



DOCUMENTO DE TRABAJO N° 7

# Regulation and innovation in the Argentinean telecommunications sector

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## 1. Introduction

The notion of innovation in the telecommunications sector is a relatively new phenomenon for developing nations. In these countries, the main concern has been connectivity and, to a lesser extent, the promotion of competition and the prevention of abuses by incumbent operators. The purpose of this paper is thus to determine how governments, and, in particular, regulatory agencies in less developed nations, can affect innovation. We introduce a theoretical framework which we term the “resource based theory of innovation regulation,” which looks at how timeliness, predictability and fairness in the decision making process can affect innovation.

We focus on the Argentinean case because, among Latin American nations, it has achieved greater development and thus there is the potential that their telecommunications sector has more resources for innovation. In addition, the country was among the first in the region to introduce a single license regime, which can facilitate entry and, through subsequent competition, foster innovation. In this paper, we find that even in a country like Argentina there are still important limitations: for example the power of large operators and the influence of politicians, as well as the economic limitations have made the regulator a relatively passive agency; it is precisely because of this passivity that innovation is being negatively impacted.

In presenting the evidence and developing the theoretical framework, this paper reviews the contributions of previous authors about governments and innovation, as well as information about innovation in general in Argentina and, more specifically, about the impact that regulation (or the lack of it) has had on the innovative processes

## 2. Literature Review

In this section we review the academic contributions that have been made about the role of regulation in the telecommunications sector and the impact that it can have on innovation. We begin with a brief overview of the scholarly contributions. We see how, in a relatively short period of time, notions about the role of the regulator have changed from seeing it as an entity that will wither away in favor of competition to seeing it as an entity that has a more prominent role and whose success will depend on characteristics such as its being independent, transparent, accountable and predictable.

In the second part of this section, we focus exclusively on innovation and the impact that regulators can have on this creative process. We begin with a definition of both innovation and regulation, and then proceed to propose a theoretical framework, “the resource base theory of innovation,” that can help explain this relationship better.

## 2.1. The role of regulators in the telecommunications sector

The main reason why countries have engaged in the privatization and liberalization of their telecommunications markets is because of the major deficiencies that the public experienced in quality and access. It was believed that the state was not capable of providing adequate services and that the private sector would do a better job (Saunders et al., 1983). It is, thus, up until the late 1990s that the main thrust of academic research was about promoting and maintaining competition in the sector (Simpson, 1998). However, it is also clear that, at the least during the transition from monopolies to competitive markets, there was a need for regulation to prevent abuses from the incumbent operator and to facilitate the entrance of new carriers. Thus, we see a number of studies that focus on the manner in which regulators have set, for example, interconnection prices in multiple countries (Yannelis, 1998) (Garcia-Murillo, 2004) (Krouse Krouse, 2005) (Gabelmann, 2001).

It is evident that some regulators have been better than others. Discrepancies in the manner in which the liberalization process was taking place had, in part, to do with how the regulator conducted those activities. Because of this, in the following years we begin to see the emergence of studies that advocate the independency, transparency and accountability in regulatory processes. It is at this time we begin to see formalized recommendations for regulators. In 2000 the International Telecommunications Union (ITU), in collaboration with InfoDev, published a book entitled the *Telecommunications Regulation Handbook* (Intven et al., 2000), which was a tool that regulators found exceedingly helpful in their efforts to open their markets and promote competition. This book has now been updated and has a permanent page on the Internet with modules that will respond to the most challenging issues that regulators face (InfoDev, 2009).

We are nonetheless passing through a period of great dynamism in technology. Advances in communication, computing, and the media are making it possible for companies to take advantage of the convergence of these sectors to offer new services. We are just beginning to see the many opportunities that connectivity can bring to society. It can make many other sectors of the economy more efficient, cost-effective, profitable, less polluting, and allow many more sectors of the population to have access to a vast array of services that might have not been possible in the past. There are thus great opportunities for innovation.

Given the changes in the sector, it is not unusual for regulators to evolve as well. Evidence of this type of evolution is documented in a study by Cho (1992), who analyzed Korean business-government relations from 1945 to 1991. He discovered that the nature of these relationships had changed from *laissez-faire* in the early period, to mercantilism in the 1960s, to paternalism in the mid 1970s, and to constitutionalism in the 1980s. Thus it is clear that we cannot think of the regulator as a static entity. In fact, regulators need to be aware of the

impact that their decisions and actions have on the sector in order to be able to modify their behavior to better respond to the needs of the market and the public.

In this paper we explore the relationship between regulation and innovation. In the next section we will highlight the work of academics that have identified factors that contribute to innovation and the manner in which regulations and regulators can affect the creative process of companies.

## 2.2. Innovation and regulation

Why is it important that we focus on innovation? Ever since Schumpeter introduced his concept of creative destruction, there has been a strong belief in the academic community about the impact that innovation can have on development. Development, for Schumpeter, is understood as the process of economic transformation that happens as a result of innovation. However, as Viotti (2001) indicates, innovation is a privilege of industrialized nations because, in his opinion, developing nations are usually limited to absorption and incremental improvements. The process of innovation that Schumpeter describes is closer to that of invention, while the notion of innovation that Viotti (2001) describes is more closely related to the notion of diffusion.

In both innovation as invention and innovation as diffusion, there are important challenges that companies have to overcome. The main challenges are access to resources and the risks associated with the introduction of a new product or service to a customer base that may not adopt it. In this paper, we make a distinction between innovation and invention. Unlike inventions, an innovation does not require the creation of an entirely new product. An innovation can be a product or service that is new for the company even if it is being offered by another company in the same or different markets.

When we talk about innovation in the telecommunications sector, we include the incorporation of a new service for the company, improvements in the provision of existing services, and increases in the number of functions of existing services to make them more versatile or more efficient or to improve quality. We also consider as innovation the customization of services to serve particular market segments. Small adjustments that companies make to improve access and the provision of services to the population are also considered innovation.

The existing literature on innovation is vast, but most of it is centered on the strategies of corporations alone. Few studies have looked at the relationship between regulation and innovation. The notion of innovation within the context of regulation is a relatively new concept in less-developed countries (Fagerberg Srholec, 2008). As technology advances, we are moving from the traditional command and control regulation that imposes technical, political, economic and social constraints on corporate behavior and towards a regulator that is perceived more as a facilitator and an enabler (Black, 2002; Gouldson Bebbington, 2007).

The regulator is an entity that can not only exert some control over the market and supervise the activities of the players, but it can also affect the rate of innovation.

It is true that in most developing countries, companies simply imitate what they see happening in developed nations, and that is why Viotti (2001) does not consider them innovations. In spite of the imitation that takes place, there are adjustments that companies have to make to be able to attract users.

The challenges that a company faces are fewer with innovations than with invention but there are still considerable obstacles that they have to overcome. In particular there are two main elements that they need to be able handle. These are access to resources and control of potential risks.

There are three ways in which government can affect innovation. A government can have an impact on demand, thus potentially opening the door for new technology to get developed. It can affect the technical standards that are used in the market, and it can also affect the resources available to corporations. In this paper we will focus on resources.

Most of the research that has been done about innovation and government has had a macroeconomic focus. Authors who have studied the impact of laws and regulations have done so at the country level and provided some general guidelines under the context of development studies termed “national innovation systems” (NIS). The NIS research tries to identify the macroeconomic circumstances that can support innovation in a country (Caerteling et al., 2008) (Fagerberg Srholec, 2008; Teece, (1986) ). Viotti (2001) has criticized the application of the national innovation systems notion to developing nations. He argues that the processes of technological change and innovation in industrializing countries are entirely different from those in developed nations.

As identified by several scholars, the macroeconomic factors that affect innovation in a country are adequate property rights, investment in research and development, openness to trade, and competitiveness.

