Open Technical Infrastructures

Connectivity Policy Paper

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Executive Summary

Internet access facilitates economic development and the enjoyment of a range of human rights. (La Rue 2011). Without it, marginalized groups and developing countries remain in a disadvantaged situation. This has been characterized as the *digital divide*, being the gap between people with effective access to digital and information technologies, in particular the Internet, and those with very limited or no access at all[1]. Among the different factors associated with non-use of technology are age, household income, educational attainment, community type, and disability.

The ability to access the Internet has become increasingly important to completely get involved in the economic, political, and social aspects in the world. Nowadays, broadband connectivity is increasingly recognized as a key engine for development of any country. Given the critical role it plays in communication, culture and commerce, most people now recognize it as the most powerful instrument of the 21st century for increasing transparency in the access to information,

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[1]   http://www.igi-global.com/dictionary/digital-divide/7600

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and for facilitating active citizen participation. While there are multiple methods of network access across Latin America and the Caribbean, the state of the access infrastructure varies considerably between countries and between different geographical areas within each of them. This results in significant variations in price, quality and coverage of Internet services in the region. Improving the state of the Internet infrastructure is a major challenge for the region in the next decade (Galperin 2013).

Access to telecommunication services, such as the Internet, has a direct and mutual correlation with the Gross Domestic Product (GDP) per capita of a country, therefore, telecommunications access strongly influences the financial and social well-being of a population. In developing countries, approximately 70% to 85% of the labor force live in rural areas, facing significant resource challenges such as poor communications, transport, electricity and water supply (Matthee et al. 2007). Providing broadband access to citizens, communities and public institutions has become a strategic objective for governments and international organizations worldwide against problems related to the "digital divide" and "traditional structural divides" which are re-edited in the online world.

I. Introduction and Focus: General Background

Access to the Internet is seen as *critical* in order to face situations of inequality, by ensuring that marginalized or disadvantaged sectors of society can express themselves effectively, obtain information, assert their rights, and participate in public debates concerning social, economic and political changes to improve their situation (La Rue 2011). It also offers an important educational tool in making accessible previously unaffordable academic material to people in developing countries.

In the last five years the countries of Latin America and the Caribbean (LATAM) have made significant progress in terms of telecommunications infrastructure deployment and development of high speed Internet access service, the so-called *broadband* (Galperin 2013a). Although network coverage gaps persist in some countries, especially in the Andean region and Central America, the vast majority of individuals and households in the region is today served by one or

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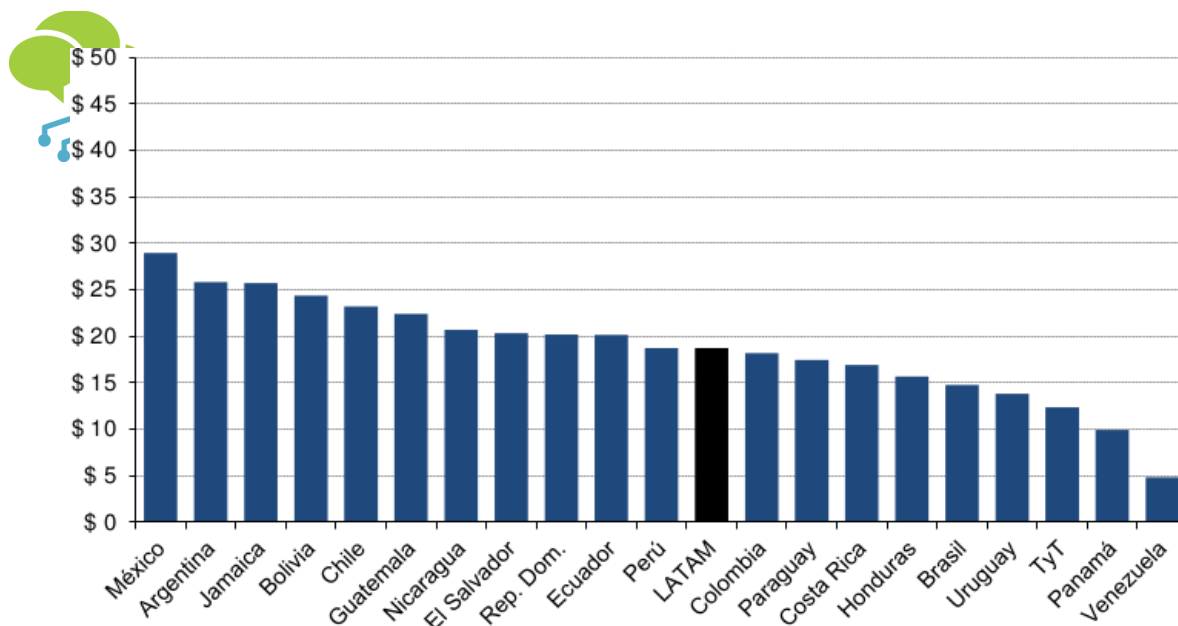comunicacion@floksociety.org
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more operators of broadband services. However, the demand for services has not the same supply growth, which means that almost two of three households served by fixed broadband operators do not hire this service because of prices.

