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INNOVATION SYSTEMS:
THE EUROPEAN EXPERIENCE AND OPPORTUNITIES FOR LATIN AMERICA AND THE CARIBBEAN

DOCTORADO EN RELACIONES INTERNACIONALES E INTEGRACIÓN EUROPEA

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Summary

The elaboration of this thesis involved several stages, and since it is a complex subject matter, it was imperative to maintain a multidisciplinary focus. In the first stage, the need to improve the innovation performance in Latin America and the Caribbean is identified. In the second, the appropriate methodology for this research is selected. Here, it was determined that a framework comprising the innovation system approach is the most suitable framework for this research. In the third stage, the relevant body of extant literature is reviewed and the research problem formulated. In the fourth stage, the data is collected and characterized. During the fifth stage, the gathered information is analyzed and the results presented. In the sixth stage, experiences in other regions are examined and best practices acquired. In the final stage, the key enablers, best practices and the elements are identified, transformed and adapted into several recommendations for Latin American and Caribbean policy makers.

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Introduction

There are challenges both new and endemic that hinder potential for sustainable growth and development in Latin American and the Caribbean.[1] Among the other entities, governments in the region need to ascertain what will be the basis for competitiveness and what will be the new solutions to these growing challenges. In recent years, the impact of innovation on business, politics and society has been more evident. Governments and business leaders are increasingly aware of the role that innovation plays in economic growth, development and competitiveness. Innovations come in many forms: products, business models, organizations, marketing and branding, and social innovations.

In order to facilitate the analysis of innovation, policy makers and international organizations have used the Innovation Systems approach as a framework. The systems approach provides a unique perspective on the manner in which innovations are produced and supported. For many years, innovations were perceived as a product of a linear process where research was the main driver. The systemic approach introduced a different method that encourages analyzing the whole process of innovation instead of focusing on just one aspect.

1 The region comprises the following countries: Antigua and Barbuda, Argentina, The Bahamas, Barbados, Belize, Bolivia, R.B. de Venezuela, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Uruguay.

As noted by Meeus and Oerlemans (2005), the field of innovation systems is a new one wherein economic growth theory, international trade theory, evolutionary theory, economics of organization, organizational sociology, regional sciences and institutional approaches emerge.

Most innovations systems literature focuses specifically on national, regional, or sectoral innovation systems. Indeed, few studies mention even the prospect of a Supranational Innovation System. The aims of this thesis are: to establish the emergence of an European Supranational Innovation System by using the innovation systems approach and to ascertain its main characteristics. Consequently, it will be determined if Latin America and the Caribbean could learn from the European experience and use it to create an enabling environment to support innovation in the region, to extend its benefits to all citizens and to enhance their competitiveness. Also, new technologies such as mobile telephone services are used to illustrate the potential benefits to developing countries of enhanced innovation activities.

The results of the examination of innovation activities at the EU-level demonstrate that there is clear evidence of the emerging European Supranational Innovation System. Also, there are potential benefits of a Supranational Innovation System for a region such as Latin America and the Caribbean. Conclusively, the European experience is not only valuable, but moreover it is applicable to Latin America and the Caribbean.

According to the 2009-2010 Global Innovation Index Ranking, out of the top fifteen countries nine are European[2] : Iceland (1), Sweden (2), Switzerland (4), Denmark (5), Finland (6), Netherlands (7), Norway (10), United Kingdom (14) and Luxembourg (15); two are from the Americas: USA (11) and Canada (12); and four are from Asia-Pacific: Hong Kong, China (3), Singapore (7), New Zealand (9) and Japan (13).

Historically, Europe has played an important role in innovation: it is the home of the Renaissance and the industrial revolution, and it could be considered as the cradle of innovation and science & technology. Europeans have been leaders in providing breakthrough inventions such as the printing press by Gutenberg (German), improvement of the steam engine by James Watt (Scotish) and the World Wide Web by Tim Berners-Lee (British).

The question arises whether history plays an important role in innovation? And if so, does this mean that Latin America and the Caribbean are destined to lag behind, playing only a marginal role in this process? Is there a possibility for the region to leapfrog and could a supranational innovation system facilitate this? Finally, can new technologies both help initiate progress and create solutions as issues arise?