*Property rights* are essential for any invention-type innovation because they provide the investor with a temporary monopoly over his creation necessary for him to recover his investment.

*Government investment in research and development* supports innovation because of the introduction of new products to the market and because of the beneficial spillovers that result from the creation of knowledge. This notion of knowledge spillovers is the main theme in the new growth theory. Knowledge in these contributions is considered a non-rival and non-excludable good that disseminates across society (Aghion Howitt, 1992; Romer, 1990). In this respect, scholars have made contributions about the right amount of research and development subsidies that the government should provide in order to stimulate innovation (Sener, 2008) (Castellacci, 2008).

*Open trade policies* are another factor that scholars have found to be relevant for technological innovation. As countries become more integrated to international trade and investment, they are also exposed to the latest technological developments. For developing countries, the process generally entails the acquisition of technologies that were developed abroad. They get assimilated, are then improved and can potentially foster local innovation. This is the process that South Korea underwent; moving it, one might argue, from a poor nation to a highly industrialized society (Kim, 1980).

Another condition that scholars have identified as contributing to the process of innovation is *competition*. This is the traditional Schumpeterian view, where high entry leads to a greater number of participants, all of which contribute to the process of innovation (Castellacci, 2008).

The aforementioned factors affect all sectors. These are general economic policies that are not aimed at any specific industry. There are, nonetheless, other policy decisions that have a direct impact on a particular sector, such as: financial support to specific sectors, establishment of standards for an industry, procurement practices, tax incentives and direct financial support (Castellacci, 2008).

*Direct support to a specific sector.* In the 1980s, the notion of national champions was quite popular; a government would select a strategic industry—and often a specific company—to which it provided financial support. This practice was heavily criticized and many governments abandoned it. There are, however, some policies that, although not intended to support a particular company, provide support to companies. These newer manifestations of direct public support are done through public incubators where the government provides start-up companies with resources such as infrastructure and business expertise to improve the likelihood of their success (Frenkel et al., 2008). This type of public support of small and medium firms has shown to have a positive effect on employment and growth of the supported companies (Lerner, 1999).

In sectors of the economy where there is strong technological change and significant network effects, governments can affect the evolution of technology in that industry because of their *role-setting standards*. (Kassicieh Radosevich, 1993)

An indirect type of support can be done through *taxation*, where the government can reduce the costs of research and development by providing tax incentives to those companies that develop a particular type of technology (Gruber Verboven, 2001).

Scholars that have analyzed the relationship between innovation and regulation have tended to focus on developed nations and on the proactive policies that foster innovation. In less-developed countries, the course of action for regulators tends to be more reactionary and less proactive.

We have not found any studies that look at the role of the regulator as a passive agency whose impact on a particular sector has more to do with the things they do not do than with the things they do.

Regulators in less-developed countries are often constrained by resources. They are often incapacitated by politics, and their role is more passive than active. Nonetheless, there are consequences to this passivity. In this paper, we explore how regulation of the telecommunications sector can affect innovation because of the impact that regulatory processes have on the resources of the companies in the sector.

## 2.3. The Resource Based Theory of Innovation Regulation

A regulation is generally considered a secondary form of legislation intended to provide more specific details about the manner in which the primary legislation is to be carried out. The role of regulators is, thus, to implement the law by issuing regulations.

Because we are advocating a *resource based theory of innovation regulation*, we also need to define what we mean by resources. A resource is a physical entity that can provide the means for a company to conduct its businesses. Often resources are scarce, thus the quantity or even the availability of resources has an impact on the operations of a company. Similarly, the manner in which those resources are used can affect the profitability of these commercial organizations. Resources can include financial capital, human resources, and access to technology—but also access to a market and to infrastructure.

In advocating a *resource based theory of innovation regulation*, we are referring to the way in which regulators affect the quantity and the manner in which resources are used by corporations. The proposed theoretical framework makes a connection between access to resources and innovation. We assume that the amount and access to resources affects how they are used as well as companies' willingness or ability to innovate.

### 2.3.1. Innovation and Resources

Figure 1 presents the connection between resources and innovation. Companies have different amounts and types of resources. Those with severely limited resources will find it difficult to engage in innovation because of the constraints on their operations that result from having few resources. As we move on the x axis towards the right, more resources are available and a company, we believe, will be more able to innovate. From the center to the left we are likely to see innovations that aim to minimize costs or that make available resources more efficient. From the center to the right of the x axis we are likely to see companies that will be able to introduce new products or services. It should be noted that the willingness of a company to engage in innovation is also affected by the amount of competition it faces. Without competition, these organizations do not need to be concerned

about introducing new services or improving existing ones, as they are the sole provider and the customer has no options.

**Figure 1. Effect of resources on innovation with and without competition**

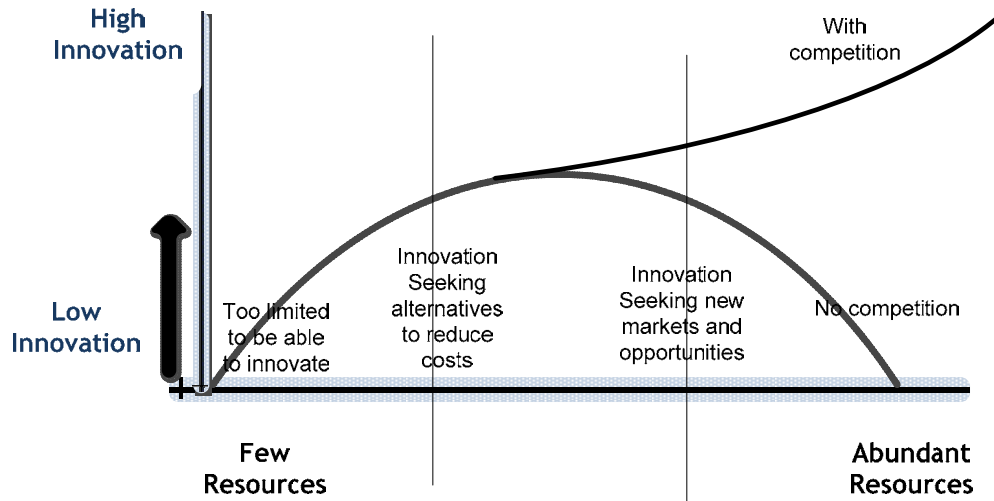
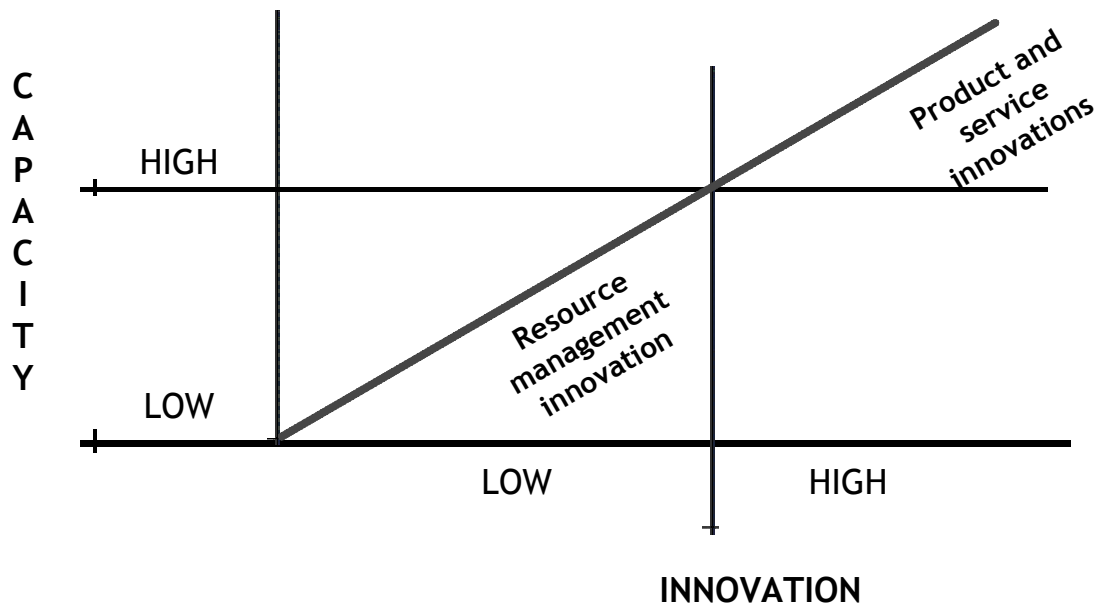


Figure 2 is another representation of the types of innovations that are likely to happen as a company acquires more resources. With few resources, the types of innovation that they are likely to introduce will focus on reducing costs and maximizing benefits from existing resources. We call these improvements “resource management innovations”. When organizations have more resources, they can spend them in developing new products and services; these are called “product and service innovations”.

