

*Research and policy to promote inclusion of the poor in the information society in Latin America*





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## Introduction

Over recent years, the introduction of low-cost technologies, regulatory reforms and new business models have made information and communications technologies (ICTs) more affordable in the Latin American region. The greater availability of ICTs, in turn, has meant greater opportunities for the inclusion of lower-income sectors in new productive processes.

Mobile telephony, for example, has been adopted by poor sectors of the population who have developed various strategies to minimize their ICT expenditure and maximize the benefits of the use of this technology in their daily lives.

However, as is well known, the unequal adoption of ICTs can widen the existing social and economic divides in the region, resulting in greater inequality, social discontent and the loss of development opportunities. In a new ICT environment – marked by technological convergence, new applications and services, and growing market control by a handful of large companies – policy makers and regulators must find new solutions to prevent the economic and social consequences of unequal development of telecommunications services.

Since its founding, the Regional Dialogue on the Information Society (DIRSI) has focused on studying

the gaps between those who have access to networks and effectively use ICTs, and those who remain excluded from the benefits of these technological advances.

DIRSI has supported the creation and dissemination of knowledge that promotes the expansion of ICT markets, which in turn fosters more equitable distribution of the benefits of ICT roll-out, in order to confront the main challenges for the region's development.

DIRSI's primary mission has been to support the design and implementation of regulatory and public policies with high-quality research and evidence to back decision-making processes.

In addition, through the organization of seminars and specialized training workshops, it has contributed to building human capital in the academic sphere, government, private sector and civil society in general.

The results achieved in this process have helped to reinforce the idea of stronger links between research and decision-making in the region, thus making a substantial contribution to development through academic work.



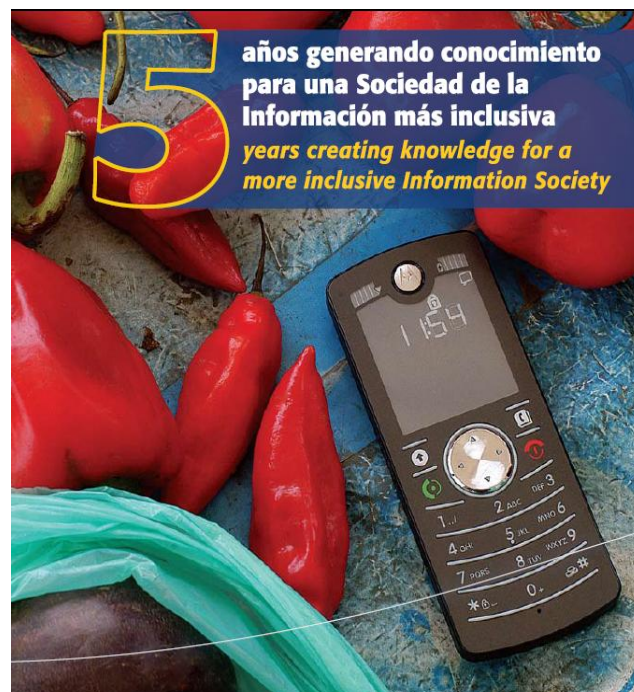
This report summarizes the activities undertaken and results achieved by DIRSI during its second cycle of research, which ended in July 2011.

This research cycle was aimed at a better understanding of the challenges and opportunities arising from the evolution of the ICT environment; the identification of pro-poor ICT-based services; and the effective communication of research findings to promote the effective incorporation of the recommendations and lessons learned in national and regional policy-making processes.

The second research cycle was organized around three main themes (Bandwidth for All, Mobile Opportunities and New ICT Indexes) and complemented by two key instruments for fostering the production of evidence to back policy making and capacity building for the creation of new knowledge. The first instrument is the Support Mechanism for Telecommunications Regulation in Latin America (known by its Spanish acronym, MARTA), designed to facilitate regulatory decision-making through short research reports on specific issues on the regulatory agenda.

The second instrument is the Amy Mahan Young Researcher Fellowships program, along with grants for participation in the workshops held prior to the ACORN-REDECOM Conferences, which have enabled the involvement of researchers in both networks.

This research cycle included a major focus on the areas of communication and impact. This report is structured in a way that makes it possible to observe the relationships between the policy context, the research, and links with policy-makers as key elements in the communication and impact process.



During the current research cycle, DIRSI marked its fifth anniversary as a research network.



## Regional context

One of the objectives established for DIRSI's second phase of research was the close observation of the current institutional environment, in order to increase the impact of its findings on public policy making in the region. For this purpose, the network was organized into three sub-regions so as to focus efforts through the expert observation of local processes.

Here we present an overview of the sub-regional contexts as described by the respective sub-regional project leaders.

### *Mexico and Central America*

The most important general facts and trends in terms of access to and use of new ICTs in the sub-region of Mexico and Central America during the 2009-2011 period are the following:

*Unequal growth in mobile telephony penetration.* While the last decade has been marked by strong growth in mobile telephony penetration in the sub-region, leading to an average penetration rate of 110 mobile lines per 100 inhabitants, this trend has not been consistent across all of the sub-region's countries. While four now have penetration levels

higher than 100% (El Salvador, 124%; Guatemala, 125%; Honduras, 125%; Panama, 184%), the other countries have much lower rates (Mexico, 80%; Nicaragua, 65%; Costa Rica, 65%). What is particularly striking is that Mexico, the largest economy in the sub-region, is not among the top-ranked countries in terms of mobile penetration.

*Low affordability of mobile telephony services.* Although mobile telephony tariffs in the sub-region decreased during the 2009-2011 period, they remain among the highest in the world. The mobile sector in the sub-region is characterized by a high level of market concentration: in one country there is a state monopoly on mobile telephone service; in four there are duopolies in which the main operator has a market share of over 60%; and in only two countries are there three operators with a more or less equal share of the market. Moreover, the limited competition in these markets is combined with serious institutional weaknesses which hinder the promotion of policies to foster greater competition. In this context, high tariffs act as a barrier to those who do not yet have mobile service, while discouraging use among those who are already users.

*Sub-regional inequality in broadband access.* Unlike other regions in the world, Mexico and Central America have not experienced explosive growth in broadband access. The sub-region has one of the lowest rates of broadband penetration in the world.



In fact, during the period covered by this report, the penetration rate in some of its countries was less than 1%. The broadband penetration rate in Mexico, however, is among the highest not only in the sub-region but also in Latin America as a whole, although it still falls far short of average levels in the developed countries.

*Emerging importance of mobile broadband.* Within a general context of high mobile telephony penetration, mobile broadband has emerged as a significant potential option for internet access. In some countries of the sub-region, such as Nicaragua, Guatemala and El Salvador, the number of mobile broadband connections has already surpassed fixed connections. As a result, this technology is now viewed as an important means of bridging gaps in access – not only the gaps within countries, but also the gap between these countries and other regions.

*Stagnation and even decline in fixed telephony.* In line with the worldwide trend, fixed-line telephony penetration rates have not only failed to grow in all countries of the region, but have actually decreased in five of them.

Meanwhile, the most pertinent developments with regard to policies on telecommunications and ICT access in general are the following:

*Competition policies.* The telecommunications market structure in the countries that make up the sub-

region continues to reflect a high degree of market concentration in all services. Consequently, one of the key concerns on the agenda of governments and regulatory agencies in these countries is the creation of more competitive markets. As a result, many telecommunications policies and government actions in the sector are aimed at increasing the level of competition by overcoming obstacles in areas like interconnection charges.

*Universal access.* Generally speaking, access does not figure as a key issue in the sub-region's policies. In the best of cases, the countries that have established universal access funds have implemented them, but without very effective results. In the specific case of promoting broadband access and use, while some countries of the sub-region have included this theme as part of a wider government program or digital agenda, none has adopted a specific plan for the development of broadband. In fact, in countries like El Salvador and Honduras, the issue of broadband is not given any priority on the public policy agenda, and is not even being discussed.



## *Andean Region*

Over recent years (2009-2011), the countries of the Andean sub-region have experienced significant increases in penetration levels of ICT services (mobile telephony, fixed-line telephony, pay TV and internet). These increases have varied across different countries, which reflects the considerable heterogeneity of ICT sector development in the sub-region.

*Heterogeneity in mobile telephony penetration.* In 2010, Ecuador recorded the highest rate of mobile penetration in the sub-region, at 102%. As a result, Ecuador and Peru (100%) are the only countries in the sub-region with penetration rates higher than the Latin American average (98%). Bolivia has the lowest rate of penetration, at only 72.3%. For its part, Colombia stands at 94%.