2 Five out of the nine are from Northern Europe.

In the last decade, mobile penetration in the world has been growing at an increasing pace, notably in developing countries. The worldwide explosive growth and increasing coverage of mobile telecommunications provide an opportunity to reach and interconnect large populations. Developing countries could benefit from this technology, and in some countries like Kenya and the Philippines, there are interesting projects and innovative mobile technologies that illustrate some of the benefits. Thus far, most of the Latin American and Caribbean countries have not yet fully grasped the potential, nor utilized the opportunities, of mobile telephone services.

Strategies and projects focused on the future establishment of a Supranational Innovation System in the region could facilitate innovative activities and enhance the innovative performance of Latin American and Caribbean countries. A Supranational Innovation System offers the possibility of generating a broad partnership with stakeholders at all levels (supranational, national, regional and local) to encourage the flow of resources and knowledge where it is most appropriate.

The track record of Latin America and the Caribbean establishing regional bodies is not very encouraging but the experience can inform endeavors. The European integration is a complex and ongoing process. In order to reach the supranational level it had, to overcome many obstacles, and this was not achieved overnight.

In fact, the foundation for the European Union can be traced back to the European Coal and Steel Community (ECSC) Treaty signed in Paris in 1951. The aim of this Treaty was to contribute, through the common market for coal and steel, to the economic expansion, growth of employment and a rising standard of living.

Latin America and the Caribbean have much to learn from the European experience, not the least of which is the creation of a regional strategy to unify and progressively establish conditions to integrate the region. The strategy could promote and support the development and deployment of innovative mobile services for the low-income segment of the population. This will contribute to sustainable development, enhance quality of life and, improve competitiveness.

Study precedents

The innovation systems approach has seen effective use already in the academic context and as a framework for innovation policy-making. In the beginning the main emphasis was on National Innovation Systems (Freeman, 1987; Lundvall, 1992; Nelson, 1993; Edquist, 1997). Most of the assumptions on National Innovation Systems (NIS) are based on systematic empirical work on developed countries with small economies such as Denmark, Slovenia and Sweden, where the national level is more important.

However, as academics analyzed National Innovation Systems, they realized the importance of local/regional actors and resources in larger territories. In countries such as the UK, Germany and France, the local or regional government plays an important role. Indeed, empirical studies demonstrated that they were the more appropriate level of government to deal with such matters. Subsequently, the importance of regional scale and resources in spurring innovation capability was underlined by many scholars who then very sensibly focused their research on Regional Innovation Systems (Cooke, 1992; Brazyck et al, 1998; Cooke et al, 2004). The shift from national to regional has led to the study of the key roles that other entities play in innovation and regional development such as the European Union (EU). In fact, the European integration model has been called by some academics a Supranational Innovation System (Edquist, 1997; Borrás, 2000; Fernández-Ribas, 2009). All the same, few studies analyze the European Supranational Innovation System.

Using the "learning economy" as an analytical framework, Gregersen and Johnson (1997) discussed the relationships between integration and innovation in which they described the European integration as a process of institutional learning. The authors argued that only a very partial European system of innovation in a narrow sense of the term was likely to emerge in the not too distant future. They concluded that the nation-state is still a relevant level of analysis in the systems of innovation approach.

In a special issue of Science and Public Policy on the subject of an European System of Innovation, Borrás (2004) sought to establish a theoretical and analytical link between the bottom-up dimensions of socio-economic dynamics with the top-down dimensions of regulatory-political institution-building dynamics. Also, a preliminary examination on whether it is possible to identify a European System of Innovation was presented. The author argues that, at present, at the EU-level, it is still early to discern a complete and formed system.

Research query, hypothesis and general description of results

This thesis aims to answer the following questions:

1. How can Latin America and the Caribbean improve their innovation performance?
2. Is a supranational innovation system the most appropriate model for Latin America and the Caribbean in view of the current context?

Premises on which this thesis is based:

- Innovations are a major driver of the economy that increase productivity and spur growth.
- Innovations are the basis for Latin American and Caribbean competitive ness and the means to find solutions to growing problems.

• Telecommunications are central to competitiveness, economic growth, poverty reduction, productivity and development.

• Mobile telephone services offer an appropriate tool for developing countries to enhance their innovation performance.

Hypothesis:

• There is evidence of the formation of a European Supranational Innovation System.

• There are important lessons for Latin America and the Caribbean from the European experience on innovation.