Figure 2. Type of innovation based on the amount of resources



### 2.3.2. Innovation and Regulations

Regulations are instruments that govern the conduct of companies or individuals. These are rules that establish a framework of acceptable or unacceptable behavior. There are three important roles that regulators have control over and that can affect a company's resources. Regulators:

- a) Issue rules and regulations on an established law
- b) Issue licenses which control entry to the market
- c) Enforce those rules and regulations to prevent abuses and violations

The next paragraphs explain how each of these roles affects a company's resources and, in turn, innovation.

### 2.3.3. Establishment of rules and regulations

Laws take a long time to pass; this is because of the many interests that are affected and represented in relation to the issue at stake. During this stage, stakeholders try to influence the law in a manner that is most beneficial to them. Once the law has been established, it is then the responsibility of the regulatory agency to issue rules and regulations that clarify and provide details related to the implementation of the law.

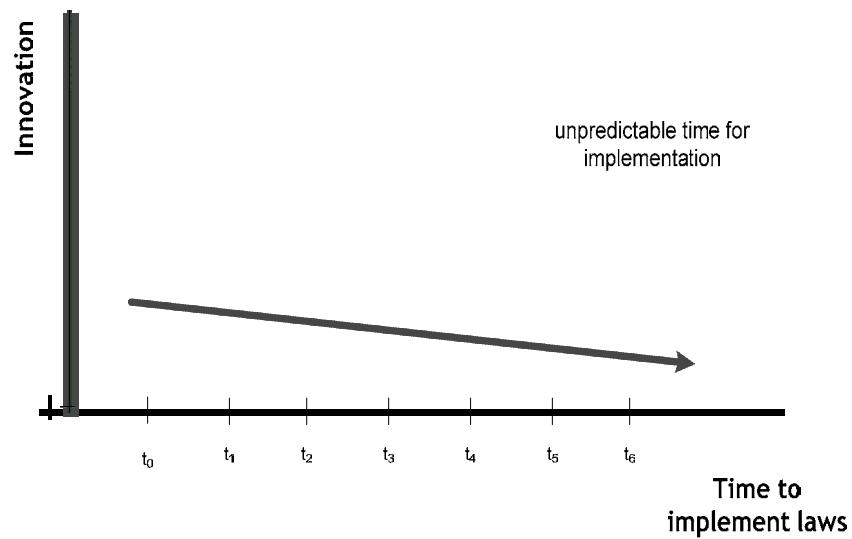
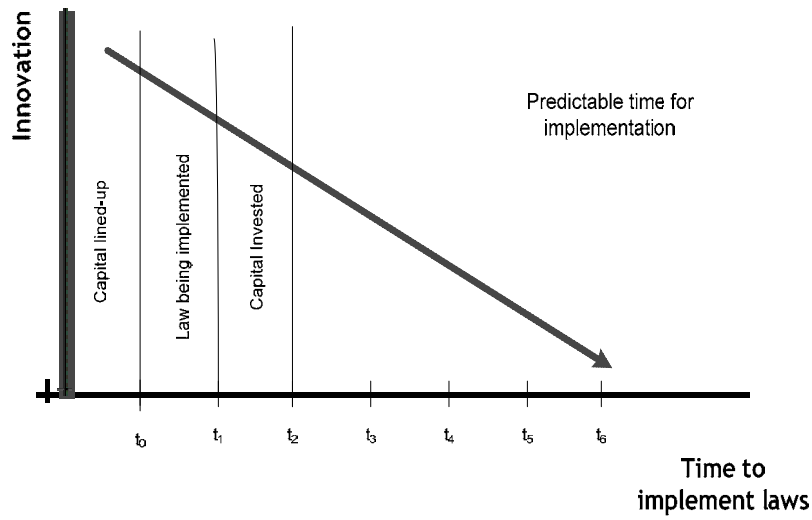
When a law has been passed, companies can then begin to make investment plans. They know their constraints and, to a certain extent, what they can or cannot do. They can begin to

gather resources that will allow them to engage in certain economic activities. So how do the rules and regulations affect their resources? Figures 3a and 3b show how the time that it takes for regulation to be issued affects the resources and, consequently, innovation in the private sector.

In Figure 3a,  $t_1$  represents the time when the law was passed, and  $t_2, t_3, t_4, t_5$ , etc. represent the period between the time when the law was passed and time when the regulations are established. The graph shows the downward slope of the resource/innovation curve. Why does the time that it takes to issue regulation affect the resources of the company? This is because companies have to obtain financing to carry on their investments. The capital necessary for these investments needs to be used, otherwise the company loses money. Capital is generally obtained through loans that accrue interest. A company's officer is not going to invest resources when he is not sure when he will be able to invest them. If capital is available, the longer it takes for the regulator to issue a rule, they more likely that these resources will be allocated to another activity. In summary, the time that it takes to issue regulations affects the resources because any capital that was available to be invested for the activities that are covered by the law can get easily diverted to other areas if the rules are not established.

Figure 3b represents the same type of relationship between the time it takes to establish the rules and regulations and resources/innovation. The only difference is that, in this figure, we added an element of unpredictability. A company's officer would not consider applying for any capital or allocate any capital if he does not know at all when the regulation will be issued. If regulations take a long time to be issued, but it is known to the public how long it will take, it is easier for companies to plan. If the timing is unknown, no plans for investment are considered at all. It is thus not only the passage of time that it takes for a regulator to issue rules but also how predictable this process is.

Figures 3a and 3b. Effect of time and predictability on innovation



## 2.4. Licenses

Market entry is important for innovation because of the competitive pressure it exerts on all the players. It forces them to differentiate themselves from their competitors, and this can be done by the introduction of new products, services, business models, or technologies, for example.

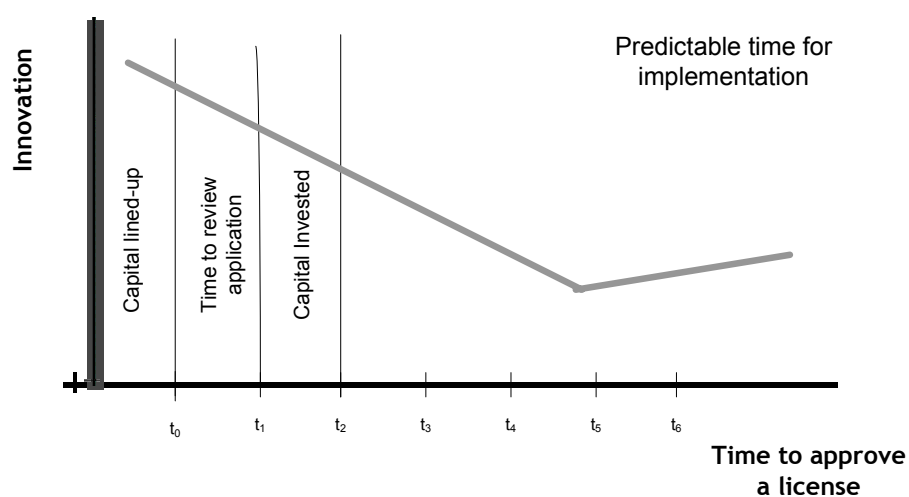
For some regulated sectors, licenses are mechanisms that governments use to limit entry and exert certain types of control over the activities of companies. A license is granted only to those that prove to have certain qualifications or that fulfill certain requirements. Without the license, a company is prohibited from operating. A license is thus a key resource, given that it provides access to the market; without such access a company could not exist.