*Heterogeneity and decrease in rate of growth of mobile penetration.* Rates of growth in mobile penetration were also found to be highly uneven across the sub-region. During the 2009-2010 period, the highest rate of growth was observed in Peru (17%), while the rate in Colombia was a mere 1.5%. Bolivia and Ecuador, for their part, recorded mobile density growth rates of 10% and 9%, respectively.

*No apparent relation between expansion of mobile service and lower service costs.* In 2009, it was estimated that the cost of a low-volume basket of

mobile services was highest in Peru, at USD 35.60, and lowest in Colombia, at USD 15.90 (almost USD 20 cheaper). This is noteworthy, given the difference in penetration levels seen above.<sup>1</sup>

*Significant increase in internet user density.* In 2010, Bolivia was once again the country with the lowest internet user density in the sub-region, with only 20%, which is seven percentage points below the Latin American average and almost 17 points below Colombia (the country with the highest internet penetration in the sub-region, with a user density of 36.5%). It should be noted, however, that Bolivia experienced the highest rate of growth in density in the sub-region, at 39%, followed by Colombia, with 21%. Internet user density in Peru and Ecuador was 34% and 24%, in that order, and growth rates in density were much more modest, at 9% and 8%, respectively.

*Broadband prices lower in countries with higher internet user density but high in comparison with the rest of Latin America and OECD countries.* Bolivia was found to have the highest broadband prices in the sub-region,<sup>2</sup> over USD 250 monthly, as compared to around USD 50 in Colombia. Broadband service in

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<sup>1</sup> All prices shown were calculated using purchasing power parity exchange rates.

<sup>2</sup> Only low-speed broadband plans were compared.





Ecuador and Peru costs approximately USD 80 and USD 100 a month, respectively. The sub-regional average (around USD 125) is higher than the Latin American average (roughly USD 90) and four times greater than the average in OECD countries (USD 30).

In terms of trends in telecommunications and ICT access policies, we observed the following:

*The countries of the sub-region have adopted different strategies for broadband development.* In Bolivia and Ecuador, the strategies observed emphasize the role of the state, while Peru and Colombia have sought to encourage private investment and place priority on the role of the market. Results have proven to be more significant in the latter two.

*In Bolivia there is no specific plan for broadband development.* There is a clear lack of a state policy on this issue: it is not mentioned in the country's National Development Plan, and its Telecommunications Law is obsolete. The only instrument that in any way promotes broadband development is the National Plan for Social Inclusion, which has still not been fully formulated.

*In Ecuador there are numerous initiatives for internet development.* These initiatives include resolutions from the telecommunications regulator CONATEL,

and the National Connectivity Plan (PNC)<sup>3</sup> formulated by the Ministry of Telecommunications (MINTEL) and executed by the state-run operator Corporación Nacional de Telecomunicaciones (CNT). There is also a Digital Ecuador Strategy, which encompasses the ICT plan for inclusive social development, ICT plan for citizen security, electronic government plan, and a plan for ICT research, technological development and “massification”.

Colombia is perhaps the most advanced country in the sub-region in terms of policies to promote the development of telecommunications. It is currently implementing a national ICT development plan known as Plan Vive Digital<sup>4</sup> (Digital Living Plan), aimed at creating a “digital ecosystem” by promoting the growth of both supply and demand as well as greater national content creation. In addition, other similar initiatives have been underway for several years. The 2008-2019 ICT Plan seeks to improve the ICT situation in Colombia in general, and was also designed to serve as a sort of “umbrella plan” for previous initiatives.

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<sup>3</sup> This plan is aimed at the expansion of fixed telephony and broadband internet services, social inclusion through telecommunications for all, and improved services for citizens, among other objectives.

<sup>4</sup> For more information see: <http://vivedigital.gov.co/page/material-de-vive-digital>



*Peru appears to be following a similar course to Colombia.* Since March 2010, an ad hoc multi-sectoral commission tasked with formulating a National Broadband Development Plan has submitted reports which identify shortfalls in the supply of broadband service as well as the legal shortcomings that have hindered broadband development in rural areas (related to the Telecommunications Investment Fund, FITEL). The commission has also put forth recommendations for the future National Broadband Development Plan, which include, among others, the creation of a national backbone; a sales tax exemption for low-priced computers; promotion of the creation and development of digital content and applications; and building partnerships between state institutions and the private sector and NGOs.

### ***Southern Cone***

During the 2009-2011 period, the following general trends with regard to ICT access and use were observed in the Southern Cone sub-region (made up by Argentina, Brazil, Paraguay and Uruguay):

*Decrease in the rate of growth of mobile telephony penetration:* Mobile penetration in the countries of the sub-region is close to or in some cases has now surpassed 100%. This has logically resulted in slower growth in the new adoption of this technology, since

the sub-region is approaching full universalization of mobile telephony.

*Modest reduction in mobile telephony tariffs, which remain among the highest in the world.* In the countries of the sub-region, and particularly Brazil, mobile telephony prices have historically been high, due to limited competition among operators and the failure of telecommunications regulatory agencies to adopt policies to promote greater competition. The high cost of service discourages use, especially among lower-income sectors of the population: while they may have access to mobile service through prepaid systems, they depend on various usage strategies to limit their expenditure on this service.

*Exponential growth in broadband service penetration.* The largest increase observed in the 2009-2011 period was in subscriptions to broadband internet service. This has led to a substantial change in the way people access the internet in the sub-region, which had previously been primarily through free narrowband connections or by way of shared access points (telecenters or cybercafés). Shared access, the subject of numerous studies and initiatives in these countries, is becoming decreasingly relevant in itself, as these initiatives are shifting their focus towards centers geared to the provision of services and access to knowledge.



*High fixed broadband prices.* Despite the trends outlined above, there has been a decline in the rate of growth of fixed broadband service connections. This growth is being limited by high service prices, especially outside of large urban centers. We have observed a dual trend in broadband adoption, in which rapid growth in adoption in urban areas, where buying power is greater, contrasts with the slower and more limited growth in other parts of the country.

*Limited investment in fixed broadband infrastructure outside of large urban centers.* Due to the relatively slow return on investment and uncertainty around the demand for broadband service outside of large urban centers, private sector investment in new generation networks (particularly fiber optic networks) is concentrated in large cities, where quality of service is much higher and prices much lower than in the rest of the country. The greatest growth in broadband service is currently taking place in the mobile broadband sector, despite the fact that persistent problems with quality of service make it less reliable than fixed service. This situation could change in the medium term as a result of the evolution of mobile internet access technology and the greater availability of spectrum for these services.

Meanwhile, the following trends were observed in the sub-region with regard to telecommunications and ICT access policies:

- Overall, during the 2009-2011 period, there was a consolidation of the trend towards proactive state policies on telecommunications and ICT access. During this period, the contrast with the previous decade, in which national governments were primarily concerned with promoting private investment and regulating competition, became even more marked. The center-left political alignment of the governments of the four countries in the sub-region has contributed to this greater emphasis on the role of the state.
- While a so-called “Digital Agenda” has formed part of government plans in the countries of the sub-region for the last decade, it was during the 2009-2011 period that the most significant concrete actions were taken. Uruguay saw the consolidation of the ambitious Plan Ceibal, aimed at connectivity in the public school sector. For their part, Argentina and Brazil both launched national broadband plans that focus on public investment in high-capacity transmission networks and the promotion of residential and government access. Another noteworthy development in Argentina was the implementation of “*Plan Conectar.Igualdad*”, which is similar to Plan Ceibal but aimed at



secondary level students during its first phase.

- There has been a significant increase in regional cooperation within the sub-region, in terms of both technical cooperation (as in the case of the digital TV standard adopted by the four countries) and the interconnection of networks within the sub-region in order to optimize data traffic and lower the costs of international connectivity. For instance, this period saw the planning and execution of the submarine cable linking Argentina and Uruguay and a number of internet exchange

points along the border between Argentina and Brazil. In addition, the resurgence of state-owned operators in Argentina and Brazil, a byproduct of the national broadband plans mentioned above, has opened up new opportunities for cooperation with state-owned operators in Paraguay and Uruguay.