• New technologies offer new opportunities for developing countries to leapfrog.

General results:

• There is evidence of the emergence of a European Supranational Innovation System.

• The European experience concerning innovation offers valuable lessons and best practices to Latin America and the Caribbean.

• When designing innovation strategies, policymakers should include new technologies as a key element for their viability, regard mobile phones as a necessity and mobile services as an important tool to offer innovative services particularly to the poor and rural populations.

- Latin American and the Caribbean at present lack political will and are not prepared to establish a supranational system.
- In the current context, a regional initiative to foster innovation in mobile services is more feasible.

Scope of the study

This thesis focuses on innovation being used as a tool for Latin America and the Caribbean to find and deploy solutions to the present and future challenges that hinder their potential for sustainable growth and development. Most Latin American and Caribbean countries do not excel in innovation when compared to other emerging economies. Regions that are rich in natural resources, talented people, among other forms of wealth, have not been able to use their assets to gain a competitive edge nor to innovate and thereby alleviate some of the challenges they are facing. The scale of these challenges warrants a coordinated approach by the countries in the region. The European experience is used as an example of the construction of a supranational innovation system. Drawing from the lessons learned and best practices examined, a strategy will be proposed for Latin America and the Caribbean. A SWOT analysis of innovation in the region has been prepared to provide a predictable policy framework.

The limitations of this thesis are mostly in relation to methodology. The innovation systems approach is not a theory; it is a conceptual framework, which suggests that the ultimate goal is innovation. Since it is not a theory per se and most of the work has been based on empirical studies rather than conceptual work, it becomes even more complex. Notwithstanding their complexity, the innovation systems approach possesses a certain flexibility that is an authentic characteristic of all evolving systems. An innovation system that is open, flexible, expanding and porous has its advantages and disadvantages.

Among the advantages, it can adapt more easily to the current conditions; it can incorporate other elements that may become relevant in the innovation process, and the framework allows the possible emergence and integration of new actors. Some of the disadvantages are that it is more difficult to identify, quantify and capture all of the elements present in an innovation system.

According to Lundvall (1992), the elements that compose the system are a structure of production and an institutional set-up. This framework emphasizes the interaction among the elements to explain the performance of the different innovation systems. It has been used by academics to elucidate the disparities in technological and economic performance between Europe and the United States and Japan, for example.

Most extant indicators of knowledge and innovation activities are not sufficient to convey the ongoing interaction among the above-mentioned elements of an innovation system. The difficult thing turns out to be using available data and methods to attempt to quantify and illustrate the flow of knowledge, interactions between institutions, innovation performance, and diffusion of innovation within the system.

Without a doubt, the economic, political, social and cultural context is important. Capital availability, management, competence, attitude, entrepreneurship, marketing skills, labor relations, education, culture, scientific and technological capability are some of the factors that play an important part in the innovation environment and determine the success of innovative activities.

Thesis structure

The thesis is structured in five chapters. The first chapter presents the theoretical framework in which the research is based, mainly the innovation systems approach with emphasis on literature concerning regional, national and supranational innovation systems to establish the emergence of the European Supranational Innovation System. Foresight is used to determine the viability of a proposal for regional strategy aimed at establishing a Supranational Innovation System in Latin America and the Caribbean.

In the second chapter, the European Supranational Innovation System is explored through a systemic analysis of several EU-level institutions, strategies, projects, programs and initiatives. The innovation performance of the EU Member States and their efforts to construct an European Innovation System are presented. The main characteristics are identified as well as the challenges and advantages a supranational innovation system offers.

The third chapter presents an overview of the state of the art and innovation in Latin America and the Caribbean. Four phases of public policy are identified and Brazil is used to illustrate these phases. In addition, a brief assessment of innovation in the region including some inputs and outputs, and a SWOT analysis is presented.

The fourth chapter explores the opportunities that innovations and mobile technologies (i.e. mobile phones) can offer Latin America and the Caribbean. An overview of mobile penetration, operators and customers in the region is presented. In addition, innovative mobile services in Kenya and the Philippines are employed as an example of success stories that could potentially enhance the innovation environment in Latin America and the Caribbean.

In the fifth chapter, the prospects for a Supranational Innovation System in Latin America and the Caribbean are examined. The main regional groups are identified and analyzed in order to establish if the current state of affairs with regards to regional integration is conducive or not to create a supranational system. A proposal concerning innovation in mobile services is presented along with the potential costs and benefits.