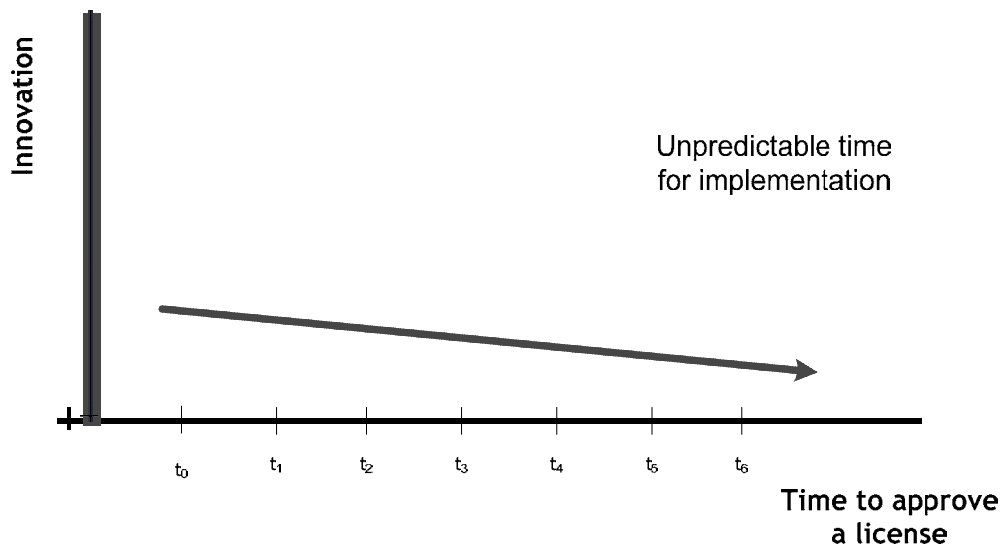
Like in the example above, both timing and predictability are crucial elements that affect resources and innovation. In Figure 4, we can see that no resources or innovation materialize until the time the license is granted; thus the horizontal line up to period  $t_5$ . Once the license is approved, one can then see the upward sloping innovation/resource curve.

In Figure 4b, we see again the effect of unpredictability on the resources/innovation curve when a company is completely handicapped. If the private sector knows the amount of time that it is going to take to obtain a license, it can then make alternative plans to be able to operate until the license is approved. These alternative arrangements may require providing services for which a license is not necessary, or the establishment of some sort of partnership with another company to resell their services. If the time for approval is unknown, the company will be unable to make any plans. Any alternative investment or partnership arrangement needs to establish time frames to determine, for example, rates of return or contracts' lengths.

The long time that a regulator takes to approve a license can be very detrimental to a company's resources and innovative capability, but even more so when the time cannot be predicted.

**Figures 4a and 4b: impact of timing and predictability in license acquisition on innovation**





## 2.5. Enforcement

Enforcement is necessary because of the violations and abuses by players in the sector. There are many types of abuses. A company may be operating without a license. This negatively affects the resources available to those with a license because the violator can be operating without the requirements established by the rules. A company may also be taking advantage of its more dominant position in the market to charge predatory prices and, eventually, take some competitors out of business. A company may be preventing access to key resources, as is the case for telecommunication operators.

Violations and abuses in the market have an effect on the resources of the other players. In the presence of these abuses, there are companies that are disadvantaged in relation to those that are committing the violations.

Fair and expedient enforcement can restore resources for those companies that are being disadvantaged by the abuses. The actions that the regulator fails to take, negatively impact the resources of companies affected by the violation while benefiting the violator.

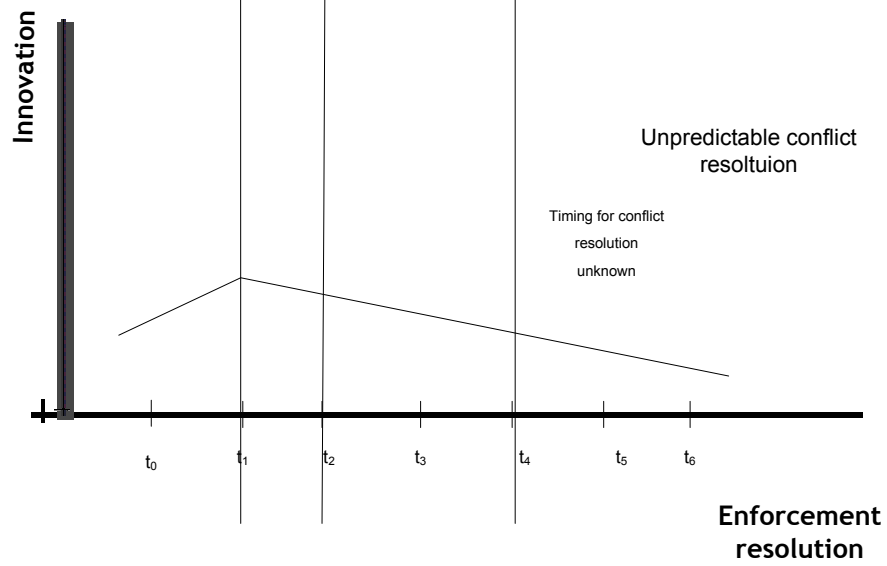
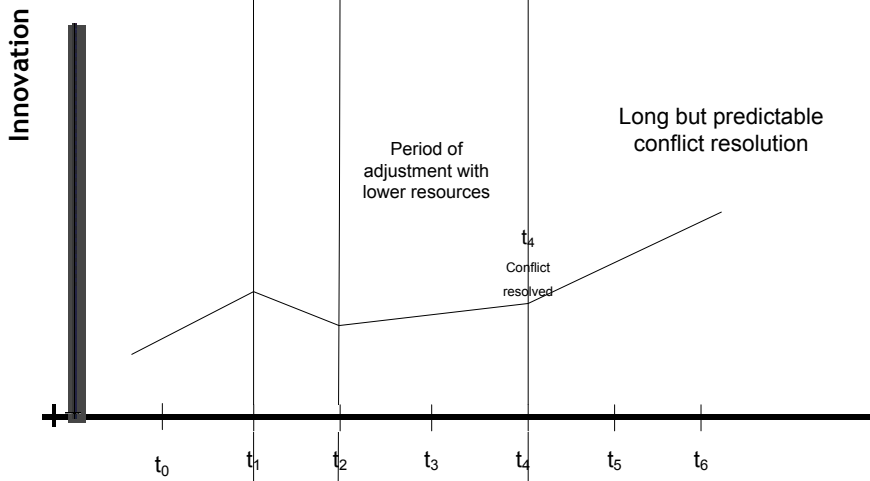
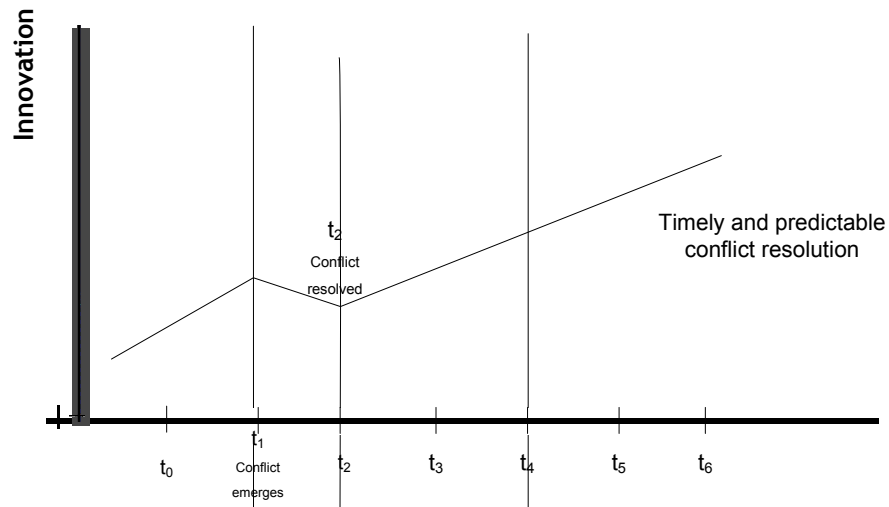
There are three elements that can affect resources because of the manner in which enforcement is carried out. Like in the previous examples, timing is an important factor; the longer it takes for a resolution to be issued, the fewer resources that are available to the affected parties. To illustrate this effect, imagine, for example, that a company is operating normally without any violators. The company may have a certain amount of resources allocated for innovations. Once the violation occurs, these resources are negatively affected and this can happen in multiple ways. The violator can illegally be using resources not available to the others, spectrum is an example. The violator can be pricing below cost,

