirements..

In the area of Growing Engines, the Chilean government has increased its subsidies to research and development. Here, international cooperation is crucial for the transfer of knowledge and the design and implementation of technological projects. This is why Chile has a strong policy in searching for international liaisons, this is evident in the free trade agreements it has with various countries.

The increase of wireless technology allows other countries, such as Korea, to become main providers of products, transfer of knowledge and technology. Further, Chile is an open market with increasing purchasing power for the IT sector. For example, the Undersecretary of Telecommunications has freed frequency space for the implementation of WiFi and WiMax among others.

The Chilean government pursuing continuous efforts to modernize the public service sector

Chilean government has increased its subsidies to research and development

The increase of wireless technology in makes it for developed countries such as Korea be main providers for products, transfer of knowledge and technology

CONCLUSIONS

Chile shows the most advanced telecommunications infrastructure in Latin America. This is explained in part due to its incomparable economic and political stability presenting the highest rate of personal computers and Internet dispersion in the region.

There are numerous precedents that show ICT as a relevant factor for the productive development of some nations. For this reason, the Chilean government is continuously working on policies that would allow for the increment of investment in research and development (R&D). The application of R&D subsidies for research centers, universities and business is a tangible example of these efforts that puts Chile ahead of its neighbor counterparts.

Governmental policies in conjunction with international cooperation efforts for the developing of a Digital Agenda is harvesting good initial on its 6 strategic areas explained below. These are the results delivered by the Digital Action Group in December of 2005

1. **Massive Access to Technology:** 667 rural schools were benefited by the completion of Internet access and through the Palena Project connecting the southernmost part of Chile with the rest of the country. To date, there are 1.953 rural schools connected sites with broad band Access - Infocenters have spread and promoted electronic services like digital alphabetization, income tax filing, municipal proceedings, mediation in health (public health plans for complaints), among others - The National Coordination of Infocenters reported that 93% of communities have Infocenters with 4,953 available PC and 94% of them connected to Internet and offering 117,312 monthly operational hours of operation; 31% of them used in training - There is a total of 980 Infocenters tutors at national level.
Other similar projects must be developed to narrow the digital divide.
2. **Education and Training:** by the end of 2005 a total of 674,000 people were info-alphabetized and there were about 107,000 computers in schools, showing a ratio of 31 students / computer. - The certification "International Computing Driving License (ICDL)" was made in 50 schools with 2000 students and 100 teachers. The second stage will take place this year and it estimates a total of 1200 participating schools. 60 samples of educative computerization, presenting 2150 experiences have already been made.
Organized transfer of knowledge of countries like Korea is crucial in this area.
3. **Government on line:** The global goal of 300 transactions was surpassed, reaching the 350 mark. Also, a web based guide on how to conduct more than 100 different requests and transactions with local municipalities has been launched. Additionally, connectivity process for the "Route 5D Health" (broad band and services) has been initiated and it is expected to reach completion by the second semester of 2006. - The conceptual design and basic legal aspects for the operation of a pilot platform oriented to the interoperability of 5 public institutions for the accomplishment of proceedings of electronic services has already been defined.
Chile has to learn about successful e-government experiences like the Korean Postal System to continue its own progress.
4. **Digital Development of the Private Sector:** In September 2005, the internal tax service launched its application for Electronic Billing: - 337.780 tax payers issued personal invoices by Internet; - the ChilePurchase (main government purchasing portal) site was expanded and consolidated reaching 164,022 merchants and 890 varied governmental institutions. The allocated amount in 2005 was USD 2,876 million (annual growth of 52%) with 917 purchases orders issued. 13 new on line proceedings were implemented reaching a total of 60 proceedings available to the public in electronic form. 80 proceedings are expected to be completed by the end of the year.

There is an urgent need to demonstrate small and medium sized business the economic benefits of applying digital technology to their operations. Developed countries in this area are a good showroom for these benefits.

5. **Launch of the ICT Industry:** currently, there are 33 ISO or CMM certified businesses and another 22 business in the process of certification; monies and funds have been identified for the Innovative and Competitiveness Fund in order to strengthen the TIC promotion of research and development (I+D) in the country.

It is crucial that Chile receives economic support and transfer of knowledge to continue developing technology to the point of being in capacity to act as model for other countries in the region.

6. **Legal Framework**

During 2004 a piece of legislation was passed to give validity to e-Invoicing providing incentives to the e-factoring business. - Consumer Legislation was updated to enhance trust on e-commerce transactions. - An Industrial Property Law has been passed. - An initiative associated to intellectual property is being discussed in parliament.