The thesis concludes with suggestions for possible future research lines and some recommendations for policy makers.

Chapter 1
Theoretical framework

Innovations are considered a major driver of the economy that can increase productivity and spur growth. They come in many forms and in order to facilitate the analysis of innovation, policy makers and international organizations have used different frameworks. The aim of this chapter is to present, analyze and review the literature on the main elements concerning innovation systems.

For many years, science policies preferred the Linear Model of Innovation to describe the relation between science and technology and the economy. This earlier framework of innovation suggested that there are three phases in the process of technological change (invention, innovation and diffusion) and that they follow one another in a linear way. Innovation begins with basic research; subsequently, applied research and development occurs; and it ends with production and diffusion.

According to Godin (2005) the linear model of innovation developed in three steps that correspond to three scientific communities that contributed to the development of the concept. In the first step, applied research and basic research were linked, and it was the natural scientists (academics as well as industrial) that developed a rhetoric of basic research as the source for applied research. In the second step, business school's researchers studied the industrial management of research and the development of technologies (the experimental development was included).

Finally, in the third step, production and diffusion, economists brought forth the concept of innovation into the discipline.

However, many authors concur that the Linear Model overlooks the importance of the interaction that takes place between the structure of production and the institutional set-up. Also, it is considered by some as being fairly unsuccessful in understanding the source, nature and dynamics of most innovation processes, especially in developing countries. Indeed, this model offers a linear explanation to the relation among science, technology and production, and considers R&D as the only source of innovation.

The linear technology-push and demand-pull models are regarded as insufficient to stimulate innovation. Nowadays, innovation is considered a complex process where the interaction among the different elements (structure of production and institutional set-up) that compose the innovation process is important. In view of the complexity and uncertainty of the process, the Linear Model has been considered by several academics as inadequate and has been replaced by a systems approach to understand the dynamics of innovation. Therefore, this thesis will analyze innovation using the systems approach.

There are different ways of defining these systems but in general three main elements are usually taken into account to delimit the concept: geography, sector and scope. Geographically, systems may be local, regional, national or supranational. By sector, innovation systems could focus on technology fields or production areas. Concerning scope, the approach to innovation systems could vary according to how narrow or broad the definition is in relation to institutions and markets. It could be argued that these elements complement each other and coexist; however, this analysis is beyond the scope of this thesis.

The idea of innovation systems could be traced back to Friederich List's The National System of Political Economy (1841). Even though there is no explicit reference to the concept of innovation systems as such, List analyses several characteristics of what is now called National System of Innovation (NIS). The author developed his arguments to support the creation of a national infrastructure and institutions to promote the accumulation of 'mental capital' to stimulate economic development. In his work, there is a clear recognition of the interdependence of tangible and intangible investment (Freeman, 1995). Moreover, List recognizes the importance of infrastructures such as transportation networks in addition to the establishment of links between industry, education and science.

More than a century later, in 1982, Charles Freeman used the concept of National System of Innovation and pointed out the need to couple education, science, trade and industry policy to build competitiveness. He also emphasized the importance of an active role for government in promoting a technological structure in a paper[3] entitled Technological infrastructure and international competitiveness (Lundvall, 2007).

Generally acknowledged by intellectuals, and other actors, like policymakers, innovation systems have proven to be an useful framework for innovation policymaking. Significant contributions by academics are focused on National Innovation Systems (i.e. Freeman, Lundvall, Nelson). In their analysis, they provide elements and insight into the functioning of these systems. Small-developed countries provided a suitable setting to better understand the innovation process; therefore, most of the assumptions on National Innovation Systems are based on them.

However, in larger territories like France or Germany the task becomes more complex because of their size and the role that other actors at different levels (i.e. local and regional) play in the innovation process. Some academics (i.e. Cooke, Brazyck, Maskell) focused their study on Regional Innovation Systems and in particular, their unique characteristics that have an important impact on the innovation process.

3 His work was not published until 2004.

The complexity is even more evident when analyzing supranational innovation systems. The European Union is a paradigm of the challenges entailed by identifying and understanding the dynamics of this type of innovation system. Few academics have considered, researched and/or studied the construction of an European Supranational Innovation System (i.e. Borrás, Fernández-Ribas).

