



Session Title:

Making Community-Driven Networks a Reality

Microtelcos and Regulatory Issues

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Abstract

Telecom sector reforms during the past decade and the policy instruments used – such as privatization of telecom companies, liberalization policies and the creation of national regulatory authorities (NRAs) – were designed and executed under the assumption that they would foster the creation of new national and local companies and facilitate the entry of global companies. This would presumably lead to an increase in competition, which would in turn improve the welfare of users, promote the growth of the sector and contribute to the development of countries that applied these policies.

However, the facts have shown that this has not happened. Instead, what we have seen in recent years is the reconcentration of companies, and in the specific case of Latin America, the creation of duopolies. It is also evident that these companies have attended only precariously or not at all to rural areas. The consequence of this situation is a deepening of the market gap.

Although it was believed that this market failure could be solved with the creation of investment funds used to subsidize investments and operations in rural areas, the necessary resources have not been fully available.

Next generation networks (NGN), voice over internet protocol (VoIP) and wireless networks are new and extraordinary alternatives to overcome the market gap. They allow for the delivery of broadband and home phone services to unserved areas, at a low cost and under new business models, in many cases practically without the need for subsidies.

The goal of this paper is to analyze how NRAs have addressed this issue and the challenges faced by microtelcos, by looking at practical experiences, policy measures and actions undertaken in Peru and the Dominican Republic.

On the basis of this analysis, a series of regulatory policy reforms are recommended. These could be applied to implement *ad hoc* regulation that promotes initiatives based on public-private partnerships, private ventures or direct subsidies.

1.0 Introduction

In 2002, Ruddy Valdivia, a visionary small telecom entrepreneur in Peru, decided to bring service to an isolated rural district called Callahuanca in the province of Huarochirí. In order to do so, he went to the Ministry of Transportation and Communications and to OSIPTEL, the Peruvian telecom NRA, for help in pursuing his initiative.

At that time, market access policies and licensing laws made this entrepreneur's idea seem impossible. First, the smallest license he could obtain was for the entire region of Lima, although Callahuanca is just one of 32 districts in Huarochirí, which in turn is one of 10 provinces in the region of Lima. Second, a license would involve the obligation to install no less than 5% of the number of lines currently available through the incumbent operator (roughly one million) over a period of five years. In other words, in five years he would have to install 50,000 lines, resulting in a penetration level of around 80% in a country where the current level was 8%.

Although Valdivia eventually succeeded with his initiative, as we will see later in this paper, the hurdles he faced highlight the need for NRAs to review and adapt rules and regulations in light of new realities. Current telecom projects are largely designed to expand the offer of broadband and related services such as voice, data and multimedia in large cities through next generation networks (NGN), voice over internet protocol (VoIP) and wireless networks. But these technological advances, and particularly wireless technologies, also offer enormous potential for extending telecom services to areas where they are currently limited or non-existent. The much lower implementation costs of wireless systems compared to traditional technologies make them accessible to underserved areas with socioeconomic constraints.

The problem is that the business models and technologies used by big international companies do not take these realities into account, and so they fail to serve these areas despite the existing demand. In the meantime, there have been growing efforts by civil society – through private ventures, NGOs and municipalities – to use these new technologies to offer services to unserved or underserved regions, especially in rural areas. But in attempting to do so, they come up against a lack of adequate information and a myriad of regulatory barriers.

Overcoming these obstacles would foster the growth and development of these new technologies and help governments in their task of promoting and offering telecom services. This is why it is essential for NRAs to review the applicable rules and regulations and stimulate ventures like these in all possible ways.

This paper presents two examples of initiatives of this kind: the abovementioned venture in Huarochirí, Peru and another in the Los Botados district of the Dominican Republic. It concludes with a number of recommendations based on these experiences.

2.0 Peru: Televias Huarochirí

2.1 Geographical location and demographics

Peru is divided into regions, provinces and districts. The province of Huarochirí is located in the region of Lima, next to the city of Lima, the national capital.

Huarochirí is divided into 32 districts which cover a total area of approximately 5,600 km² but have a total combined population of barely 64,000 inhabitants. One reason for the small

population is the extremely rugged terrain as well as the presence of four major river basins. The province encompasses mountains up to 6,000 meters high, and population centers can be found from sea level to over 5,000 meters above sea level.