effectively taking away market share (resources) from the competition. In the telecommunications sector, violations are often associated with access to networks, a vital resource for competitors which is often delayed or not provided at all.

The effects of enforcement are illustrated in Figures 5a and 5b, and 5c shows the change in slope of the resource/innovation curve after the violation occurs. If the regulator makes a prompt decision, the company gets back its resources, and can continue to operate and engage in innovation; the slope increases again. If the enforcement takes a long time, resources are diminishing even if a resolution is made after a few years; by then, the affected company might have lost resources in the form of market share or obsolescence of its technologies. This is represented by the downward slope of the curve after a certain period of time has passed.

The second element of enforcement is predictability. Once again, if the company does not know when a resolution is going to be made, the company cannot plan to alleviate the problem that the violator is causing.

The third element of enforcement is fairness in the resolution. Fairness is important because it will determine where the resources go. If, for example, the regulator decides in favor of the violator, this can dramatically reduce the resources of the company affected. This is an unfair decision because the violator was not adequately punished after infringing the rules established in the regulation.



When regulators are continually unpredictable, do not enforce regulation and take a long time to make decisions, there can be a severe and long term negative impact on innovation. There is a very well known saying: “Once bitten, twice shy.” If regulators continue to exhibit these characteristics, the private sector will be hard pressed to enter the market or to invest in new products because of the experiences that they have had in the past. It is thus not surprising that companies in less-developed countries prefer to copy innovations invented in other countries than develop their own. A, perhaps unintended, negative regulatory environment can be contributing to this.

In this theoretical framework we argue that three main activities of a regulator and the manner in which regulations are carried out can significantly affect resources and, thus, innovation in a sector. We argue that there are three elements of great importance that can affect resources: one is timing, another is predictability, and the last one is fairness. None of these characteristics and the manner in which they affect the behavior of companies and how they use their resources to innovate has been adequately recognized.

### 3. Methodology and data Collection

This paper benefited from multiple sources of evidence in order to understand the impact of regulation on innovation in the Argentinean telecommunications sector.

This is primarily an exploratory qualitative study. We rely on news reports, a survey and interviews from which to collect data.

From a comprehensive review of the innovation literature, a survey was developed to capture the main policy and regulation factors that previous authors have identified. The survey was tested with colleagues that work in telecommunications companies. Once the survey was completed, we relied on a database available to the public from the Argentinean regulator's, the National Communications Commission (CNC), website. The database had 1457 companies listed as of April, 2009. Unfortunately, the database was not updated and it appeared that officers had simply added companies as they got their licenses but they never deleted the companies that had ceased to provide services.

From a set of 1225 companies, and after discharging companies dedicated to services not related to massive telecommunication uses such as alarm or taxi services, 1222 companies (83.87%) were contacted by phone; but many of the phone numbers (633 - 60.5%) were no longer in service or were assigned to another user. An effort was then made to try to locate the company through the Internet using the legal name, commercial name, address, or contact information posted in the CNC's database. Using this process, we were able to contact 126 of these companies (12.0%), and we invited them to answer the survey we posted on the Internet.

Table 1 presents statistics about the number of companies that were in the database, the number of companies whose number was no longer in service, companies that were valid and the number of companies who answered the survey.

**Table 1. Number of companies contacted for survey**

<b>Total set of companies</b>	<b>1,046</b>	<b>100.0%</b>
Wrong contact information	633	60.5%
Unable to find information on the web	507	48.5%
Contacted through the website	48	4.6%
Alternative email found online	78	7.5%
<b>Total number of companies with correct contact info</b>	<b>365</b>	<b>34.9%</b>
Contacted	241	23.0%
E-mail did not work	32	3.1%
Nobody replied any time of the day	92	8.8%
<b>Total number of companies who answered the survey</b>	<b>50</b>	

In the survey, the participants were asked if they wanted to be contacted again for an in-depth interview. Twenty-two companies and public officials agreed to participate in the interview and were subsequently contacted to set up telephone interviews. Table [ ] presents some basic information about the type of companies that were interviewed.

**Company age**

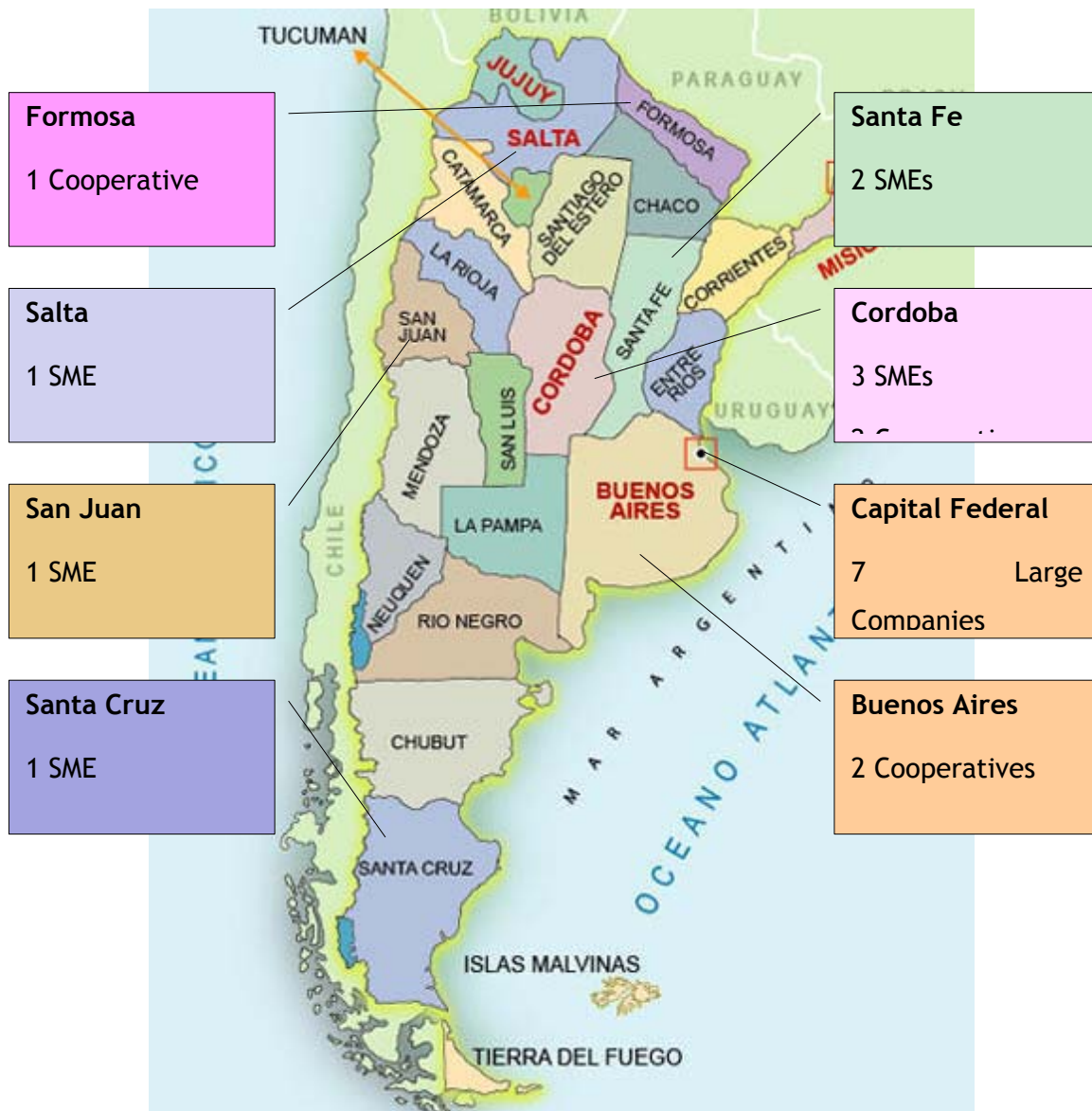
Founded after 1980	25%
Founded between 1980 / 1999	25%
Founded after 2000	50%