At present, there is no consensus among experts on the exact definition of "innovation systems". However, the concept is still emerging, and there are some definitions that illustrate the main elements that compose an innovation system.

1.1 Innovations

To date, authors have defined "innovation" by emphasizing singular features of it, activities or some combination of the two. Still others have chosen to focus on the characteristic processes of innovation or the outcomes of those processes. An example of the first is the definition of Dosi (1998). According to him "innovation concerns the search for and the discovery, experimentation, development, imitation and adoption of new products, new production processes and new organizational set-ups". An example of the later is given by Edquist (1997), "innovations are new creations of economic significance of either a tangible or intangible nature".

This author contends that Innovation is best described as something new that as a result augments and already extant body of knowledge. More technically, the innovation process can be characterized as cumulative, nonlinear, path dependent, context dependent, continuous and interactive. Nedis and Byler (2009) define innovations as the ability to take new ideas and translate them into a marketable product by using new processes, products or services more rapidly and improved than those of the competition.

Innovations can take place at any given stage of a process such as research, development, production, marketing and distribution. It is a common practice to mention Schumpeter when defining innovation. For Schumpeter (1934), innovation is a process characterized by new combinations that are conceived by the introduction of a new product; introduction of a new method of production; the opening of a new market; the conquest of the new raw material source; or the establishment of a new organization. An invention becomes an innovation when it is introduced in the market. The core of Schumpeter's definition is that innovation is an effort made by one or more people, which produce an economic gain, either by reducing costs or by creating extra income.

There can be innovations in product, production and distribution. Product innovations are new or improved products (or product varieties) being produced and

sold, including goods and services. Production innovations are new ways of producing goods and services; they can be technological or organizational. Distribution innovations are new or improved ways to diffuse the product.

Three forms of innovation have been identified in the literature, each representing a unique strategy. First, "continuing" innovation, which improves upon an existing product. Second, "disruptive" innovation that creates a substitute good (usually at lower costs) with the aim of stealing market share from an existing product. Third and last, "revolutionary" innovation relies on the invention of an entirely new product. Innovations we here define as new creations of economic significance, the results of evolutionary and interactive processes. Beyond these three accepted "types" of innovation, we have five fundamental activities of the innovation process: research, implementation, end-use, linkage and education. Each of these should be addressed to analyze innovation systems (Liu and White, 2001).

According to the Oslo Manual (OECD and Eurostat, 2005) an innovation is the implementation of a new (i.e. to the market, the world) or significantly improved product (good or service), or process, new marketing method, or a new organizational method in business practices, workplace organization or external relations. In addition, four types of innovation are identified in the Manual: product innovation, process innovation, marketing innovation and organizational innovation.

In sum, then, for the purpose of this thesis, a broad concept of innovation is employed that includes not only the product, but also process, business model, design, marketing and branding, services, social, and organizational.

1.2 Systems

According to the area of study, systems may be referred to as "open", "closed", or "isolated". Regardless of type each can also be analyzed either quantitatively or qualitatively. Systems include both the all-important determinants of innovation (Edquist, 2000) and the crucial inter-relationships among them (Lundvall, 1992).

The "systems approach" conveys a different outlook on the manner in which innovations are produced and supported. For many years, innovations were perceived as a product of a linear process within which research was the main thing. The systemic approach introduced a different method that encourages analyzing the whole process of innovation instead of focusing on a single aspect.

Edquist (1997) identified nine characteristics of innovation systems approaches: innovation and learning processes are the center of focus; adoption of a holistic and interdisciplinary perspective; historical perspectives are employed; they

stress differences between systems, rather than the optimality of systems; non-linearity and interdependence are emphasized; they encompass product technologies and organizational innovations; the role of institutions is central; they are still associated with conceptual diffuseness; and they are conceptual frameworks rather than formal theories.

As mentioned above, an essential characteristic of the innovation system approach is the interaction among components of the system. Theories of interactive learning and evolutionary theories have influenced the development of the innovation systems approach (Edquist, 1997). In fact, the innovation systems literature conceptualizes innovation as an evolutionary and social process (Edquist, 2004).