Despite being one step away from Lima, Huarochirí can seem as remote as the most far-flung province. Its road network is far from satisfactory; to reach places that are geographically about 100 kilometers from the capital, it takes at least eight hours to get there by car.



2.2 The entrepreneur and the venture

When he set out to bring telephone service to the district of Callahuanca in Huarochirí, the first obstacle that Ruddy Valdivia faced was the licensing regime in

place at the time, as described at the beginning of this paper. This problematic situation was subsequently addressed by the telecom NRA, OSIPTEL, and the Ministry of Transportation and Communications. The two institutions joined forces to get a law passed in parliament, reducing the minimum license from the regional level to the provincial level, with no obligations regarding the number of lines installed (except in the city of Lima).

This change in legislation paved the way for Valdivia to apply for a license and to seek financing for his project from the Telecom Investment Fund (FITEL). Then he could deploy his network and provide the services demanded by the community of Callahuanca.

After many months he managed to present his project to OSIPTEL. It was analyzed in order to be considered as a pilot project and eligible for financing. After more than a year, the project was approved, but in the meantime, OSIPTEL had been instructed to apply the rules concerning public investment projects to its telecom projects. Valdivia had to reformulate his initiative so that the economic analysis and supporting justifications demonstrated the project's social profitability.

Once this was done, the project was presented to the Ministry. However, because Valdivia proposed the use of wireless technology using the 450 MHz frequency, adjustments to the frequency allocation policy had to be made.

Finally, more than two and a half years after initiating the procedure, the project was approved and OSIPTEL granted partial financing.

Immediately, interconnection problems arose. The legislation was designed for big companies to negotiate with a pool of engineers, economists and lawyers. In this case, all three of them – engineer, economist and lawyer – were one person. Around this time, the legislation was modified to allow interconnection for rural enterprises to be carried out through subscriber lines, which cut the costs of the process and shortened the negotiation time. This alternative has been an incentive for companies to speed up their interconnection processes, since an agreement can now be reached after only a few months of negotiation. In this regard, the rules that OSIPTEL established in order to make telecom companies formulate a mandatory basic interconnection offer were a big help.

The project was finally inaugurated on June 19, 2006, with a ceremony attended by telecom authorities, telecom company officials and the local government.

This story sums up the problematic process faced by Ruddy Valdivia and the patience needed to make his public service project a reality. Thanks to this initiative, the road for small operators in Peru has been made smoother, because the necessary procedures and rules are now in place – although they still need to be speeded up and simplified.

Valdivia's microtelco venture is in full operation and is currently expanding its services. It has more than 240 subscribers, and so far the traffic involved has proven to be higher than the most optimistic estimates, for both incoming and outgoing traffic.

In the meantime, Callahuanca has become a technological innovation center for appropriate technologies for rural areas, as well as a professional training institution. Ricardo Palma University and National University of San Marcos rural telecom

courses are taught there, and are also open to students from three or four other universities. Three courses have been given in the last year and a half.

The initial Televias Huarochirí project has now expanded to become Televias Peru,¹ as explained on the microtelco's website:

Televias Peru was born from the Televias Huarochirí project. This project aimed to bring technological services to rural communities in the province of Huarochirí. We have analyzed and studied the entire Huarochirí area and designed our system with the most advanced and appropriate technologies for rural areas. The planning of the project started three years ago and we are currently providing technological services to residents of rural communities.

Mission: To expand our network and provide technological tools to rural communities throughout Peru, reaching every corner of the country.

Vision: To be a world leader in rural telecommunications, because we consider Peru as a little laboratory. To continue constantly researching, developing and innovating our technology to offer the highest quality services to our customers.

The Technological Valley project: The aim of this project is to offer training courses to the residents of communities in Huarochirí, as well as informative courses to students and telecom professionals interested in learning about the technologies implemented in the Televias Huarochirí project.



This is how Ruddy Valdivia himself tells the story behind Televias:

It's hard to really say where the idea was born. When you get caught up in developing an idea you forget certain details and the matter of where it all started can get hazy.

I think the idea began developing progressively many years ago. Now that you've asked me to tell the story, I remember that before Telefónica started its operations in Peru, when we still had monopoly legislation, I tried really hard to get permission to operate, but it was denied. It took so long for the authorities to give me an answer

¹ <www.televiasperu.com> Accessed 6 November 2007.

that I got it when Telefónica was already in the market. The contents of the resolution are so lame that it's not worth quoting.