ITU-ICT Index ranked 157 countries based on their level of ICT access, use, and skills. It said that 250 million people were connected online in 2012, but 4.4 billion remain unconnected. Of 1.1 billion households worldwide not yet connected to the net, 90% were in developing countries, mostly in Africa. The high cost of net access in developing countries was restricting uptake and causing a "digital divide". South Korea led the world in ICT development followed by Sweden, Iceland, Denmark, Finland, Norway, the Netherlands, United Kingdom, Luxembourg, and Hong Kong (China).

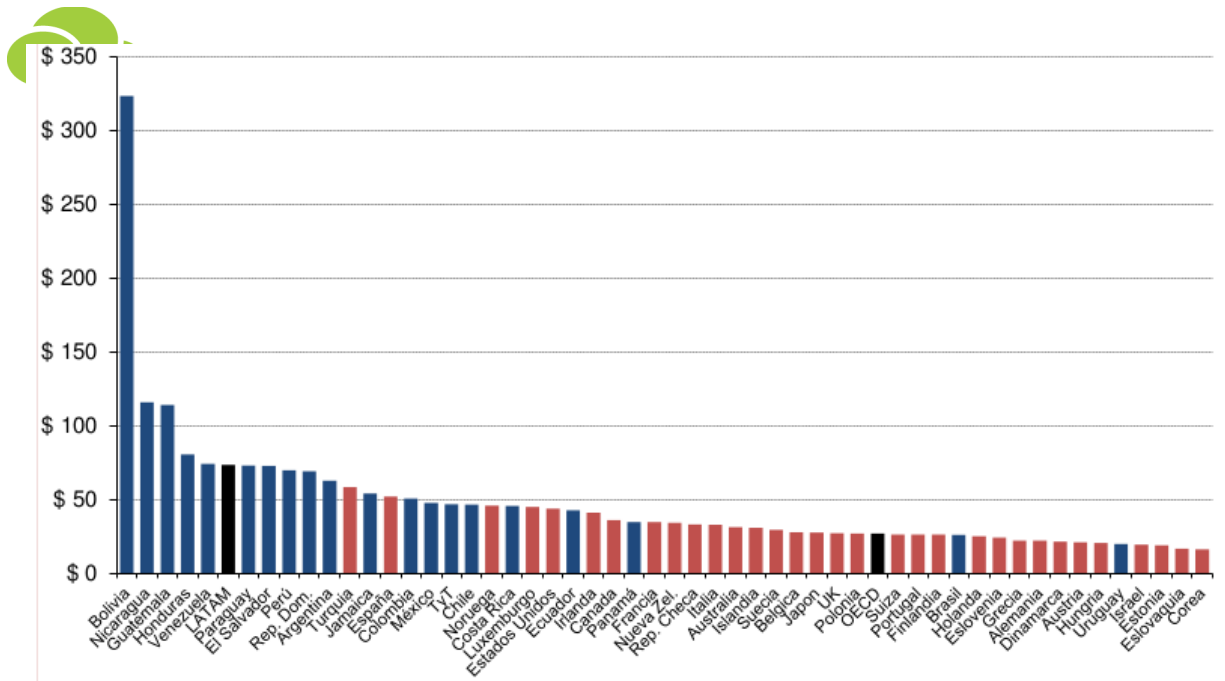## Broadband cost comparing Latin American and the OECD countries

The variety of fixed broadband plans offered by operators allows to construct different indicators that capture the market situation in their different segments. One of the indicators used in international comparisons is the price of the cheapest plan (not packaged with other services) offered in each country. This indicator represents the minimum monthly spend for a broadband connection, regardless of the quality of service, capacity constraints and additional services offered by the operator. As shown in the following picture, there is a significant price dispersion in the region, while in countries such as Panama and Venezuela the price of basic connectivity service does not exceed $10 per month, the same exceeds $25 USD in countries like Argentina and Mexico (Galperin 2013a).

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The good performance of some countries like Venezuela and Uruguay is explained mainly by the aggressive policies of universal broadband access implemented through the public operator. In countries like Brazil, these policies have been implemented through public-private partnerships between state and private operators. Nevertheless, in countries like Mexico, the backlog of policies to promote globalization and competition result in prices that are twice those in Brazil and are 55% above the regional average.

The cost of the cheapest connectivity plan typically refers to offers that include low speed and limited data download. For a comparison in the middle market segment of residential access, it is used as indicator the cost of the cheapest plan that offers a download speed of at least 2.5 Mbps and a data download of at least 2GB. Although, in LATAM most of the plans in this segment have a flat rate (without limits on data downloads), this indicator represents the largest volume segment in the market access, and allows comparison with respect to OECD countries, like showed in the next picture (Galperin 2013a).