## Research themes

DIRSI's second cycle of research focused on two overarching themes. The first theme addressed emerging models for universal access, concentrating specifically on access to broadband services and mobile-based services. The second main area of research was aimed at developing indicators to help policy makers assess the impact of ICTs on the social and economic development of the poorest sectors of the population in the region. The three lines of research were called Bandwidth for All, Mobile Opportunities, and ICT Indexes.

Here we provide an overview of the research activities conducted in each of these areas.

### ***Bandwidth for All***

A fundamental cause of the limited availability and high cost of bandwidth in the region is the lack of high-capacity backbone networks. The backbone networks provided by incumbent operators are often of low quality and cover only a limited number of geographical areas. In fact, networks are concentrated almost exclusively in densely populated areas.

This line of research focused on two key questions: Under what conditions would an alternate IP backbone network be viable and efficient, and how

can it be institutionalized in such a way that the region does not experience the same problems of uneven network development and insufficient market efficiency that were previously caused to a significant degree by weak institutional regulation?

These questions were addressed by studying the availability of broadband services in different countries of the region.

### **Pricing and affordability**

The research study "*Las tarifas de banda ancha en América Latina y el Caribe: Benchmarking y análisis*" ("Broadband tariffs in Latin America and the Caribbean: Benchmarking and analysis"), by Christian Ruzzier and Hernán Galperín, is one of the few works in Latin America to systematically and comprehensively study existing price levels of

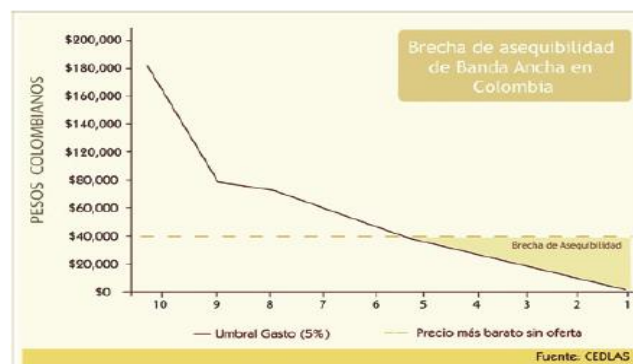


Cover of the book co-published with ECLAC in 2010.



broadband internet access services and their effect on adoption and use. The study was included as a chapter in the book *“Acelerando la revolución digital: banda ancha para América Latina y el Caribe”* (*Speeding Up the Digital Revolution: Broadband for Latin America and the Caribbean*), jointly published by DIRSI and ECLAC.

A fundamental component of the study was the development of the broadband performance index (BPI), according to which the countries of the region are performing below their potential for broadband development. In the meantime, data gathered on the plans and tariffs offered by the main service providers revealed that there is wide variation in the price levels and quality of services offered in the region. In general, the quality of service is low and prices are high when benchmarked against the OECD countries.



Graph of the affordability gap identified by the research

The study has been disseminated at academic meetings such as the ACORN-REDECOM Conference and among specialists in telecommunications policy design in forums like CITEL, Regulatel and eLAC. It has also been quoted in the press on numerous occasions.

### Infrastructure development policies

The case of Mexico was used as the basis for a discussion of policies for the roll-out of broadband backbone networks in the region.

The situation in Mexico was analyzed in a report by Ernesto Flores-Roux and Judith Mariscal, *“Política de Generación de Infraestructura de Telecomunicaciones en México”* (“Policies for the creation of telecommunications infrastructure in Mexico”), which was presented in January 2010.

The report included an international comparative analysis of policies for the development of broadband services and infrastructure. This analysis revealed a



clear international trend in which governments play an active role, either through direct investment or the promotion of massive roll-outs of infrastructure for use in broadband networks. With regard to the case of Mexico, the report analyzed the proposal for the construction of a new backbone network as an example of an innovative policy to foster broadband development.

Previously, in late 2009, DIRSI had produced the paper *"Propuesta de licitación de la fibra oscura propiedad de la CFE"* ("Tender proposal for CFE-owned dark fiber") in response to the public consultation opened by the Mexican Federal Energy Commission (CFE) regarding its proposal to place existing telecommunications transmission infrastructure on the market.

This DIRSI paper was disseminated through internet and Web 2.0 channels, and was reprinted and discussed by various web portals that specialize in telecommunications issues. It was also endorsed by a number of industry representatives in Mexico, including the National Chamber of the Electronics, Telecommunications and Information Technology Industries (CANIETI), the National Chamber of the Cable Telecommunications Industry (CANITEC), and the Mexican Internet Association (AMIPCI).

The report's findings contributed to discussion on the Brazilian National Broadband Plan in late 2009 and to discussion around a similar plan in Peru in 2010.

Another DIRSI paper, *"El Caso de la Licitación de la Red Troncal en México: Lecciones para el Perú"* ("The backbone tender case in Mexico: Lessons for Peru") stressed that the most significant lesson from the tender process in Mexico was probably the decision to include the approval of the Federal Competition Commission, to ensure that the new backbone network does not result in greater market concentration.

The paper also stressed the importance of avoiding the creation of an artificial shortage through the fiber tender process and recommended opening the proposal to "carrier-of-carriers" wholesale operators in order to promote greater competition and minimize market distortions.

These recommendations were presented at the international seminar "Telecommunications in Latin America: Persistent Gaps, Commitments and Opportunities", organized by DIRSI in the framework of the 2010 eLAC Ministerial Meeting.

To further contribute to the discussion of policies needed for broadband development in Peru, and specifically the more effective design of the National Broadband Plan, Roxana Barrantes and Aileen Agüero prepared the *"Estudio sobre la Banda Ancha en el"*



*Perú*” (“Study on broadband in Peru”), which focused on an analysis of policies specifically aimed at promoting the use and adoption of broadband services, competition policies, and infrastructure development policies.

In the meantime, the studies “*El estado de la Banda Ancha en Ecuador*” (“The state of broadband in Ecuador”) by María Belén Albornoz and Aileen Agüero, and “*Políticas públicas de acceso a las tecnologías de información y de inclusión digital en Bolivia (2007-2010)*” (“Public policies for access to information technologies and digital inclusion in Bolivia, 2007-2010”) by Marlene Choque, provided a diagnosis of the current state of the broadband market in Ecuador and Bolivia.

Both works contributed to the first ever comparative study on broadband development policy initiatives in the Andean region, prepared by Roxana Barrantes and Aileen Agüero and titled “*Desarrollo de la banda ancha en la región andina: Estudio comparativo de Bolivia, Colombia, Ecuador y Perú*” (“Broadband development in the Andean region: A comparative study of Bolivia, Colombia, Ecuador and Peru”). The study presents an analysis of the current situation of telecommunications infrastructure for the provision of broadband access in each country, as well as an analysis and evaluation of policies for broadband development. It shows that Colombia is better positioned than the rest of the countries in terms of

service penetration indicators as well as the design of related public policies. The study was released in February 2011.

### Universal access

The study “*Políticas para el desarrollo de la banda ancha*” (“Policies for broadband development”), by Roxana Barrantes, states that the potential of broadband as a tool for development can only be fully realized through the design and implementation of specific public policies that involve multi-sector government participation, and not solely the telecommunications sector, which has traditionally led up efforts to expand connectivity. The study puts forward four main recommendations: 1) formulating broadband development plans and raising them to the category of state policy, thus creating a binding obligation for coordination among various government sectors and between the government and the private sector; 2) establishing ambitious goals which are at the same time realistic and consistent with the amount of public resources allocated to this area; 3) mobilizing public resources to undertake the activities required for the development of a broadband ecosystem which the private sector will not address; and 4) balancing the needs of infrastructure development and promotion of private investment with the need to foster competition and innovation.





This study was also included as a chapter in the book *“Acelerando la revolución digital: banda ancha para América Latina y el Caribe”* (*Speeding Up the Digital Revolution: Broadband for Latin America and the Caribbean*), jointly published by DIRSI and ECLAC.

Along the same lines, the report *“Acceso universal y los planes de banda ancha”* (“Universal access and broadband plans”), by Roxana Barrantes and Aileen Agüero, notes that while numerous countries in the region have universal service funds, only three of the 20 countries studied have adopted specific plans for broadband development: Brazil, the Dominican Republic, and Trinidad and Tobago. The report stresses that universal access policies and broadband development policies are similar in that they both require government participation as well as the promotion of telecommunications infrastructure development. The authors state that the way to decide if a particular service should be included in a universal access policy lies in knowing whether an individual’s inability to use the service will result in a situation of exclusion.