As the years passed, I participated in the implementation of some of the Telefónica networks, until the first FITEC project arrived and was awarded to the company Gilat. I remember that I was consulted for each step that had to be taken, until they reached the conclusion that although this operator was new in the operating activities, it had the necessary technical and financial support.

I believe that was the moment when the idea of being an operator began, and it grew stronger when we stopped working as contractors for that company. I started to visit the jungle area in the provinces of San Martín and Alto Amazonas, and I was actually on the verge of buying land near Tarapoto for what I now call the Technological Valley. I even got as far as developing the technical project.

After thinking about it more carefully, I reached the conclusion that a project in such a remote location could cause me economic problems. My company, Valtron, is registered in Lima, so I decided to look for a location closer to my current operations at the time. By chance, I chose Huarochirí when I found out my friend Enrique Risco had moved to Santa Eulalia [one of the districts in the province] and dedicated himself to providing cable TV services.

From this point on, you know how the story continues, and have already recounted it in this paper.

The fact that we chose the CDMA platform in the 450 MHz frequency allowed us to take advantage of technological developments with low levels of investment. I am not sure whether it was my desire as an engineer to be innovative or my restricted personal budget that made me look for economical alternatives.

With the per capita traffic that was registered, and because I already knew in some detail the needs of the people in the area, we requested permission from the Ministry to provide mobile services with the same platform. They liked the idea and we can now provide that service.

Each CDMA cell offers the possibility to serve around 500 subscribers per carrier and per sector and that led us to increase the coverage and link cell repeater stations. In order to do that, we thought about designing our own antennas, and the idea was successful. We also decided that we should try to work with a company to develop our repeaters, since it wasn't efficient to start from scratch. Here we ran into some trouble because it took more than a year until the design was ready and we could finally test the efficiency of this choice. It may seem like we wasted time, but the truth is that the existing repeaters have been designed based on the requirements of big operators, in order to fill gaps near the cells. This was very different from our requirement to locate the repeaters at a distance of more than 30 kilometers from the base station, because that meant more gain in the repeater and also more isolation between antennas, which meant more filters that were designed *ad hoc*.

We've had good results. The only problem was that we focused on low power repeaters and we realized that we need higher power repeaters to make it possible to link them.

When it comes to the market, we've had interesting experiences. We saw that there was a demand for our services, but you have to be part of a rural community to understand its needs and to be able to create the best tariff options, to know how to serve the market, the best way to treat your customers, the best way to charge them, and so on.

For example, an advantage that we have over our competitors is that when our customers run out of credit on their monthly plan, they can simply make a free call

and ask for more credit, which they will be charged for when their bill arrives at the end of the month. Our competitors' customers have to purchase a prepaid card that is sometimes hard to get.

Perhaps the main challenge facing a small operator is the need to have cash to grow fast and the fact that cash is not available when you ask for it in a financial institution, because they do not think the rural market is profitable. If rural telecom investment funds had the possibility to provide loans (not subsidies) for the expansion of operations, this problem would be solved. It would be an ideal solution.



3.0 The Dominican Republic: Los Botados

3.1 Geographical location and demographics

The Dominican Republic is divided into provinces, districts and municipal districts. Los Botados is located in the province of Monte Plata, just 38 kilometers from the country's capital, Santo Domingo. It is divided into six sections which are in turn divided into urban and rural areas. Of its 13,950 inhabitants, 3,986 live in urban areas and 9,964 in rural areas.

Although it is so close to Santo Domingo, Los Botados could easily be confused with a remote community. Until a few months ago it was totally isolated in terms of communications. There was no mobile phone coverage, except for certain hills where people had to go to make or receive calls. The only other option was to travel to the nearest town, Yamasá, with the resulting loss of time and opportunities.

As in the case of Callahuanca in Peru, global telecom companies established in the Dominican Republic never saw the investment opportunity of providing telecom services to Los Botados. According to their demand and income estimates and their working standards, this location did not fulfill their requirements to ensure an adequate return on their investment.

The experience in Los Botados reveals that the major unknown variables are the estimated demand, the residents' willingness to pay, and, if we include broadband services, the availability of computers and computer training.