In this segment price dispersion across region countries is confirmed and is higher than in the case of basic connectivity plans, stressing the case of Bolivia in which prices are much higher than regional average of $73 USD. The minimum expend that must make a home in Managua to access a fixed broadband service of at least 2.5 Mbps ($115 USD) is almost six times higher than an access in Montevideo ($20 USD). On the other hand, the price gap relative to the OECD countries remains wide. While some countries in the region are comparable with the price of those countries, in average a connection of at least 2.5 Mbps costs almost 3 times more in LATAM ($73.6 USD) than in the OECD countries ($27.2 USD). Some countries have implemented public initiatives for universalization of broadband access where prices remain very competitive in this higher quality of service segment, such as Uruguay and Brazil. However in the case of Venezuela, there is an evident wide gap between the price of subsidized basic connectivity services and non-subsidized segment of higher quality.

In order to analyze the situation of the regional market segment with higher quality of service access, the first indicator determined is the cheapest plan's price offering at least 15Mbps download speed. In 13 of the 20 countries surveyed there are residential connectivity offers with speeds higher than 15Mbps, unlike OECD countries, where this type of service is offered in all countries. Brazil and Uruguay appear as the best performing countries in the region, with prices comparable to the average of OECD countries. In countries like Peru and Ecuador, there is

supply but high prices limit the market. In this segment the price gap relative to OECD expands to 3.5 times.

Internet and Human Rights

In 2000, Estonia passed a law that declared access to the Internet as a basic human right. In 2009, France followed and Finland passed a decree stating that every Internet connection needs to have a speed of at least 1 Mbps (La Rue 2011). In 2010, legislators in Costa Rica reached a similar decision. The same year, a survey of 26 countries conducted by the BBC found that nearly four out of five people (79%) believe that access to the Internet is a "fundamental human right" (Jackson 2011). Finally, in 2011, as part of a United Nations (UN) commission, Dr. Hamadoun Touré, the head of the International Telecommunication Union (ITU) - the UN agency that oversees all communication things, including radio spectrum, satellite paths, global digital standards among others - made a remarkable statement, declaring, unambiguously that "*broadband access is a basic human right, right up there with the right to healthcare, shelter and food*". And additionally that "*disconnecting individuals from the Internet is a violation of human rights and goes against international law*" (Lane 2011).

On July 5, 2012, the Human Rights Council (HRC) of the United Nations, unanimously adopted a resolution to protect the free speech of individuals on the Internet[2]. The Resolution:

> *Affirms that the same rights that people have offline must also be protected online, in particular freedom of expression, which is applicable regardless of frontiers and through any media of one's choice, in accordance with articles 19 of the Universal Declaration of Human Rights and the International Covenant on Civil and Political Rights;*

> *Recognizes the global and open nature of the Internet as a driving force in accelerating progress towards development in its various forms*

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[2] http://www.loc.gov/lawweb/servlet/lloc_news?disp3_l205403231_text

This Resolution is a reference for all countries "to promote and facilitate access to the Internet and international cooperation" in developing "media and, information and communications facilities in all countries" and to adopt "special procedures" to take such issues into account.

The 2013 CSTD Report to the UN Secretary General notes that a broad-based ecosystem approach is needed to address the digital divide: *"The success of deploying ICTs in countries depends on following an ecosystem approach that engages all stakeholders and ensures comprehensive and coordinated incorporation of all inter-related elements: supply and demand, infrastructure, access facilities, policy and regulation, applications, content, capacity-building, digital literacy, funding sources and mechanisms"* (CSTD 2014).

In the case of Ecuador, the constitution, that has been placed in 2008, (Article 16, paragraph 2) recognizes the right of universal access to Information and Communication Technologies (ICT) as a right for all people, individually or collectively.

Cybersecurity and connectivity

The Internet and other communication technologies have created unprecedented opportunities to share information, opening up paths for activists, journalists and individuals around the world to organize, and hold their governments accountable. Nevertheless, the new technological tools are vulnerable to exploitation by governments, as well as big corporations, aiming to crush dissent and deny human rights. All governments struggle to balance a need to deal with serious issues such as security and privacy. In repressive societies, these concerns often serve as pretext to engage in surveillance of the Internet that violates the rights and privacy of users and threatens the free flow of information.

Nevertheless, it is not only powerful countries spying to less developed. Research has shown evidence of the existence and implementation of monitoring programs on the Internet in Latin America. It draws attention to the cases of Mexico, Brazil and Colombia, for example, espionage systems of computers and online content , which are underway or to be established, for the purpose of anticipating and neutralizing social protests and criminal actions. Governments point

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out that these systems do not seek intelligence work but police. However, there is no clarity on the objectives, limits and the principles on which such systems operate nor control mechanisms, accountability and transparency designed to limit abuses of power and authority (Varon and Alvarez 2013).

The protection of privacy is a fundamental right guaranteed by the Universal Declaration of Human Rights[3]. In a democratic society, *privacy* is an essential enabler for other fundamental rights, such as the right to freedom of expression. Nevertheless, nowadays, there is an interest, already widespread on the Internet, in weakening the protection of this fundamental right by collecting, processing, storing and trading citizen's information through surveillance. The Internet was not originally designed with its own security in mind and, as a result, connected computers are vulnerable to on line incursion and attacks (Tibbs 2013). Securing cyberspace has become one of the most important challenges of the 21st century since the Internet can be used as a medium for on line theft, message traffic interception, manipulation of information assets, destructive attacks on information and real-world assets such as national infrastructures.