**Company sizes**

Less than 10 Emp.	40%
Between 11 and 99 Emp.	50%
More than 100 Emp.	10%

Interviews responses were coded using content analysis software called QDA Miner®. While the researchers were aware of the factors that the literature had identified as having an impact on innovation, it was clear that there were other significant factors that affected, perhaps more pervasively, the manner in which companies conducted their business in the sector. It was from all of these data sources that the *resource based theory of innovation regulation* was created.

Because of confidentiality and privacy issues, we cannot provide the names of the companies interviewed or the names of the people we interviewed. The companies are thus identified by their type (cooperative, small and medium enterprise and large companies and location. The map shows the type and location of the companies that participated in the interviews.



### 3.1. Innovation in the Argentinean Telecommunications Sector

Based on the information obtained from the survey and the interviews with executives, all companies have engaged in some sort of innovation in the last twelve months. In this section, we present some examples of the types of innovation that companies in Argentina are implementing. This will allow the reader to determine the extent and type of innovation that is taking place in the country.

Most of the companies interviewed reported some examples of innovation. The market and size of the companies affects the areas of their operation in which they innovate. Innovation in cooperatives is related to the advantage they have of knowing their customers, as they often operate in small towns. They have direct contact with their clients, therefore they have a better understanding of their needs. They provide personalized services and prompt and effective solutions to their problems. This is seen by some of their executives as an advantage

when competing with large companies. A senior manager of a cooperative in the province of Buenos Aires said:

*"Our clients want personalized attention, as soon as possible. This is the way cooperatives can compete; we make things easier. If you have a problem with a big company, an answering machine will receive your calls."*

Cooperatives have also been able to take advantage of their captive market to engage in innovative business models that expand beyond telecommunications. By offering a wide variety of services, they strengthen their ties with their customers, and allow for cross subsidization. A manager of a cooperative located in Cordoba province indicated:

*"Cooperatives are very strong here and they offer a large amount of services. Our cooperative, for example, offers electricity services, public lighting, fixed line services, Internet services, via ADSL, rural Internet services via WiFi, funeral services, emergency services and water services, among others. Many of the cooperatives in this region were established fifty years ago or more."*

Personal attention has become a trait of cooperatives. These personalized strategies differ from those of large companies, whose competitive advantage resides in their large amount of both financial and human resources, which allow these companies to constantly work on new services or service features. While SMEs and cooperatives would normally work on one or a handful of innovations at a time, a large company is likely to have several concurrent initiatives.

Companies are innovating to reduce their costs. A case occurred in the province of Santa Fe, in a town that, despite being near the capital city of that province, had unsatisfied services demands. Large incumbents did not consider deploying services there and were also not interested in reselling bandwidth to the local supplier. To meet this growing demand, an SME in the city decided to install a satellite antenna and other equipment to sell Internet services via dial-up to four counties nearby. Because the rate was very high, they had to offer new services such as technical support, self-built PCs, and others. They later replaced the expensive satellite connection with access to the fiber of a large operator, thereby reducing costs and prices and offering broadband access via WiFi to their customers. This is an example of a company reducing its costs of basic resources.

Small and medium enterprises innovation is also related to exploration and income generation from existing resources. These entities realize that the introduction of new services that take advantage of the existing infrastructure can help them generate more income. A common application is alarm services. We found that three of the interviewed organizations had introduced ancillary services such as alarm services, monitoring services, conference calls, and detailed phone bills.

It is larger companies with greater resources that are engaging in product and service innovation. This is consistent with the resource-innovation relationship presented in the theoretical framework. For example, the three major mobile network operators (MNOs) added to their portfolios new plans responding to increasingly sophisticated market demands. They launched mobile broadband plans in 2007, giving customers the possibility to receive emails, surf the Internet at high speed, make video calls or work from anywhere in the country with 3G services. They have developed a competitive alternative to fixed broadband services. These initiatives are helping MNOs to reach communities where wiring is not cost effective and are allowing them to compete favorably with SMEs and cooperatives in the provision of Internet services.

### **3.2. The impact of regulation on innovation**

*The regulator.* Companies in the sector are governed by laws and regulations. These provide the basic framework that lets them to know what they can or cannot do. This, under ideal conditions, allows companies to plan and set expectations. Through laws and regulations, a regulator can have direct influence in the development of innovations in the market.

Regarding laws in general and tariffs in particular, large companies are critical about the way these are being handled. For large companies it is difficult to invest in a country with unstable rules.

*"There is not a clear framework; there is a lack of legal stability and not only in the regulatory level, this unpredictability is general. Argentina often makes changes in taxes, fees and contributions. There are huge amounts of fees at the different levels of government that make the service even more expensive for consumers. From every peso paid by consumers, around 40 cents go to the provincial, municipal and federal treasury. Big companies will invest where the economic environment is more attractive."*

A senior manager of an SME located in the province of Buenos Aires commented: "The agencies that are related to regulation in telecommunications do not have innovation as a topic on their agenda. They are thinking more in terms of connectivity, a much more basic issue than innovation."

#### **3.2.1. On entry: Licenses**

According to information gathered in our surveys, the process of awarding licenses in Argentina can take between two and five years, with serious consequences on the market and discouraging investments and innovations in this area. Currently, many agencies are involved in the awarding of licenses, which has become a very bureaucratic procedure. The National Communications Commission (NCC, the regulator) is involved, which usually takes about 4 months to issue a decision on licenses. The Secretary of Communications (SECOM) is also involved and, due to the absence of its own legal bureau, cases are forwarded to the Ministry

of Federal Planning, Public Investment and Services (MinPlan), which is also responsible for energy, transport, public works, etc. This makes it a long procedure, frequently exhausting and discouraging for companies. The applicant does not have any idea of how long the license approval will take, as the regulator itself does not know. This is because it depends on the case load of the MinPlan at any given time.

"There is huge inefficiency and we try to find an alternative to survive by other means," said a manager of an SME in Capital Federal.

"There is very little predictability and it depends a lot on the administration in charge of the secretary," said a manager of an SME that gives legal advice to telecom businessmen.