The report was released in November 2010, and its findings were also presented at the ACORN-REDECOM Conference held in Lima, Peru in May 2011.

### **Mobile broadband**

Given the high levels of mobile telephony penetration in the region, mobile broadband has significant

potential for providing the majority of the population with internet access. The report *“Oportunidades y desafíos de la banda ancha móvil”* (“Opportunities and challenges of mobile broadband”), by Ernesto Flores-Roux and Judith Mariscal, notes that while the internet has enabled the democratization of information, a large part of the region’s population is still unable to access this opportunity. However, the report stresses, due its particular characteristics, mobile broadband represents a new opportunity to decrease digital exclusion in the region. In order for this to happen, it is crucial to eliminate barriers to entry in the sector, beginning with institutional barriers. The role of the authorities is to ensure that these opportunities are not limited, which means they must act transparently as regulators, put spectrum up for auction, promote inclusion and investment, and only intervene in cases where there are clear market failures.

This research report was included as a chapter in the book *“Acelerando la revolución digital: banda ancha para América Latina y el Caribe”* (*Speeding Up the Digital Revolution: Broadband for Latin America and the Caribbean*), jointly published by DIRSI and ECLAC. Its findings were also presented at the ACORN-REDECOM Conference held in Lima, Peru in May 2011.



## Spectrum management policies

Spectrum is a fundamental resource to facilitate the transmission of voice and data signals through areas with rugged terrain. The report "Políticas de Administración del espectro y acceso universal a las comunicaciones" ("Spectrum management policies and universal access to communications"), prepared by a team of researchers led by Marcio Iorio Aranha of the University of Brasilia, contributed to the development of new ideas in the discussion around public policy to promote the extension of telecommunications services to low-income users and in rural areas of Brazil. The researchers responsible for the study also helped to organize the first seminar on this subject at the Strategic Affairs Secretariat of the Presidency of the Republic of Brazil, "Alternatives for Infrastructure Development and Broadband Access", held 16 November 2009.

The research also resulted in an important contribution to a public consultation on the assignment of frequencies in the 450 MHz band to fixed and mobile networks in rural and underserved areas in Brazil.

The Central American region was analyzed by Alexander Elbittar in the research report "Asignación y Administración del Espectro Radioeléctrico en Países de Centroamérica y su Impacto en el Desarrollo del Sector de Servicios de Telecomunicación Móvil"

("Spectrum assignment and management in the countries of Central America and their impact on the development of the mobile telecommunications services sector"). The report looked at the experiences of Costa Rica, El Salvador, Guatemala, Nicaragua and Panama with regard to spectrum allocation, and found that it has a significant effect on the reduction of telecommunications service prices. This makes it possible to conclude that a spectrum allocation policy is a key tool for the promotion of greater competition in the telecommunications sector and, as a consequence, the supply of services at a lower cost in the region. In light of this evidence, the report offers a series of recommendations for public policies on the allocation and use of spectrum. It was published in December 2010.

In the meantime, the potential impact of the switch from analog to digital television signals was also analyzed by DIRSI during this period. A research report by Roberto Muñoz and Diego Avanzini, "El valor social de la banda 700 MHz en América Latina" ("The social value of the 700 MHz band in Latin America"), calculated estimates for nine countries in Latin America, resulting in an average social value of USD 408.30 per capita if this spectrum is reassigned to advanced mobile services.



## Public access

The study “A Base da Pirâmide Cultural: Novos Padrões de Consumo de Conteúdo Digital pela População de Baixa Renda: Lan-House” (“At the bottom of the cultural pyramid: New patterns in the consumption of digital content by the low-income population”), carried out by Brazilian researcher Alan Angeluci in the framework of the Amy Mahan Young Researcher Fellowships program, was based on an ethnographic analysis of the conditions of internet adoption and use among low-income youth on the outskirts of Sao Paulo. Among the findings, the most noteworthy include the socialization function of cybercafés and the limited appeal of government-operated telecenters.

## Mobile Opportunities

During its first research cycle, DIRSI conducted a regional study of ICT access strategies and usage patterns among the poor, with a specific focus on mobile telephony.

The results from the seven-country survey (Argentina, Brazil, Colombia, Jamaica, Mexico, Peru, and Trinidad and Tobago), along with in-depth interviews in two countries (Jamaica and Peru), confirmed the extent and depth of the diffusion of mobile telephony in poor households. However, they also underscored

two factors that mitigate the potential opportunities arising from this expansion in mobile teledensity: first, that there were still significant gaps in access, partly resulting from tariff structures and business models that inhibit access and discourage broader use; and second, that there was little use of mobile services beyond voice, due in part to a lack of appropriate mobile applications for the poor.

On the basis of these findings, during the second phase of research, DIRSI sought to explore the best regulatory and policy practices for stimulating faster deployment and wider use of pro-poor mobile services and identifying the bottlenecks limiting the expansion of mobile telephony, while contributing to the body of knowledge required to design incentive mechanisms to promote investment and roll-out of services.

## M-agriculture

This study emerged from the need to identify the potential uses of mobile telephony to reduce transaction costs in agricultural production chains, which would contribute to increased income for farmers. The aim of the study was thus to analyze the possibilities for the development of mobile-based information systems, in collaboration with selected large wholesale markets in the region (Brazil, Peru and Uruguay), that could contribute to advances in communications among the participants in the



agricultural value chain. The research was conducted in collaboration with the Inter-American Institute for Cooperation on Agriculture (IICA).

The Peru component of the study, carried out in the framework of DIRSI's research activities, focused on two agricultural products: potatoes grown in Huánuco and lemons from Piura. It encompassed the development and proposal of an information system, an analysis of the system's viability, and a study of the potential effects on the value chain that could result from its adoption.

### **M-health: WawaRed**

This study was developed in light of the significant increase that has been observed in the use of mobile technology for health care purposes. There are numerous health care interventions that use SMS text messages which have proven not only to be economical, but also to produce results comparable to interventions that use other means of communication. However, there is still very little known about the types and characteristics of text messages that most effectively lead to health-related behavioral changes, especially among poor sectors of the population who are marginalized in terms of access to health care services.

The study was conducted as a complementary research component for the WawaRed project, a mobile phone-based health care initiative targeted at

expectant mothers in Ventanilla, Callao, Peru, and implemented by Cayetano Heredia University. The study designed and tested text messages to be sent by mobile phone to encourage expectant mothers to attend prenatal medical appointments in their respective health care centers.

The resulting research evidence indicated that SMS text messages sent by mobile phone have the potential to generate behavioral changes in a disadvantaged sector of the population, in this case, expectant mothers in a marginalized urban area in



Peru, who were evidently motivated by the messages to comply with prenatal check-ups in health care centers.



### Mobile use in micro-enterprises

This study explored the effects of the use of mobile phones within a specific group of micro-enterprises in Lima, Peru: a collection of micro-enterprises devoted to carpentry and cabinetry located in an area known as the Villa El Salvador Industrial Park. Using a qualitative research approach, it sought to shed light on the role of the mobile phone in increasing productivity at different stages of the value chain in this particular context.

The study considered the problems posed by the heterogeneity of micro-enterprises in general and the need to analyze relatively similar cases, as there is a scarcity of research of this nature on an international level.

The study found that mobile phones can have a positive impact for different micro-enterprises in the field of woodworking. These effects are incremental in nature. The primary role of the mobile phone is to ensure the rapid flow of information which makes it possible to speed up the negotiation and production processes, as well as to respond more effectively to any emergencies or impasses that arise as a result of the production of furniture based on particular designs. Mobile phones also play a role, although a less significant one, in the stage of the final sale of products: they make it possible to quickly inform customers when their goods are ready, and to agree

upon and confirm the exact time when they will be delivered. These gains in productivity therefore take place at the level of interaction with final consumers and not at the level of changes in productive processes.

### Mobile telephony: Gender and age issues

A study conducted by Sandra Silva was aimed at an anthropological exploration of mobile phone adoption among women in a poor neighborhood in Curitiba, Pará, in southern Brazil. Through an ethnographic approach, it looked at the effect of the costs of mobile service, and the role that mobile phones play for these women in terms of child care and maintenance of family ties. It also identified the expectations and strategies adopted with regard to internet and mobile phone use among the women in this community.

Some interesting findings emerged. For example, these women recognize the importance of the internet in today's world and make an effort to ensure their children have access to this service. It was also found that mobile phone ownership is widespread, although usage is limited to a few minutes a month, because mobile service is perceived as "expensive".