Nowadays, cyber threat is one of the most serious economic and national security challenges that a country can face. The surveillance has the potential to produce not only direct violations of privacy and freedom of expression, but other harms like remotely attacks, legal penalties, exposure to attack by third parties, and in general, harmful to human rights. These practices of governments, which who apparently have the complicity of global Internet companies, seriously erode and violate human rights, not only security and privacy, but also rights related to freedom of expression, freedom of association, among others. In the end, arbitrary interference by governments or other actors in the information and communication between citizens, impacts not only civil and political rights but is able to fully exercise their economic, social and cultural rights[4].

Privacy protection needs to be adapted to the digital era and strengthened to take up these new challenges. It is essential for the continuation of democracy to force companies and governments

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[3]   http://www.laquadrature.net/en/Privacy

[4] Intervention by Valeria Betancourt in the panel: Security and surveillance on the internet: the spying of power, CIESPAL,4th July 2013.

to be more transparent and accountable to citizens for the protection of our data. As technologies that facilitate State surveillance of communications advance, States are failing to ensure that laws and regulations related to communications surveillance adhere to international human rights and adequately protect the rights to privacy and freedom of expression. International Principles on the Application of Human Rights to Communications Surveillance[5] provides a framework to assess whether laws and surveillance practices, existing or proposed, are in line with human rights.

In Latin America almost all global Internet connections using fiber optic cables pass through the United States. In order to avoid crossing boundaries, countries need to form industrial alliances to create an alternative physical infrastructure for the Internet, strengthen their actual infrastructure by regulating the Internet providers sector, applying strong encryption on the communication links, and establishing cyber security strategies. This will protect countries from surveillance, and will let them achieve sovereignty and economic competitiveness.

Development and social inclusion relies on the Internet remaining a global resource, managed in the public interest as a democratic, free and pluralistic platform. States must promote and facilitate universal, equitable, affordable and high-quality Internet access on the basis of human rights, the rule of law, and net-neutrality[6].

Problems and Challenges

In developing countries and emerging economies, among the different factors that affect the level of demand for broadband services there are: the lack of a strong public access policy, the level of income as the main determinant of broadband adoption, the level of education attained by the individual and the individual's age. Household surveys in several countries in the region, with a computer but no Internet connectivity, point to the cost of services as the main barrier. Broadband affordability, defined as the relation between the price of the service and the individual or household income, seems to be the main barrier to growth in demand for connectivity in the region (Galperin 2013a).

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[5] https://es.necessaryandproportionate.org/text
[6]   https://www.apc.org/en/node/19418

The quality of service is a key factor for the development of the Internet ecosystem. Different studies show that a high level of latency discourages the adoption and reduces utilization. Poor quality also slows the growth of industry, especially VoIP and VOD services, and encourages content providers to use hosting services outside the country, limiting the scale of the local market and, thus exacerbating the problem of quality. In the absence of higher quality services, local Internet markets tend to get caught in a vicious circle of low adoption, low traffic volumes, few local content and applications and, the slow development of Internet (Galperin 2013).

II. The Ecuadorian Political Framework

By the end of 2012, the Internet penetration in Ecuador had reached a high of 35%, although some sources within the country cite penetration rates as high as 55 % (FOTN 2013). This was the result of government efforts to increase connectivity in all the country, according with the "Digital Strategy 2.0 Ecuador" plan stated in November 2011, which set goals for increase Internet access and enhance technology that included the extension of Internet connectivity to 50% of households by 2015. Nevertheless, despite the substantial improvement that it had over the past two years, the country still faces challenges related to Information and Communication Technology (ICT) development such as broadband connectivity especially in rural areas, high consumer costs, poor quality of ISP service and high taxes on mobile phones, particularly those with Internet access.

Among the different initiatives that the government did based on increasing digital literacy and general Internet access we have the Infocentros[7]. This project was in charge of the Ministry of Telecommunications (MINTEL), and consisted on the creation of a number of public Internet access centers in remote regions. Infocentros have been installed in 377 of the 810 rural parishes (48%) in Ecuador, they provide free access to computers, telephones, and the Internet, and also

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[7] http://www.infocentros.gob.ec/infocentros/index.php?
option=com_content&view=category&layout=blog&id=38&Itemid=56

offer ICT training[8]. During 2012, teams from the National Plan of Digital Recruitment (PLANADI) used this Infocentros to train a 34,500 people to be technical managers, and about 445,000 visitors have accessed the Internet from such centers in rural districts.

Internet cafes are also becoming increasingly common, providing an alternative means of access to Internet for educational, communication, and researching purposes. However, isolated communities in rural areas have less presence online due to connectivity issues, and therefore less representation in terms of advocating for matters such as water rights and indigenous land issues, leading to potential marginalization in online communities.

Infrastructure

Three groups of fiber-optic cable run through Ecuador, offering connectivity to 23 of the 24 provinces: from the north through Colombia towards the Andean region, from the coast in the province of Guayas, and from the south through the province of El Oro. Ecuador has about 22 Internet Service Providers (ISPs), most of which offer Internet service via these points of connection without activation fees. Of Ecuador's ISPs, ETAPA and GroupTvCable hold the greatest percentage of market share.