Some of the SMEs consulted commented that they had to provide services through other companies because of the delay in obtaining the license. In many cases, this led them to postpone their plans, and whole projects were thus delayed as a consequence. It is difficult for a small company to gather all the many information requests from regulators; managers make regular trips to Buenos Aires to follow-up on their license application status. This can be very costly for a small company located far away from the capital city. In this regard, an SME manager of Santa Fe province said:

*"Prior to our license award, we had to work under the supervision of another company. This meant that all our projects were delayed; we were not able to deploy any type of innovation...When you request a license, there are all these requirements you need to fulfill, such as technical, economic, financial, provide cash flow to ensure you will offer the service, etc. The regulator gave us comments from time to time and requested additional information. The company is 800 km away from Buenos Aires capital city and we had to travel once a month to keep track of the license, folders, papers, etc."*

Another case was that of a cable company which was not initially allowed to offer any other communication services. Unable to provide these transport services themselves, they sold them under the auspices of another company. One company allowing other companies to operate under their auspices commented:

*"Those who were cable TV providers were not allowed to provide any type of transport services. We started allowing other cable companies to sell their bandwidth under our name. This has helped to develop the cable TV business. We do this although we shouldn't; if the government finds out we will have an army of lawyers with half of them arguing that we can and half of them arguing that we cannot do this."*

Many companies are persistent and finally obtained a license, but others do not fare the same : "I was very much involved in the licensing award to my company, I learned a lot of regulatory issues and fortunately we had success in achieving our goal. But other companies

have not been able to obtain a license after 4 or 5 years. Many SMEs which were operating under the license of other companies had stopped offering their services due to the incumbent complaints and had their equipment seized."

Obtaining a permit from the regulator to offer new services is another obstacle we found. When an operator requests a license, it needs to specify the type of service it wants to offer (Internet, mobile, fixed lines, VAS, etc). To add a new one, a permit, also provided by the regulator, is necessary. In the opinion of our respondents, predictability is, once more, absent because an operator might wait the same amount of time that it takes to obtain a new license. The manager of a legal consulting company told us:

*"If an operator wants to offer fixed line services, mobile, or rural, it needs to register for each of these services and this permit is treated by the regulator almost with the same complexity that a new license award has. The regulator can last three months or three years."*

If the licensing process is uncertain, it is unlikely that companies will invest in the country. A manager of an SME in Santa Fe told us:

*"Some companies are seeking new ideas and making lots of progress, but they have to wait two or three years to obtain a license. Technology changes fast, we cannot wait that long. The technology presented to the regulator two years ago matches little or nothing to what is offered today....Our company is waiting for a year for the approval of a telecommunications license; we already have Internet."*

The manager told us upon request that he had excellent equipment and good access to funding, but the global crisis had changed this picture and the project's viability is now in doubt.

As an alternative to long and unpredictable licensing approvals, some firms, especially SMEs, have decided to offer voice over IP services (VoIP). Capitalizing on the absence of regulation in this area, several companies do not wait to get a telephony license and offer voice services with lower rates than the incumbent through broadband networks. But these have come with controversy since the incumbent does not want this type of service to thrive. In some cases, when incumbents detect voice traffic on their networks, they block it. In fact, a manager of an SME in Santa Fe told us:

*"If they [the incumbents] detect those [VoIP services], they block them. The regulation does not prohibit the usage of these services to users, but incumbents do not want companies to offer them."*

In addition to the regulators, the incumbents, as networks owners, often create obstacles that affect the innovation and the entry of new participants to the market. A manager of a company of Rosario, Santa Fe province, told us:

*"We requested bandwidth to an incumbent in order to deploy broadband services in our region; they told us that it would be delivered to us in a two months period; six months later this company began to offer broadband services in our locality. A month after that they gave us the broadband access we requested seven months ago."*

This evidence suggests that the lack of licenses is impeding entry and limiting investment in other additional services, given that the registration for additional services also takes time. The difficulty of obtaining a license is also forcing companies to enter illegally or operate under the auspices of others. Access to a market is a key resource without which a company cannot operate. The limited competition that results from few entrants is likely to negatively affect innovation as well.

### **3.2.2. On disputes: Enforcement**

When deregulation took place in the telecommunications market in 2001, new companies were created and entered the market, which also brought new challenges to the regulator, such as interconnection negotiations between powerful incumbents and new entrants.

In Argentina, the two major incumbents (also called historical operators) are the owners of the fixed telephone network and they are accused of charging companies high interconnection prices. Interconnection prices were set in U.S. dollars before the 2001 crisis and the 2002 devaluation of the peso. Interconnection fees were never changed and are very high for companies with earnings in local currency. Sometimes interconnection prices charged to small companies are even higher than the final prices offered by incumbents to their own customers.

These negotiations are difficult because the terms and rates for access to infrastructure are a resource that can impair the operations of an entrant if these are high and unfavorable. Thus adequate, timely and fair enforcement is necessary. The evidence suggests that enforcement does not happen, leaving smaller players to solve problems on their own, which leads to unfavorable terms.

A manager of an SME in the Federal Capital characterized this complicated balance with an example:

*"In 2001 there were around twenty small firms that required interconnection with the incumbents. These companies had problems by the reluctance of the latter who did not want them interconnected to their networks. If the NCC was involved, the incumbents then gave them very limited network capacity. If they wanted twenty frames they obtained ten or fifteen which often caused busy lines and customer complaints."*

In the opinion of a manager from a cooperative of Buenos Aires province,

*"You cannot develop huge innovations in many cases because the lack of regulation does not allow fair treatments among big and small companies. Small*

companies are not allowed to enter the market in favorable terms, and this limits the creation of new services and innovation."

Disputes related to illegal entry are also not enforced unless reported to the authorities. Reactive enforcement, after a denunciation, is normally the case. Proactive enforcement is, for the most part, not done. In this respect, a representative of a regulatory agency said: *"We have many unresolved issues in the agency. We need to be more expeditious and resolve these cases faster and more efficiently."*

An Internet operator from Santa Cruz province that uses WiFi technology had serious difficulties caused by illegal signals that were interfering with their broadcasts. In this case, the company told us that after they raised several complaints to local government entities the regulator intervened and seized the unauthorized equipment. But little was done to find out if there were more companies offering services without a license, which is not only illegal but harmful to others.

Even though there are abuses, these are not reported because of the need for infrastructure access, which is often the issue of contention. Entrants are generally cautious about their complaints and try not to confront regulators or incumbents in a country where, according to them, the regulator is not on their side.

Some SMEs are incumbents' suppliers or customers—as well as competitors—and need to have good relations with them. In this regard, another manager of a firm located in Rosario said: *"I don't see the politicians willing to level the field for all competitors. Surviving relies only on you because there is no predictability from politicians."*

*"I often see instances of companies that are not able to interconnect with incumbents. I saw many companies willing to invest but the interconnection was denied. The enforcement rules are not clear. They do not act firmly and this attempts against stability and transparency as we are not sure about the rules. Rules do not apply equally to all. We need to manage ourselves the best we can, it is as if we are alone."*

The manager of an SME located in Santa Fe also indicated:

*"In some places we are incumbents' customers and competitors. This is a problem for us because if they provide services in the same areas, they become competitors and we must treat them with prudence." This point of view is also shared by an SME located in Capital Federal: "Our bargaining power is limited. Legal procedures take too long here in Argentina. If you choose this way you will also lose the benefits of having good relations with big companies. It would be like "to bite the hand of that who feeds you."*

This sentiment is also voiced by another manager of an SME, "If you complain you will be punished. In this way, usually small companies cannot afford getting punished because they spent a lot of time trying to establish a good relationship with the incumbents."

Moreover, those SMEs that are not large companies' clients or suppliers are also reluctant to initiate legal action against them because they consider it a waste of time. A manager of an SME, said, *"We have raised some issues with the regulator and they never got back to us, as a matter of fact, I think they are being stored in a closet" "It is difficult to send them to trial, it takes two or three years....We need to be careful in the way we fight our enemy....It is really difficult for a small company to afford a lawyer for such time, and big companies know this"*.