Based on its findings, the study recommends the following measures: promoting community actions via SMS text messages, organizing audiovisual production



workshops (using mobile phone cameras), developing public initiatives in partnership with the Wikimapia project, and providing subsidized mobile phones to community health agents, among others.

The study was conducted in the framework of the Fourth DIRSI Young Researcher Fellowships competition, and was translated from Portuguese to Spanish thanks to the support of the Brazilian embassy in Peru.

Along the same lines of research, Rossana Flores of Ecuador, recipient of an Amy Mahan Young Researcher Fellowship, undertook a research study on *“Caracterización del uso y apropiación de la telefonía móvil en zonas rurales pobres del Ecuador por parte de mujeres campesinas”* (“Characteristics of mobile telephony adoption and use by women peasant farmers in poor rural areas of Ecuador”). The research was aimed at analyzing the ways in which rural peasant women who are beneficiaries of the Human Development Bond cash transfer program have adopted information and communications technologies, and specifically mobile telephony, to facilitate social and commercial relations.

Similarly, another Amy Mahan Fellowship recipient, Elías Said Hung of Colombia, conducted research on *“Apropiación y la participación ciudadana móvil en los jóvenes de poblaciones vulnerables en Barranquilla, Colombia”* (“Mobile adoption and civic participation

by young people in vulnerable communities in Barranquilla, Colombia”). The study sought to estimate the degree of adoption and means of civic participation through mobile use among young Colombians from vulnerable social sectors.

### ***ICT Indexes***

Since its founding, DIRSI has been committed to generating and accumulating information emerging from the research it conducts on best practices and policies for the development of the information society with an emphasis on poor and marginalized communities and access to ICT infrastructure in the region. During its first research cycle, DIRSI worked on indicators of the demand for ICT services, developing the concept of digital poverty, which was introduced into the specialized literature for the first time.

Comparatively speaking, the region of Latin America and the Caribbean is still at a very early stage in the development of systems of national and regional indicators that make it possible to monitor progress in infrastructure creation and the adoption of new ICTs, as well as to assess the impact of public initiatives in this area.

The ICT Indexes research work focused on the design and development of indicators related to new ICTs to support decision-making processes and facilitate the evaluation of the results of public policies for digital inclusion and infrastructure development. Within this



framework, the actions undertaken during the 2009-2011 period were aimed at collaborating with different stakeholders in the implementation and improvement of existing systems of indicators, as well as developing new indicators geared to analyzing the participation of the poor in the information society.

The research work carried out in this cycle built on the initiatives of the first cycle, focusing on the measurement of the demand for ICT services by the poor and the supply of services geared to this segment of the population.

### Tariffs and affordability

One of the key initiatives pursued in the 2009-2011 period was the continued monitoring of mobile telephony tariffs in the region and the expansion of the sample to include all of the countries in the region. To enable this, DIRSI has established a yearly data-gathering mechanism through which the tariffs offered by all of the service providers in the region are recorded. This information was fed into a database that also included data from OECD countries, provided by the organization itself, for comparative purposes. The database is open for consultation by the general public on DIRSI's website.

This data gathering has served as an input for a number of papers and policy briefs. One of the key works in this regard is the paper *"Tarifas y brecha de asequibilidad de los servicios de telefonía móvil en*



*América Latina y el Caribe*" ("Tariffs and affordability gap of mobile telephony services in Latin America and the Caribbean"), by Hernán Galperín. The paper summarizes the findings of the data gathering and analyzes trends in the supply and affordability of mobile services in the region. It also includes a new tool for measuring affordability called the "affordability gap".

The main advantage of this measurement tool over those normally used is that it differentiates affordability across different income deciles and in different areas within each country (in particular, rural versus urban areas), which makes it possible to more precisely identify problems of affordability in the most disadvantaged social sectors. This tool was developed in collaboration with CEDLAS (the Center for Distributive, Labor and Social Studies of the National University of La Plata, Argentina), one of the region's leading academic authorities in income data processing.



Galperín's paper was presented at various academic conferences and meetings of industry regulators, including the LIRNEasia@5 international conference (Colombo, December 2009), the ACORN-REDECOM Conference (Brasilia, May 2010) and eLAC 2010. In addition, the Policy Brief based on the paper has received significant press coverage in some of the region's leading publications, including articles in *La Nación* (Argentina), *O Globo* (Brazil), and *El País* (Uruguay).

Another important work based on the data collected was the paper *“¿Es más asequible hoy la telefonía móvil? Una nota metodológica sobre la comparación del valor de las canastas de servicios entre 2006 y 2009”* (“Is mobile telephony more affordable today? A methodological note on the comparison of the price of service baskets between 2006 and 2009”), by Roxana Barrantes and Aileen Agüero. The paper presents an analysis of different methodologies for the development of indexes applied to mobile telephony tariffs in the region, and examines trends in tariffs during the 2006-2009 period. It was published in January 2011 as a working document on the DIRSI website.

In the meantime, the main innovation in this research area during the second cycle was the extension of the monitoring of tariffs to broadband services. This initiative was aimed primarily at identifying the barriers to broadband adoption by low-income

sectors of the population and providing support for the various programs for the universalization of broadband service implemented in numerous countries in the region since 2008.

The experience accumulated by DIRSI in mobile telephony data collection allowed for rapid adaptation to the case of broadband services. However, a number of challenges were encountered, in particular:

- the lack of a standardized methodology to measure and compare tariff levels between countries and different service providers;
- the multiplicity of service providers in different localities in each region; and
- the difficulty of corroborating the quality of service promised by providers, especially in the mobile broadband market segment.

The first collection of data was undertaken during the month of May 2010, and the results were shared in the paper *“Las tarifas de banda ancha en América Latina y el Caribe: Benchmarking y análisis”*, (“Broadband tariffs in Latin America and the Caribbean: Benchmarking and analysis”), prepared by Hernán Galperín and Christian Ruzzier, a specialist in public service tariff regulation who was hired as a consultant for this initiative. The paper was presented at various academic conferences, including the ACORN-REDECOM Conference (Lima, May 2011), and





was submitted for publication as part of the Social Science Research Network (SSRN) Economics of Networks paper series.

Finally, it is worth highlighting the impact of the presentation of the research results at the Third Ministerial Conference on the Information Society, held in Lima in November 2010, where the participants included the main national authorities and stakeholders in the telecommunications sector in the region. This impact was reflected in various ways: on one hand, through references to the tariff data generated by DIRSI in numerous national broadband plans (those from Peru and Argentina in particular explicitly refer to these data); and, on the other hand, in the concern of national authorities over the current situation of tariffs in the region, which led to a request from the countries for the implementation of a permanent mechanism to monitor broadband service offerings in the region in the framework of eLAC 2015. This new mechanism will be implemented by the ECLAC Regional Broadband Observatory, with which DIRSI researchers actively collaborate. The results of the tariff data collection also served as a key input for the book *“Acelerando la Revolución Digital: Banda Ancha en América Latina y el Caribe” (Speeding Up the Digital Revolution: Broadband for Latin America and the Caribbean)*.

On the basis of the data gathered and findings reached through these studies, DIRSI conducted a

study aimed at estimating the price elasticity of demand for broadband services. DIRSI considers this to be key to the success of the national connectivity plans launched by various countries in the region, yet there are virtually no studies on this subject.

The resulting paper has been submitted for publication in *Information Economics and Policy*, one of the most prestigious academic journals in the field.

### Measuring impact

The underlying goal of the universalization of broadband service is to improve the quality of life in the region’s households. Therefore, an increase in income levels in households where broadband is adopted is a key aspect. From a theoretical point of view there are various mechanisms that could lead to this positive impact on household income, as well as various studies at the regional and national level that suggest that this impact is in fact taking place. However, at the level of individual households, evidence is still scant, largely owing to the methodological challenges posed in this type of research.

In order to create and contribute knowledge around this important question, DIRSI commissioned Carlos de los Ríos (IEP) to conduct a study on the impact of internet use on Peruvian households. The study was able to make use of the availability of panel data on income and internet use gathered through the INEI



household survey (2007-2009). The initial findings on the impact of the internet on household income were highly encouraging, and were published in the working document *“Impacto del Uso de Internet en el Bienestar de los Hogares Peruanos”* (“Impact of internet usage on Peruvian households’ well-being”) and summarized in a Policy Brief with the same title. The findings were also presented at the international conference Mind the Gap: From Evidence to Policy Impact, held in Cuernavaca, Mexico, 15-17 June 2011.