Talking about mobile service providers, Ecuador has mainly three: CNT, a state-run operator, and private providers, Claro (CONECEL) and Movistar (OTECEL). The total number of active cellular accounts exceeds 14 million. Claro has about 67% of subscribers, followed by Movistar with 30%, and finally CNT with 2,5% of the subscribers[9]. In 2012, the Ecuadorian government awarded 30MHz of spectrum in the 700MHz band and 40MHz in the 1.7-2.1 GHz band to the state-owned telecommunications company, CNT, for delivering 4G services, which caused concern among private operators about possible discrimination by the government. 4G technology allow high speeds improving the time of response of the network. For instance, to upload an image takes the user 25 seconds on a 3G network, while in LTE (4G), the time is

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[8]http://www.infocentros.gob.ec/infocentros/index.php?
option=com_content&view=category&layout=blog&id=38&Itemid=56

[9]   http://www.hoy.com.ec/noticias-ecuador/correa-anuncio-que-renegociara-la-banda-4g-607874.html

reduced to one second. Recently, June 2014, the government had considered the negotiation of the 4G concession to the other mobile operators, a process that will last about 6 months.

National Broadband Plan

In 2011, Ecuador launched the National Broadband Plan, which promotes the bridge of the digital divide, seeking that 75% of the population has access to a good quality Internet connection over the next six years, as well as to meet the demand of services and promote the reduction of prices. The main objectives of the plan are to improve the quality of life of Ecuadorians through use, introduction and appropriation of new information and communication technologies, decrease rates of broadband Internet access service, and promote the deployment of networks and services in all the country[10].

Nowadays, between 33 and 66% of Internet users have broadband speeds between 2 to 3Mbps, at a cost of $20 to $25 per month (FOTN 2013). In May 2012, Superintendent of Telecommunications indicated that the overall average speed of an Internet connection in Ecuador is 128Kbps. Although speeds are lower in rural areas, prices of access are consistent in both rural and urban settings. In June 2014, the CONATEL (Consejo Nacional de Telecomunicaciones) establishes a new broadband definition under resolution TEL 431-13-CONATEL-2014[11]:

> *"Broadband: bandwidth delivered to a user through a downstream transmission speed (provider to user) minimum effective equal or higher to 1024 kbps, permanently connected, allowing the combined provision of transmission of voice, data and video simultaneously."*

With this new resolution, one of the main government's objective is to achieve, by 2017, 90% of the country with the necessary infrastructure to cover the fixed and mobile broadband Internet services.

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[10] www.telecomunicaciones.gob.ec/plan-nacional-de-desarrollo-de-banda-ancha/
[11] http://www.regulaciontelecomunicaciones.gob.ec/wp-content/uploads/downloads/2014/06/TEL-431-13-CONATEL-2014.pdf

III. Critique to capitalist models

Infrastructure helps to improve the quality of life, social inclusion, and opportunities for isolated communities while, at the same time, it promotes economic growth, facilitates national integration, regional interconnection, decentralization, and internal mobility. During the past two decades, ICT have expanded significantly in Latin America (Barbero 2011). The first wave of dissemination has been in fixed telephony and mobile telephony. These developments have been based on public policies that concentrated on the privatization of fixed line operators, on the promotion of mobile telephony and on the promotion of competitive structures for providing these services. The second wave of ICT development was related to the adoption of personal computers and the Internet, and the third was the adoption of broadband services in homes as well as companies and public administration.

At the same time, the region analysis showed significant gaps in broadband use between and within countries, between regions and social groups. National capitals, provincial capitals and primary urban centers show a significant development of networks while smaller urban centers and rural areas are not yet efficiently served by the telecommunications networks (Barbero 2011). That means that many people still remain outside network coverage and many within coverage areas cannot afford the high cost. These gaps represent a significant obstacle for the development of these regions and for the inclusion of the less privileged socioeconomic groups. At the same time, the public sector will work to ensure quality of service and ensure universal coverage in telephony and broadband. The migration to third and fourth generation mobile networks (3G and 4G), need to satisfy the growing traffic, demanding to the existing infrastructure, a greater trunk capacity and greater allocation of the radio electric spectrum.

IV. Alternative Models

Case Study 1: Africa (rural Zambia)

Statistics published in 2007 by the International Telecommunications Union (ITU) show that the entire continent of Africa has fewer Internet users than France alone (Matthee et al. 2007). This huge disparity in Internet access is undesirable because it demonstrates that people of different communities do not have equal opportunities to benefit from technology in their daily lives. LinkNet, an organization who brings telecommunication services and Internet connectivity to rural areas throughout Zambia, provided Internet access in rural Macha in 2004.