Clearly, the unfavorable terms resulting from the lack of fair and timely intervention from the regulator negatively affect innovation. In this respect, an SME located in Buenos Aires province stated: *"The price is regulated by the incumbent; and this gives them the chance to set it at an inconvenient price for my company. This clearly limits my expansion."*

Similarly, the manager of a cooperative located in the province of Buenos Aires indicated: *"The authority is not fulfilling its duties, there are abuses [in interconnection prices], and there is no chance of resolving it because the authorities are unwilling to do so. There are small cooperatives that cannot offer telecommunications services because the interconnection is too expensive."*

The regulator needs to fairly, and in a timely manner, enforce its laws and regulations to release access to resources which currently are under the control of incumbents. Unequal and often abusive terms are limiting competition, resources and innovation.

### **3.2.3. On the passage of rules and regulations**

Many of the innovations carried out by companies rely on the passage of new laws or regulations, or the updating of those that already exist. In the telecommunications sector, there have been few changes since the deregulation of the sector in 2000 (Decree 764/00 of 2000). This decree sought to open the telecommunications market by encouraging new entrants, but also included many other initiatives such as number portability, universal service, and changes to the tariff and spectrum allocation regimes. Unfortunately, these mandates are yet to be implemented.

*Tariffs.* The crisis that the country experienced in 2001 had dramatic social and economic effects. As a result, the first concern for governmental agencies was affordable communication. The government thus froze tariffs for basic wired services in an effort to give the population basic telecommunication access.

In the opinion of many of the consulted companies, the freezing of tariffs for fixed line services was very positive at first, but then ended up damaging the innovation process. Price distortion hurt the smaller players seeking to enter the market. Many respondents cited the

example of mobile and broadband markets, which are not regulated; the unregulated rates have led to more innovative types of companies compared to those that only offer fixed telephony services.

*Number Portability:* In Argentina, number portability has not been implemented even though it was mandated in the 764 Decree of 2000. In June 2009, a national court required the Secretary of Communications to issue regulations for the implementation of portability that would allow cellular phone users to keep their numbers if they change their service provider. The court ruled that it had to be implemented within 90 working days (around four months and a half).

Small companies and new entrants are the most interested in the implementation of number portability. They argue that the fact that portability has not been implemented is harmful for them, and they believe that implementation has been difficult due to strong lobbying from incumbents. A manager of a cooperative located in Buenos Aires province told us: *"Number portability will improve service, that's for sure. Customer preservation will rely exclusively on customer service. The operator will have to take more care of their customers. Anyway, it is not going to be easy to implement, incumbents are lobbying strongly on this issue."*

Large companies and some regulators argue that the number of customers who choose to change their company is very low and that it would be better if they use these resources to invest in new products or triple play in areas where there is still no access. A manager of a large company told us:

*"Number portability requires a significant investment that is not necessarily reasonable. If we examine the markets where number portability has been implemented, we observe that only an average of 5% of the customers port their numbers. Why should operators have to invest so much money in a service that the client will not use? This investment can be used to launch more relevant products for our clients."*

If number portability had been implemented, perhaps more players would have entered the market and it would have forced companies to be innovative—not only in the services and tariffs provided, but also in quality and customer service offerings that would help them to retain customers.

*Universal Service Fund (USF).* Something similar happened with the Universal Service fund (USF), also mandated by the 764 Decree of 2000. The USF requires a 1% contribution from telecommunications companies' revenue. These resources are then to be used to provide access in unprofitable locations in the interior of the country. Even though is mandated in the law, this system has never been structured. Many of the interviewed representatives of SMEs and cooperatives are unaware of the program and they raised doubts about the regulator collecting them. A manager of an SME located in Capital Federal told us: *"Governmental*

*agencies do not always 'respect' this fund which is exclusively owned by the telecommunications company. The fund has not been used in any significant project as far as I am concerned."*

On the other side, managers of large firms believe they can use this money in a better way than the government does. A manager of a big company thinks it would be better if they kept this 1% of their income rather than handing it to the state. In this regard, he said: *"Basic rules were established some years ago but it has never been regulated yet. The existence of this contribution prevents our company's growth in less profitable areas"*.

The impact of the lack of regulations for a universal service fund simply meant that companies, such as cooperatives, who could have benefited from these resources did not plan or even intend to apply or compete for projects. They were, for the most part, unaware that this initiative even existed.

*Spectrum.* According to a Secretary of Communications announcement, spectrum auction of AWS band (1.7-2.1 MHz, used for mobile broadband services) is to be held this year. This process has been delayed and players are not sure that the SeCom will meet the deadlines. This lack of predictability has great impact on operators' deployment plans. Big operators need to improve their 3G services, and this spectrum band is crucial to meet customers' expectations. SMEs are looking closely at this band; it is a good opportunity for them to deploy niche services such as those based on WiMax technology. A manager of an SME located in Santa Fe told us: *"In this case, we can see the absence of the state. I participated in several seminars in order to learn about this subject but as of today, no one can tell me anything about the technical plans, nor how much money we need in order to access a license in this band."*

Regarding spectrum issues, a manager of an SME located in Capital Federal told us: *"The NCC created a record of those companies interested in offering WiMax-based services. More than 1250 SMEs and cooperatives were enrolled. The auction was to take place in March 2009. These enrolled companies have invested more than \$25 million. For now there is no willingness to auction this frequency band. The announcements are not realistic and small businesses with interest development are not being favored at all. That fact that some regulatory issues are not being implemented causes frustration for the investors, entrepreneurs and the market which expects to reap the benefits of innovation. One thing is the written law and something different is the implementation of that law."*

The problems with national regulations affect not only SMEs but also large companies seeking to invest in Argentina. A manager of a big company that provides telecommunications services throughout the country told us: *"The licenses take years to be awarded, from three to five years. Tariffs are not updated; there is no reference price for termination charges, no specifications for facilities access from one carrier to another. This creates an artificial barrier. The regulator must be aware of the fact that investment is not a philanthropic*

*activity, the investor must have a return on their investment and if the regulatory framework is not clear the country will attract no investments.*

## 4. Conclusions and recommendations

In this paper we propose a theoretical framework that can help us understand the impact of regulation and the actions of regulators on innovation in the telecommunications sector.

The framework links innovation to resources and resources to regulation.

The evidence provided suggests that it is not only independence, transparency, and accountability that matters. Investment in innovation and invention also requires timely and predictable policy decisions, as well as fair enforcement. Without these, companies find themselves operating in an uncertain environment that is not conducive to investment.

Unlike other innovation studies, we focus on a less-developed country and find that it is often not their actions, but their lack thereof, that negatively affects the innovative process.

We nonetheless find that even in such circumstances there are companies that continue to operate and introduce innovations, even though these are, for the most part, quite minor. In an unfavorable regulatory environment, companies become even more reluctant to invest. It is thus not surprising that innovations in this less-developed country have generally been imitations and even these are slow to get introduced.

In an uncertain regulatory context, when it comes to key areas such as licensing and authorizations for new services and interconnection fees, companies are facing obstacles that affect innovation. Delay, inaction and lack of predictability are impacting directly in the ability of a company to implement innovations because uncertainty affects their resources. As we were able to see, although small business units appear to be the most affected by this uneven regulatory framework, big companies are also being harmed, especially in their large investment plans.

Of the three factors that negatively affect innovation identified here, fairness and lack of predictability have the worst impact on innovation. Regulators, even when late, should provide clear time and decision guidelines that can help companies plan their long term investments.

This study is clearly exploratory and greater evidence needs to be collected from other countries to determine if these factors indeed have a pervasive effect on innovation in both the short and, most importantly, the long term. A long term effect can generate a culture in the private sector that avoids risks, further impairing a country's technological development.

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