Another research study was aimed at measuring the impact of access to a range of ICTs (fixed telephony, mobile telephony and internet) on households in Peru, entitled *“Evaluación del Impacto del Acceso a las TIC sobre el Ingreso de los Hogares”* (“Evaluation of the impact of ICT access on household income”). Authors Pamela Medina and Roxana Fernández, recipients of an Amy Mahan Young Researcher Fellowship, used panel data from a national household survey for the years 2002-2006, and found positive and significant effects through propensity score matching methodology for all telecommunications services. These findings demonstrate the importance of incorporating other ICTs in national broadband development plans (as was the case in Brazil and the United States).

Along similar lines, *“Estudio del impacto del uso de TIC en la eficiencia y la productividad de los hogares rurales. Evidencia de un panel de hogares 2003 – 2007”*

*en Piura y en el Valle del Mantaro”* (“Study of the impact of ICT use on the efficiency and productivity of rural households: Evidence from 2003-2007 household survey panel data in Piura and Valle del Mantaro”) by Carlos de los Ríos sought to analyze the impact of ICT use on total-factor productivity (TFP) and technical and economic efficiency in rural households in two areas of Peru, Piura and Valle del Mantaro, between 2003 and 2007.

For its part, the study *“Relación entre adopción de Internet y empleo de alta calidad en Uruguay”* (“The relationship between internet adoption and high-quality employment in Uruguay”), undertaken by Daniel Ferrés as part of the Amy Mahan Young Researcher Fellowships program, analyzed the impact of internet adoption on formal or high-quality employment at the level of zonal community centers within Montevideo and departments in the rest of the country. The findings showed positive and significant effects of internet use on the type of work performed by the employed population.

In the meantime, with the aim of contributing to decision making by the authorities responsible for designing telecommunications projects in Peru, the study *“Metodología de Estimación de Beneficios Sociales de Proyectos de Telefonía Rural en el Perú”* (“Methodology for the estimation of the social benefits of rural telephony projects in Peru”), by Milton von Hesse, reviewed the evaluation



methodology used in Peru for rural telecommunications projects executed in the framework of the National Public Investment System (SNIP). The study concluded that the methodology used underestimates the total social benefits of these projects, given that that social value of time assigned for the estimation of direct social benefits is below its current level, and indirect social benefits are not considered. To address this, the study developed a methodology for the estimation of indirect social benefits based on a fixed effects panel data model.

A direct consequence of this research study is that more accurate identification and measurement of both direct and indirect social benefits associated with the expansion of telecommunications projects in rural areas will lead to an increase in telecommunications service coverage through state-backed projects.

In the area of e-government, Rodrigo Sandoval and Ramón Gil García's study "*Evaluación de portales de gobierno electrónico en Centro América*" ("Evaluation of electronic governmental portals in Central America") focused on the development of national government portals in the countries of the sub-region. The goal of the research was to develop a tool to evaluate the degree of progress achieved using a benchmarking or ranking methodology based on strengths and weaknesses in terms of six stages of e-government development: web presence,

information, interaction, transaction, integration and political participation.

DIRSI also sought to evaluate the impact of ICTs on the productive sector, and particularly on small and medium enterprises (SMEs), in recognition of the key role they can play in programs to combat poverty.

Three research studies were produced in conjunction with ECLAC: "*Ciencia, tecnología, cooperación tecnológica, TIC y rentabilidad de las empresas manufactureras bajo un enfoque empresarial: el caso del Perú, 2004-2005*" ("Science and technology, ICTs and the profitability of the manufacturing sector in Peru"), by Mario Tello; "*Impacto de las TIC y de la innovación en la productividad de la industria manufacturera uruguaya*" ("Impact of ICT and innovation on industrial productivity in Uruguay"), by Griselda Charlo; and "*TIC, capital humano y productividad en la industria manufacturera colombiana*" ("ICT and labor productivity in the Colombian manufacturing industry"), by Luis H. Gutiérrez.

Finally, in view of the significant impact that ICTs can have on the environment, DIRSI commissioned Fernando Borraz to produce the study "*TIC y cambio climático*" ("ICT and climate change"), which sought to identify the most relevant variables that determine the potential role of ICTs in mitigating the effects of climate change for poor communities in the region.



The study also aimed to outline a research agenda focusing on ICTs and adaptation and mitigation, as well as disaster management and risk reduction. Within this agenda, it stressed the role of public policies in order for ICTs to contribute to more effective adaptation strategies for vulnerable sectors of the population.

During this phase of research, work also continued on the evaluation of the telecommunications regulatory environment (TRE) in Peru, resulting in the publication of the report “Entorno Regulatorio de las Telecomunicaciones: Perú 2007-2009” (Telecommunications Regulatory Environment: Peru 2007-2009), by Jorge Bossio. The report concluded that the TRE in Peru had improved slightly since the previous assessment, covering the period from September 2006 to August 2007, but that values were still very close to the efficient/inefficient threshold.

The report also included reflections on the improvements still required to create more competitive conditions in most markets, and recommended the development of policies to stimulate investment in networks in the country's interior.



## Linking research and policy agendas

The prominence of digital agenda-related issues in the policies of the region's governments during the 2009-2011 period has increased opportunities for linking DIRSI's research agenda with national policy-making processes. In particular, the questions of greatest relevance have concerned the adoption of mobile telephony by low-income sectors of the population, potential models for the universalization of

broadband, and the impact of the adoption of new technologies on household well-being. Thus, during this second phase, much of the research conducted by DIRSI has been geared to supporting the policy-making process around these questions.

### *Mexico and Central America*

The topics on DIRSI's research agenda for Mexico and Central America during the 2009-2011 period were closely linked to the issues given highest priority on the digital agendas of the sub-region's countries. As a result, in numerous cases, DIRSI's research findings have served as inputs for high-level decision-making

## **MARTA**

### ***"Support Mechanism for Telecommunications Regulation in Latin America"***

To supplement the network's research work, in 2009 DIRSI began the implementation of MARTA, a program designed to facilitate the work of experts and researchers working on current regulatory issues in the region.

Studies carried out as part of this program include:

- MEXICO: New telecommunications tax (2009)
- MEXICO: Dark fiber tender (2009)
- MEXICO: Cost models for interconnection services (2009)
- PERU: Differentiation of interconnection charges for rural networks (2010)
- BRAZIL: Regulation of the 450 to 470 MHz bands (2009)
- DOMINICAN REPUBLIC: Number portability impact evaluation (2010)
- ARGENTINA: Survey of the quality of mobile telephony service (2010)
- REGIONAL: The social value of the 700 MHz band in Latin America (2010)
- PERU: The backbone tender case in Mexico: Lessons for Peru (2010)
- PERU: Broadband in Peru (2011)
- PERU: Comments on the proposed methodology to determine important providers in public telecommunications services markets (2011)
- PERU: Methodology for the estimation of the social benefits of rural telephony projects in Peru in the framework of the SNIP (2011)



processes.

The subject of telecommunications infrastructure development was addressed in two papers produced in response to the proposed tender of dark fiber strands by the Federal Electricity Commission, a Mexican government agency. In addition to being disseminated by DIRSI through its website and Web 2.0 platforms, these papers were also reprinted and discussed on various web portals that specialize in telecommunications issues.

Meanwhile, in response to a Mexican federal government proposal to increase taxes on telecommunications services, DIRSI's analysis of the proposal pinpointed a number of significant negative impacts, which received considerable media coverage. As a result of the ensuing debate, it was decided that the tax increase, originally planned to apply to all telecommunications services, would be limited to services related to internet access, rural telephony and public telephony.

In July 2009, Mexico's telecommunications regulator, COFETEL, as part of a process for greater openness and transparency in decision making, held a public consultation on the principles that should govern the cost models that would be used to establish interconnection tariffs. DIRSI contributed a series of comments that enriched the discussion by warning that the proposal to include the concept of “network

externalities” would leave open the possibility of incorporating subsidies in the payments between operators with the objective of promoting the incorporation of new users.

Finally, the DIRSI research on universal access in Mexico resulted in findings that contributed to the reorientation of Social Coverage Fund resources towards initiatives in which broadband access is a top priority.