Prior to this, the only forms of communication in Macha were by an unreliable high frequency (HF) radio link that enabled short messages to be sent to/received from other towns and a very high frequency (VHF) system for voice communication to the nearest town, Choma. Before 2004, Macha had only a handful of 'stand-alone' computers not connected to the Internet and mobile phone services were not available. In the town, there are no fixed lines or optical fibers as telecommunication operators don't think this as a viable business opportunity. Nevertheless, the successful implementation of telecommunication services and the Internet was based on four key enablers (Matthee et al. 2007):

- A holistic approach involving all the stakeholders including health institutions, schools and community members
- Training of local people for daily IT operations and on-site support
- Affordable technology customized to the local environment
- Central training and implementation at the LinkNet Center of Experience at Macha

The key to the success in Macha was a holistic approach involving all the stakeholders including government, the local community, local institutions, and donor organizations. In 2007, after three years of operation, there are in excess of 100 computers, 200 local people have been trained in basic computer literacy, ten locals from Macha have been trained as IT technicians and more than 65 new jobs have been created .

The Internet in the community is provided to local research institutions, hospital and schools. Individuals can access the Internet in a public Internet cafe or by a connection at home. The most

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important usage of the Internet is personal communication via e-mail and chat services. Furthermore, it has yielded several innovations that were not anticipated when the Internet was first introduced. These innovations have led to significant socio-economic benefits.

Case Study 2: Free Networks in the community

Wireless Community Networks (WCN) are public wireless access schemes, result of collective efforts of individual volunteers based on infrastructure sharing, granting an open and free access to each of them. Most of these initiatives are promoted by non-profit citizen communities of technology enthusiasts who share a common view, often based on "hacker ethics" and a "free software" ideology. In wireless commons model, each user contributes with resources, usually fixed broadband Internet service and/or access points, and adheres to a set of rules or charter governing the infrastructure sharing (Oliver et al. 2010). As WCNs provide no customer care, no service level agreements, and do not plan network deployment, they can not be considered as Internet Service Providers (ISPs). Nevertheless, in some cases CWNs do play a critical role, for example by complementing the coverage of commercial ISPs in rural "grey zones" where commercial broadband access is only partial.

Among the most successful implementation of WCNs there is Guifi.net. The Guifi network[12] is a telecommunications network, open, free and neutral built through a peer to peer agreement where everyone can join the network by providing his connection, extending the network and gaining connectivity to all. This CWN was originated in Osona (Oliver et al. 2010), a rural area in the autonomous region of Catalonia, Spain. Despite Guifi started as a citizen initiative, it immediately got support from local municipalities in Osona, which financed nodes for the mesh network to provide broadband in areas where there was no commercial ISP coverage. Guifi uses unlicensed spectrum for its communications links, and its users create network nodes on a volunteer basis from inexpensive Wi-Fi equipment. Guifi's self-organizing community is governed by a Wireless Commons charter that views unlicensed spectrum as a public asset, which means that Guifi satisfies the definition of an open network with free access and a self regulating community with a well defined charter.

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[12] http://guifi.net

The first Guifi radio links were established in 2004 between houses in the Catalan countryside. The first one thousand running devices were reached during the summer of 2006, at which time growth had already become exponential. In November 2009, the Guifi network consists of over 9,000 live nodes and almost another 4,000 projected. Nowadays, the network serves around 20,000 nodes. Guifi's usage statistics show that Guifi users make significantly more intensive use of the Internet than users with commercial fixed broadband access (mostly ADSL). In the last three months Guifi has made Internet usage grow to 74,6% in the Osona region. This makes this region now rank sixth in the Eurostat ranking of Internet use.

Guifi community established a set of principles describing the terms and conditions to expand and use the network. These are formulated as the Wireless Commons License[13] which takes its inspiration from the Creative Commons License used in the Linux communities. The Guifi Wireless Commons License establishes the Guifi network as being constructed from collaborative individual contributions, and have no proprietor. The definition of a Wireless Commons license as the basis for joining the community was one of the decisions that proved crucial for the openness and transparency of the Guifi network. In order to join the network, a user engage in a peer to peer commitment where every node extends the network by receiving connectivity from one or more peers and in turn providing connectivity to others.

Among the most interesting experiments of WCNs (Frangoudis et al. 2011) there are:

- Athens Wireless Metropolitan Network (AWMN)[14] is one of the largest community mesh networks in the world. Currently it has more than 9000 registered nodes, with more than 2400 of them being active.

- SeattleWireless[15], has been at the forefront of the WCN movement since the early 2000s.

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[13] http://guifi.net/en/WCL_EN
[14] http://www.awmn.net
[15] http://www.seattlewireless.net

- NYCwireless[16] and the CUWiN Foundation[17] advocate the use of open wireless technologies developing free wireless access solutions for undeserved communities. They also develop software for community wireless projects and are operated by nonprofit organizations.

- Freifunk mesh networks (Milic and Malek 2007) have sprung up in various German cities, as well as in cities in Austria and Switzerland. In Berlin, Freifunk counted 316 concurrent participating nodes on average, according to a 2007 study.

- FON[18], has proposed a private hotspot sharing scheme, where WLAN owners can either share their WLANs for a small monetary compensation or in exchange for similar service when they are away from their own WLAN. FON takes care of user registration and authentication and withholds a fraction of the money paid to the hotspot micro-operator for the provided service. British Telecom has recently partnered with FON so that hundreds of thousands of BT's subscribers share their home broadband lines over Wi-Fi with other community members.