3.2 The entrepreneur and the venture

In order to assess the real demand for telecom services in Los Botados, the NRA of the Dominican Republic, INDOTEL, decided to undertake a pilot project as part of a national project called Rural Broadband Connectivity.

This led to the establishment of a public-private partnership between INDOTEL, the municipality of Los Botados, and Centennial Dominicana, a telecom service provider in the country. INDOTEL promoted the project and provided support through equipment and fieldwork. The municipality was responsible for providing the site for setting up the signal reception antenna as well as the necessary electric power. Centennial provided the internet and VoIP services and the interconnection service.

To configure the model, I needed deeper knowledge of the rural reality, of its problems and alternatives. That is why I have been living in Los Botados since June 2007.



3.2.1 Technological results

In technological terms, the following results have been achieved so far:

- The deployment of a wireless link of more than 24 kilometers through which Centennial brings the signal from a hill called La Naviza with low cost equipment. This shattered the myth that it was impossible to accomplish a connection at such a low cost.
- The installation of a hot spot that allows a laptop with wireless connection to connect to the internet from a radius of more than a kilometer away.
- The initial installation of 20 home phones and a call center project that is in process.

3.2.2 Uncovering the true demand

Experience has confirmed that there is an important hidden demand for these services. For example, it was estimated that the internet access demand in Los Botados came from only two or three families that owned a PC. However, more than ten families are currently using the service, and we estimate that this number will increase to 30 in the coming months.

The same phenomenon was seen with regard to home phone service. There are currently more than 100 applications from households that want the service, when the initial estimate was ten families.

3.2.3 Social impact

The town has gone through a technological revolution and has shown that in rural areas like these there are also young people and adults with knowledge of computers.

Young people from Los Botados have assembled ten computers that are being used in the local Computer Training Center, and have also installed wireless network cards to access the internet from their computers at home. Many new youngsters and adults have started going to the Centre to receive training in computer handling.

A computer service center has already been established, where various computer-related services are offered, such as typing, information research, internet navigation, PC repair and PC assembling. This center makes it possible for five young people to earn additional income and serve their community.

3.2.4 Services and interconnection

This whole venture would not have been possible without the involvement of Centennial, and here I want to say something about these kinds of partnerships.

Technology has advanced very rapidly and wireless technologies have become less costly, allowing for deployments like the one described above. At the same time, people living in rural areas are avid for new services and willing to pay for them. Many of them are also already trained in computer skills, thanks to the contagious influence from nearby cities. In addition, the arrival of technologies is immediately followed by the generation of related businesses.

Nevertheless, many ventures like the ones described in this paper get stuck at the stage of ideas or frustrated implementation attempts when it comes to looking for service providers.

Interconnection rules established by NRAs in different countries are mainly developed for homologous and big companies to negotiate and do not consider the existence of small entrepreneurs. Interconnection proceedings require the involvement of lawyers, engineers and economists that small private or public entrepreneurs cannot afford.

This is why it is necessary to initiate a new policy of regulatory treatment that promotes the entrance of small entrepreneurs in rural areas. With these innovations, the objectives of telecom reforms in the Dominican Republic, Peru and other countries around the globe can be successfully accomplished.

4.0 Conclusions and recommendations

It is essential for NRAs to review their license awarding policies, in accordance with their specific country conditions, to allow for the development of initiatives by small companies and microtelcos willing to provide services in underserved areas, especially in rural areas.

New technology networks and wireless technologies are a key tool to accomplish these goals. That is why NRAs need to review their frequency and power allocation policies to adapt them to the use of these technologies in rural and underserved areas.

The procedures that entrepreneurs need to follow to provide telecom services legally should be explained on NRA websites.

NRAs should have rules to make incumbent and dominant companies offer basic interconnection offers that allow microtelcos and small entrepreneurs to achieve interconnection through subscriber lines, without the need for major investments of money and time. Procedures must be simplified, to lessen the need for specialized and costly personnel.

Finally, NRAs should promote public-private partnerships so that service can be provided to unserved and underserved communities through joint efforts. The right model is all that communities and companies need to start working to meet demand, as is shown by various existing ventures around the world.

5.0 References

Instituto Dominicano de las Telecomunicaciones <www.indotel.net.do>

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