An innovation system can be described in terms of three elements: actors (organizations and individuals engaged in generating, using, adapting and disseminating new knowledge); interaction (occurs when engaging in activities that lead to innovation); and institutions (regulations, rules of the game and all of the instruments that govern how the interactions and processes take place). The complexity of the innovation process has been highlighted in many empirical studies (Lundvall, 1992). Indeed, many elements interact with each other in order to create unpredictable outcomes.

In sum, the innovation process should be treated in a systematic manner that integrates actors (public and private sector players), knowledge (creation, diffusion and absorption) interaction (competition, transaction, networking and knowledge transfer), instruments such as policies and regulations (promote, regulate, incentive the relation and interaction between actors), and geographic boundaries.

1.3 National innovation systems

Authors have regularly defined National Innovation Systems according to their own foci or scopes of analysis. It is important to note that the "innovation systems" approach offers a perspective with certain flexibility. Most definitions in the literature include the basic elements of what a national innovation system is, but some authors focus on specific aspects of the definition and contribute to a better understanding of how the systems work. Some of the most relevant contributions will be analyzed in this chapter.

Freeman (1995) and Lundvall (2007) attribute to each other the first use of the expression 'National System of Innovation'. In a study on Japan, Freeman (1987) defined national systems of innovation as "…the network of institutions in the

public and private sectors, whose activities and interactions initiate, import, modify and diffuse new technologies". Moreover, an important contribution to the concept was presented by Lundvall (1992) in a publication entitled National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning "… the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge… and are either located within or rooted inside the borders of a nation state". Both authors conceptual approach are very country-specific and mainly centered on the role of technology in the innovation system; Lundvall uses it to explain the economic performance of Denmark while Freeman uses it to analyze the institutional reasons for the differences in growth among nations, particularly in Japan.

In the same line of country-specific studies, the book *National Innovation Systems: A Comparative Analysis* edited by Nelson (1993) consists of a 15-country study on national systems of technical innovation. The similarities and differences across countries with regards to institutions and mechanisms that support technical innovation are highlighted in this publication. Nelson defines the NIS concept as "… a set of institutions whose interaction determine the innovative performance of … national firms".

Metcalfe (1995) defines national innovation systems with an approach that is essentially focused on technology "… that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer knowledge, skills and artifacts which define new technologies".

Among the authors that introduced a broad definition of national systems of innovations are Edquist (1997) "all important economic, social, political, organizational, institutional and other factors that influence the development, diffusion and use of innovations" and Patel and Pavitt (1994) a national innovation system comprises "… the national institutions, their incentive structures and their competencies, that determine the rate and direction of technological learning (or the volume and composition of change generating activities) in a country".

Important contributions from the literature on national systems of innovation include demonstrations that innovation processes are interactive and non-linear, but more importantly, several signal contributions introduce the concept of 'institutional learning' (Braczyk, Cooke and Heidenreich, 1998).

The policy priorities of national innovation systems consist of enhancing the innovative capacity of firms by focusing on the following actions: improving enterprises ability to access the appropriate networks, to finding and identifying relevant technologies and information, and adapting such knowledge to their own needs.

Holbrook and Wolfe (2000) summarized the key characteristics of a National Innovation System (NIS) as follows:

- Firms are part of a network of public and private sector institutions whose activities and interactions initiate, import, modify and diffuse new technolo gies;
- A NIS consists of linkages (both formal and informal) between institutions;
- A NIS includes the flow of intellectual resources between institutions; and
- Analysis of NIS emphasizes learning as a key economic resource and that geography and location matters.

According to Gregersen and Johnson (1996) institutional set-ups, production structures, knowledge infrastructures, patterns of consumer demand and government policies of national systems of innovation have sufficiently clear national stamps on them and are sufficiently stable over time to motivate this level of analysis within the innovation-systems approach to innovation studies.

However, as academics analyzed NIS, some of them realized the importance of local/regional actors and resources in larger territories. In countries such as the UK and Italy, the local or regional government plays an important role. Indeed, empirical studies demonstrated that they were the more appropriate level of government to deal with such matters. Subsequently, the importance of regional scale and resources in spurring innovation capability was underlined by many scholars who then very sensibly focused their research on Regional Innovation Systems (Cooke, 1992; Brazyck et al, 1998; Cooke et al, 2004).