- South African wireless community networks were developed in different cities allowing members to talk, send messages, share files and play games independent of the commercial landlines and mobile telephone networks.

V. Preliminary General Principles for Policy Making

Among the different principles concerning the access to the Internet and the necessary infrastructure, United Nations states (La Rue 2011):

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[16] http://www.nycwireless.net
[17] www.cuwireless.net
[18] http://www.fon.com

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- To develop effective policies to attain universal access to the Internet. Without concrete policies and plans of action, the Internet will become a technological tool that is accessible only to a certain elite while perpetrating the "digital divide". Public access is a core component of strategies for reducing the digital divide.

- The term "digital divide" refers to the gap between people with effective access to digital and information technologies, in particular the Internet, and those with very limited or no access at all. In contrast to 71.6 Internet users per 100 inhabitants in developed countries, there are only 21.1 Internet users per 100 inhabitants in developing countries. This disparity is starker in the African region, with only 9.6 users per 100 inhabitants. Digital divides also exist along wealth, gender, geographical and social lines within countries.

- Being wealth one of the significant factors in determining who can access ICT, Internet access is likely to be concentrated among socio economic elites, particularly in countries where Internet penetration is low.

- People in rural areas are often confronted with obstacles to Internet access, such as lack of technological availability, slower Internet connection, and/or higher costs.

- Even where Internet connection is available, disadvantaged groups, such as persons with disabilities and persons belonging to minority groups, often face barriers to accessing the Internet in a way that is meaningful, relevant and useful to them in their daily lives.

- Without Internet access, which facilitates economic development, marginalized groups and developing countries remain trapped in a disadvantaged situation, thereby perpetuating inequality both within and between countries.

- The Internet offers a key means by which such groups can obtain information, assert their rights, and participate in public debates concerning social, economic and political changes to improve their situation.

- The Internet is an important educational tool, as it provides access to a vast and expanding source of knowledge, supplements or transforms traditional forms of schooling, and makes, through "open access" initiatives, previously unaffordable scholarly research available to people in developing countries.

- To build an inclusive Information Society, to put the potential of knowledge ICTs at the service of development, to promote the use of information and knowledge for the achievement of internationally agreed development goals.

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- To adopt effective and concrete policies and strategies - developed in consultation with individuals from all segments of society, including the private sector as well as relevant Government ministries - to make the Internet widely available, accessible and affordable to all.

VI. Policy Recommendations

Among the main pillars to be considered for consolidating a society based on Information and Knowledge there are: the access and use of ICT, the deployment of telecommunications infrastructure, the development of digital content and applications, the appropriation of new technologies and training of human resources in these technologies. In the Buen Conocer / FLOK Society Summit, the ICT/Connectivity and accesibility working table had presented as a formal declaration that:

"*It can't bring into being a social knowledge economy without universal access to a free and open Internet. The principles of openness, freedom, democracy and embedded collaboration protocols and Internet architecture must be transferred to the management, access, development and policies that regulate it. Take the Internet as a common good is the foundation to counteract the different forms of domination (including political domination), cultural subordination, technological dependencies, the consolidation of a model that privatizes and appropriates knowledge; a model that centralizes and controls infrastructure networks and contents that circulate by it. The same rights that people have outside Internet must be protected when they are connected. Therefore Internet access must be reinforced as an enabler of the exercise of human rights and their advocacy in the digital environment. The net neutrality must be protected at all costs to prevent the establishment of first and second category Internet. We can't move toward the Good Living without a universal, affordable, quality, free and open broadband Internet access. The government, in collaboration with other stakeholders, has the responsibility and obligation to create conditions for broadband Internet access fully exploited by the public,*

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allowing a more just and inclusive society, making it part of the management and shaping of their own development"[19]

Among the different policy recommendations regarding the Connectivity topic suggested to be included in Organic Code of Social Knowledge Economy (COESC + i) there are:

Policy 1: Public access to digital inclusion: to allocate significant financial resources oriented to increase public investment in fixed and mobile infrastructure Internet; to train human talent and; to develop content according with local and national needs.

Policy 2: Infrastructure sharing: to establish a infrastructure sharing strategy as a means to improve broadband coverage and promote competition in order to reduce the cost of access.

Policy 3:Development of community wireless networks: to provide public wireless access in rural and sparsely populated areas.

Policy 4: Regulation of the broadband market: to design policies to ensure robust competition, encouraging price reductions in broadband service to the final user.

Policy 5: An integral civil and rights framework for the internet: Overall, one of the key recommendations is to develop a civi/rights internet framework for Ecuador which sets the principles, right, and obligations related to internet access, use, management and development.

Policy 6: Cybersecurity.

In the process of implementing these public policies, different actions can be specified, including:

Policy 1: Public access to digital inclusion

   – To complement and extend the current impact achieved by increasing public investment in fixed and mobile infrastructure Internet. This deployment should be done primarily in undeserved areas, to support the achievement of the objectives of the country in public education, healthcare and e-government.