### *Andean Region*

The five studies conducted with regard to the importance of broadband infrastructure provision in the Andean sub-region have highlighted the role of the state in promoting the development of this infrastructure. These studies have also aimed to provide an objective overview of the situation in each of the countries of the sub-region and the directions they have each taken in terms of policies to promote broadband networks. At the same time, they have underscored the relationship between broadband and the concepts of universal access and service.

Regarding the latter point, it was observed how countries have established universal service funds and diversified their sources of financing. Ambitious broadband plans have now been developed by countries like Brazil, and the countries of the Andean sub-region have begun to follow in their footsteps, particularly Colombia and Peru.



From the studies conducted on mobile telephony for development, we are able to see how mobile phones have made it possible to overcome former information and communication limitations. In all of the research studies undertaken, the subjects chosen for study have been members of sectors of the population that represent the “bottom of the pyramid”. These are the sectors of greatest interest to both DIRSI and policy makers in the region. Mobile service is also the most important ICT for these social sectors, given its widespread availability, ease of use, and relative affordability compared with other ICTs like the internet.

In the case of the m-agriculture project, mobile phones were successfully used by producers to obtain important information that previously gave “market power” to intermediaries and wholesale merchants. For its part, the WawaRed project demonstrated that a low-cost, simple-to-use SMS text message system brought about “behavioral changes” among low-income expectant mothers by reminding them to attend prenatal medical appointments, thus improving the quality of their own lives and those of their children. Research conducted with micro-entrepreneurs demonstrated how mobile phones have become a key part of the productive process, by facilitating and lowering the costs of information gathering and coordination, while contributing to better customer relations. Finally, the case study of women in Curitiba, Brazil revealed that they view the

mobile phone as an important means of maintaining family ties and providing better care for their children.

Studies on the impact of ICTs found positive effects on the income and/or well-being of Peruvian households. This statistical evidence has been used as a means to prove the importance of the promotion of these services in the countries of Latin America, given their low levels of penetration as compared to the developed countries and the high tariffs in the region.

### *Southern Cone*

In this particular sub-region, DIRSI has interacted very closely with sector authorities.

With regard to the process of mobile telephony adoption, the work undertaken in collaboration with the National Communications Commission of Argentina has contributed to the creation of a new instrument for the measurement of quality of service, whose results have been used in the design of mobile service quality regulations as well as consumer protection policies. This work has also served as an input in planning for the implementation of number portability and cost determination.

The research on mobile telephony adoption by women from vulnerable communities in southern



Brazil was aimed at highlighting the importance of designing specific policies to address issues of gender, an aspect that is not currently emphasized in the public policies adopted by the countries of the region.

In terms of models to achieve universalization of broadband access, the research conducted by DIRSI has contributed to the policy-making process in Brazil in two fundamental ways. The first is the discussion of spectrum allocation in Brazil, a key issue given the opportunities offered by wireless technology for the development of low-cost broadband access networks. It is worth highlighting that DIRSI's contributions have been taken up not only by the telecommunications regulator, ANATEL, but also by the Ministry of Communications in the design of the National

Broadband Plan, which stresses the importance of wireless network deployment by local operators in long-range frequencies.

Second, the research on public internet access centers in the Sao Paulo region has significantly contributed to debate over the role of the centers in view of the major increase in individual access, and particularly the role of the state in the promotion and management of shared access centers.

**The Amy Mahan Young Researcher Fellowships in ICT Inclusion Policies** was one of a number of initiatives in honor of our friend and colleague Amy Mahan. Other initiatives were the Amy Mahan Research Fellowship Program to Assess the Impact of Public Access to ICTs, Global Information Society Watch 2009 dedicated to Amy Mahan, and the LACNIC Outstanding Achievement Award 2009.

The research studies conducted thanks to this fellowship program were:

- Mobile adoption and civic participation by young people in vulnerable communities in Barranquilla, Colombia / Elías Saíd Hung
- Characteristics of mobile telephony adoption and use by women peasant farmers in poor rural areas of Ecuador / Rossana de Lourdes Flores Venegas
- Evaluation of the impact of ICT access on household income: An approximation based on Propensity Score Matching methodology in Peru / Pamela Medina Quispe and Roxana Fernandez Machado
- At the bottom of the cultural pyramid: New patterns in the consumption of digital content by the low-income population: LAN house, School, Home / Alan Cesar Angeluci Belo
- Causal relationship among broadband development, employment and poverty in Uruguay / Daniel José Ferrés Otegui
- Mobile telephony and gender issues: Socio-cultural aspects of adoption of mobile use among women in a situation of vulnerability / Sandra Rubia Silva





## Impact

The 2009-2011 period has been the most successful in terms of DIRSI's impact on policy-making processes. This is the result of a number of factors, including, above all:

- The maturation of the research conducted in the previous phase, whose impact has been reflected in the creation of new links and opportunities for policy impact in this period.
- The MARTA mechanism for resource allocation, which has made it possible to attend to the research needs of regulators with regard to specific issues.
- The incorporation of new members in the DIRSI network, which has strengthened and consolidated our research capacities, as reflected in the quantity and quality of research conducted and the issues addressed.
- The relevance of DIRSI's research for the design and formulation of national broadband plans in the countries of the region, a key factor in the increased public impact of our network.

Links with the traditional media through the production of Policy Briefs, as well as the use of social networking platforms to share continuously updated information on the issues of top priority in the region and how these tie in with DIRSI's research agenda, have been heavily emphasized tools during this period.

As is illustrated in the table of indicators in Annex 1 (see page 39 below), all of the quantitative targets established for the second cycle of research have been fulfilled.

### *Communication strategy*

From the beginning of the second research phase, DIRSI has significantly emphasized the importance of alternative means of communication and dissemination of our research results. Our communication strategy initially focused on the network's website, which was redesigned to integrate Web 2.0 technologies and social networking platforms.

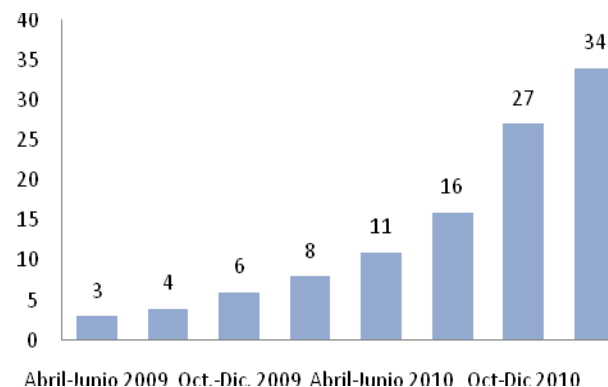


Figure 1 Working documents published



The new DIRSI website went online 1 September and was officially launched on 4 September 2009 at the ACORN-REDECOM Conference in Mexico City. As of March 2011 it had received more than 200,000 unique visits, thus surpassing the target set for 100,000 unique visits a year.

During this period, the number of articles published on the DIRSI website has increased six-fold. More than 30 documents have been published, all of them peer reviewed.

Of particular note is the use of the website to provide public access to the collection of Policy Briefs prepared by DIRSI, based on papers and studies authored by the network's members. The collection not only contributes to disseminating the network's research activities, but can also serve as a valuable input for regulators and policy makers in the ICT sector. The publication of these Policy Briefs on the website where they are available to download has helped to attract more visitors to the site.

One troubling development with regard to the network's communication strategy is the fact that over the last three quarters there has been a steady decline in the number of visitors to the website. One possible explanation for this is that those interested in DIRSI research and events are using other channels to stay up to date on the network's activities.

## Social networks

Over recent months, DIRSI's Facebook page has developed into an important dissemination tool. At the time this report was prepared, the page had a total of 740 "fans", with consistent growth in numbers since October 2009.

The number of visits to the DIRSI Facebook page has also been steadily increasing, reaching more than 1,000 active users a month in May 2011.

With regard to Twitter, although it is not yet a widely used communication platform in the region, DIRSI's Twitter "followers" have increased from 250 in September 2010 to 524 in July 2011.