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[19] http://buenconocer.org/english.html

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- To allocate significant financial resources oriented to the training of human talent and content development according with local and national needs. Nowadays, there is a lack of awareness about the importance of public access and the implementation and sustain of public access facilities, particularly in developing countries. This can be achieved through the stimulation and promotion of the adoption of broadband through digital literacy, deployment of public access centers, and development of e-government applications, in order to awareness citizenship about the critical society challenge from an economic growth perspective.

- A basic requirement for public access are the low costs and high connection speed. This requires a policy and a regulatory environment conducive to ensure Internet services to be competitive, massive and reliable.

- To set objectives and goals, and monitor their progress. Indicators should be established to measure the progress in providing public access and assess the impact.

Among the different elements of this policy we have:

- To design strategies of digital literacy
- To cover undeserved areas
- Develop solid strategies of awareness, promotion and capacity building for use in all sectors and social actors.
- Social appropriation of Infocentros
- Construction of quantitative and qualitative indicators on the social, economic, political and cultural impact of Internet access with broadband connectivity.

Policy 2: Infrastructure sharing

- To establish the infrastructure sharing as a means to improve broadband coverage and promote competition in order to reduce the cost of access. Infrastructure sharing is a business strategy supported by regulatory policy designed to minimize duplication of infrastructure, making it less costly to deploy, freeing up capital from sunk costs in

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construction so that more funds can also be available for services and further infrastructure deployment in areas that may otherwise be uneconomic to serve. In fiber deployment for example, 80-90% of the cost is in the civil works for the ducting – if this can be shared, the savings are substantial. Similarly, duplication of masts massively increases the cost for providers rolling out last mile wireless networks. Infrastructure sharing is therefore increasingly being seen as an important means to improve broadband coverage and promote competition to drive down the price of access.

Policy 3: Development of community wireless networks

– To provide public wireless access in rural and sparsely populated areas (in marginal or peripheral areas). This will contribute to good living in these areas by optimizing the potential of access to broadband for economic development, social inclusion, political participation and the exercise of rights, avoiding the perpetuation of inequities.

– To adopt a free network approach focused on free and open networks principles, it means that any user is free to know about the network components, how it works and use it for any purpose and type of communication, unless the user affects the network availability and/or the freedom of the other users. The network as a whole does not have any owner, regardless of how significant is everyone contribution to the network, therefore, it is not responsible of the usage or any damage caused by the network participants.

– To reassign frequency bands or to search "unused bands" and assign them to the wireless mobile communications sector in order to reach universal broadband service coverage. Wide spectrum bands have to be able to provide broadband access at adequate quality levels (download speeds). High cost of spectrum for providers is past on to end-users in high access prices. Restricted access to spectrum stops end-users from being able to self-provide, and supports the mobile operators' efforts to retain their market dominance for provision of broadband services which have been shown to be too costly for the bottom of the pyramid, and speeds are too slow for maximizing the multimedia benefits of broadband. Television White Spaces (TVWS) provides an alternative, and does not require us to wait for digital migration (which will only end up releasing spectrum for

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mobile broadband unless other spectrum opening opportunities such as TVWS and dynamic spectrum management are not adopted at the same time).

Policy 4: Regulation of the broadband market

– To design policies to ensure robust competition, encouraging healthy competition in the broadband market, establishing a mandatory infrastructure sharing strategy in order to reduce backhaul costs (backbone and towers).

– Encourage price reductions in broadband service to the final user.

Policy 5: An integral civil and rights framework for the internet

– To move towards a collective construction of an Ecuadorian Civil Rights Framework for the Internet that would constitute the framework to guide the development of Internet public policy and regulatory principles for access, use, operation and development of Internet law. In this context, it should be assumed the *broadband connectivity* as a public service.

Policy 6: Cybersecurity

– To determine a national cybersecurity strategy, since the Internet and ICTs have become essential for the economy and the social development of the country. This national cybersecurity strategy should be considered as a tool to improve the security and resilience of national information infrastructures and services, among government priorities. Each strategy should establish a range of objectives and priorities in the country, scheduled to be achieved in a specific timeframe.

– To establish the *encryption* as a crucial tool to ensure security. In the absence of encryption, online communications can easily be intercepted by anyone. Individuals and government institutions, as well as service providers should all use strong encryption routinely.

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– To encourage the development of open standards enabling innovation for security solutions, relying on open Internet standardization groups and avoiding unilateral modification of Internet standards (promote open and universal knowledge).

– An existing institution or a new one should be established to ensure information security compliance. This institution should be in charge of enhancing governmental co-ordination at policy and operational levels to facilitate co-operation, encourage synergies, avoid duplication, and pool initiatives. This evolution from a multi-agency to an inter-agency approach requires strong leadership to enable co-ordination and co-operation across pre- existing government silos.

Among the different elements of this policy we have:

- Protection and resilience of critical information infrastructure, for instance, to set redundancy alternative routes for emergency communications
- Human talent training to support country's cybersecurity needs and build capacity
- Promotion of research and development in cybersecurity
- Create cyber security awareness
- Ensure net neutrality
- Suggest guidelines for the management and operation of the country domain name. EC
- Eliminate or minimize data retention
- Encourage debate, knowledge and public awareness on digital rights -digital literacy-
- Accelerate the implementation of the optical ring in South America and a possible undersea cable to Europe

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