Another tool that has proven to have a significant impact in terms of dissemination is SlideShare, a web platform DIRSI has used to publish presentations given by the network's researchers. So far, 39 presentations and 13 documents have been uploaded

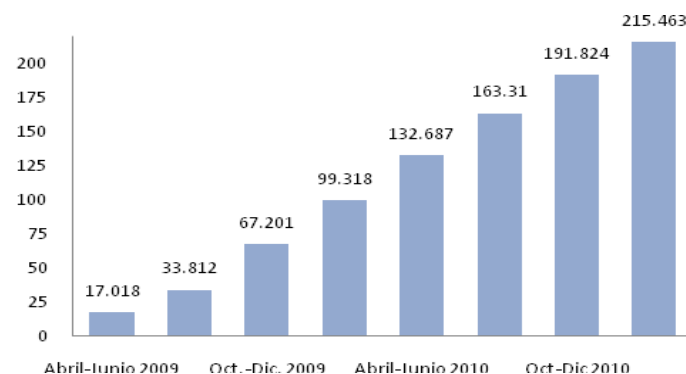


Figure 2 Accumulated unique visits to the DIRSI website



to this platform. They include a presentation by Luis Gutiérrez on ICTs and SMEs in Colombia, which has been viewed close to 3,000 times, and a study on Peru’s national broadband plan by Roxana Barrantes and Aileen Agüero, which has been viewed 870 times and downloaded more than 40 times from this platform.

### Media presence

Throughout the second research cycle, DIRSI has made a concerted effort to achieve greater media coverage, particularly in the written press, in order to reach a wider public with its research results. While this proved difficult at first, coverage has grown in the last four quarters. This was made possible by the availability of the results of the research studies initiated in the first year of the cycle, the Policy Briefs that have been prepared, and opportunities for the dissemination of information in events such as AHCIET, eLAC and CITELE meetings.

In addition, other indicators were evaluated that serve to demonstrate the impact of the research conducted by DIRSI during this second research cycle. These include, for example, the publication of works by DIRSI researchers in peer-reviewed publications, and the quotation and referencing of DIRSI publications in specialized documents and publications.

Indicators were also established to measure the level of contact between members of the network and decision makers and institutions responsible for the implementation of public policies. As has been demonstrated, DIRSI has been very active in this regard, strengthening its institutional relations with ECLAC and CITELE by undertaking joint projects with the first and being invited to participate as an observer by the second. Closer links have also been established with regulatory agencies and authorities in Peru, Argentina, Mexico, the Dominican Republic and Brazil, primarily.

DIRSI has expanded its network of collaborators to a total of 29 active researchers, while promoting the involvement of young researchers through the young researcher fellowships program and grants for participation in the workshops held prior to the ACORN-REDECOM Conferences in Brasilia and Lima.

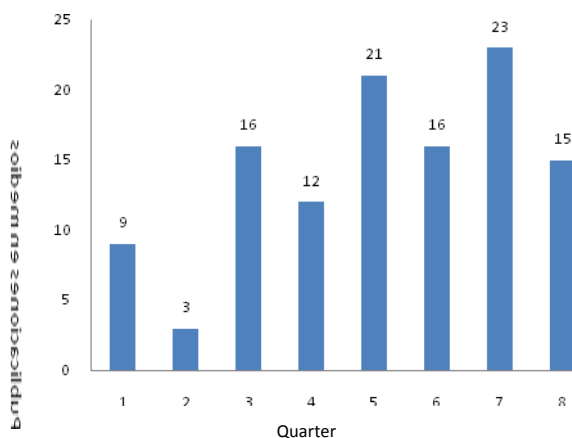


Figure 3 Media presence



## Project management

The administration of the funds donated by the IDRC for the project, a task that is handled by the Instituto de Estudios Peruanos (IEP), continued to be efficient and effective and to fully comply with IDRC guidelines and recommendations.

The execution of the funds allocated for the DIRSI Phase II project can be divided into two stages: the first covered the period from the project start date until the beginning of the second half of 2010, while the second covered the period thereafter. During the first stage, the budget was executed in accordance with the plans approved by the IDRC; during the second, the funds were reallocated among budget items to meet the need for financial resources for the organization of the DIRSI@5 event. DIRSI@5 celebrated the fifth anniversary of the DIRSI network and coincided with the eLAC 2010 meeting held 21-23 November in Lima. The grant contract did not need to be amended for this reallocation of funds.

These funds were used to help cover the travel costs and per diems of guest presenters and members of the network. The reallocated funds totaled USD 37,050.00, which represented 14.8% of the original budget item corresponding to consultants. However, not all of the resources reallocated were spent on travel expenses, leaving a small amount of resources for research and MARTA reports. With the knowledge of the IDRC, it was decided not to make any further changes to budget allocations and to continue working on research activities.

As a result, of the original budget allocation of USD 250,250.00 for consultants, USD 213,200.00 were available for this line item following the reallocation of funds. At the time this report was prepared, a total of USD 235,556.11 from this budget item had been disbursed, distributed among research in the three main research areas and MARTA projects in each sub-region.



With regard to research activities, throughout the DIRSI Phase II project, partnerships have been established with international organizations as a means of obtaining external funding sources. The financial resources saved in this way have been allocated to other research activities. Partnerships of this kind were established with ECLAC, INDOTEL, IFC and IICA.

With regard to personnel management, as was reported at the time, the network's communications officer decided to resign from his duties, which ended on 15 July 2010. The communications assistant based in Montevideo also resigned, and was replaced by a communications practicum student as of July. Communications area duties were taken over by the coordination team in Lima.

As was also reported previously, a problematic situation emerged with regard to researcher Hugo Carrión of Ecuador, who failed to fulfill his commitment to submit a completed study on ICT indicators for Ecuador as well as a revised draft and final version of a MARTA report on the TRE in Ecuador.

With regard to financial resources, we have mentioned on previous occasions that problems

sometimes emerge with researchers when bank transfers are made. It has been suggested that the project should cover the fees charged for receiving bank transfers up to a certain amount. Over the last year and a half, we have not experienced problems of this kind, as we have taken the precaution of clarifying the IDRC's policies in this regard in our initial communications and specifying that the project will cover only the costs of sending a transfer.

In terms of the payment of travel expenses, following the audit conducted by the IDRC, we have complied with the recommendation that expenditures only be reimbursed upon the presentation of receipts or other backing documentation. This measure has not been difficult to implement, since researchers are accustomed to this practice.

At the time this report was prepared, 99.44% of the total budget had been executed, representing an amount of USD 745,493.53. Following the last transfer of funds received from the IDRC on 31 March 2011, the current account balance was –USD 64,252.76. These funds have been provided as a loan by the Instituto de Estudios Peruanos in order to cover financial commitments for research activities and the payment of staff.

## Annex 1 - Indicators

| Indicator identifier | Indicator   | Baseline | Target  | Frequency of measurement | April 2009-March 2010 | April 2010-March 2011 |
|----------------------|---|----------|---------|--------------------------|-----------------------|-----------------------|
| I-1                  | Government interest in issues promoted by DIRSI                               | 0        | 2       | Twice yearly             | 5                     | 4                     |
| I-2                  | Impact through direct advisory or consultancy services from DIRSI researchers | 0        | 4       | Twice yearly             | 3                     | 0                     |
| R-1                  | Publication of DIRSI Working Papers in peer-reviewed publications             | 2        | 4       | Yearly                   | 11                    | 10                    |
| R-2                  | DIRSI media presence  | 4        | 6       | Quarterly                | 40                    | 75                    |
| R-3                  | Quotations and references in specialized publications                         | 0        | 4       | Yearly                   | 18                    | 13                    |
| R-4                  | Downloads of DIRSI articles   | 116      | 150     | Quarterly                | 2,852                 | 5,546                 |
| R-5                  | Visits to DIRSI website   | 77,636   | 100,000 | Quarterly                | 99,318                | 116,145               |
| R-6                  | <b>Face-to-face</b> contacts (talks, meetings, conferences)                   | 1        | 2       | Yearly                   | 2                     | 4                     |
| R-7                  | Networking with actors with direct impact                                     | 0        | 4       | Yearly                   | 11                    | 16                    |
| R-8                  | Networking with actors with indirect impact                                   | 0        | 4       | Yearly                   | 4                     | 2                     |
| R-9                  | Number of researchers and organizations affiliated with DIRSI                 | 18       | 25      | Yearly                   | 29                    | 29                    |
| P-1                  | <b>Working Papers</b> produced by DIRSI researchers                           | 9        | 12      | Yearly                   | 8                     | 26                    |
| P-2                  | Forums, talks and conferences with DIRSI participation                        | 4        | 10      | Yearly                   | 41                    | 36                    |
| P-3                  | Training of young researchers   | 3        | 5       | Yearly                   | 4                     | 3                     |