1.4 Regional innovation systems

Despite the fact that National Innovation Systems are clearly defined by their geographic boundaries and instruments (policies and regulations) it is not always the case for Regional Innovation Systems (RIS); distance is a significant factor to take into account when analyzing interactions among actors in an innovation system. It can be argued that geographic proximity plays an important role in the frequency of communication between individuals, and consequently this has a positive impact on the innovation system. Therefore, the regional level provides an easier to observe environment for innovation systems where certain regional characteristics have an important impact on the innovation process.

All the same, in order to define a RIS, it is important to first outline the concept of region. In a policy paper by Cooke (2003) the concept of region is defined in terms of four main criteria:

1. It must not have a determinate size;
2. It is homogeneous in terms of specific criteria;
3. It can be distinguished from bordering areas by a particular kind of association of related features;
4. It possesses some kind of internal cohesion.

Also, it is important to note that the boundaries of regions can change and cannot be permanently fixed. As a result, in order to analyze a region, criteria that define a functioning entity within a specific time frame should be found. In an increasingly globalized world, it is most useful to consider regions as political governance systems below the national level but above the local level of public administration. In general, federal states or provinces have administrative legitimacy and the capability to develop policies to support enterprises.

Niosi (2000) defines RIS as "regions in which innovative activities take place" and adds that these activities ought to be measured by a "universally acceptable indicator". Asheim and Gertler (2004) point out that the regional innovation system expands beyond its own boundaries through a process of economic integration and globalization.

Perhaps Philip Cooke has developed some of the most important contributions to the RIS literature. Cooke defines regional innovation systems as interacting knowledge generation and exploitation sub-systems linked to global, national and other regional systems for commercializing new knowledge (Cooke, 2004). In addition, he developed a conceptual model of a regional innovation system by which RIS are defined to be a two-dimensional structure of innovation activity with a governance dimension (grassroots, network and dirigiste) and a business innovation dimension (localist, interactive and globalized) (Braczyk, Cooke and Heidenreich, 1998). Cooke argues that the development of the Regional Innovation Systems approach has been particularly influenced by science and economic geography. In the beginning, there was conceptual tension between those who endorsed the 'Listian' notion of the nation system and those who viewed the increasing significance of regions in a globalizing economy (Cooke, 2001).

As mentioned above, the conceptual model proposed by Cooke classifies the governance dimension of regional innovation systems into grassroots, network or dirigiste. The emphasis of this dimension is fundamentally on the institutions. The business innovation dimension categorizes RIS according to their stance as localist, interactive and globalized. The main focus of this dimension is on the firm. A brief description and illustrations of the model is presented in order to understand the fundamentals of different regional systems.

In a grassroots system technology transfer and funding are essentially locally organized (municipal or district level). Any research competency is most likely 'applied research', and technical specializations as well as degree of coordination are low. Two typical examples of this system are the multimedia clusters in Southern California (USA) and Tuscany (Italy). The first was grassroots in its governance structure but has become globalized. The second, was locally initiated, funded, researched, coordinated and focused, but it has shifted towards a more networked governance of innovation support.

The 'network' type of innovation system is multi-level with regards to technology transfer because local, regional, federal and supranational levels may be included. Therefore, funding is mostly conducted through agreements among financial institutions, government agencies and businesses. Concerning research within these systems, it is most likely to be pure and applied. Technical specializations are flexible, and the degree of coordination is high. An example of this is the Baden-Württemberg (Germany) region that maintains a strong networking culture (see Heidenreich and Krauss, 2004).

In a dirigiste system, technology transfer is mainly from outside and above the region itself (central government). Funding is mostly centrally determined and research is basic or fundamental. Technical specialization and levels of

coordination are both high. Slovenia was a good example of this system, having a dirigiste but fragmented innovation; we may now remark that today, Slovenia innovates via network building activities. A synopsis of the main characteristics of the governance dimension of innovation using Cooke's conceptual model is presented below in Table 1.

Table 1 Governance dimension

Governance dimension	Technology transfer	Funding	Research	Technical specialization	Level of coordination
Grassroots	Local	Local	Applied	Low	Low
Network	Multi-level	Multi-level	Pure and applied	Flexible	High
Dirigiste	Outside and above the region itself	Centrally determined	Basic or fundamental	High	High

Source: Compiled by author with data from Cooke's (2004) conceptual model.

With regards to the business innovation dimension, firms can be localist, interactive or globalized (see Table 2). In a localist regional innovation system there are few or no large indigenous firms and few large local offices of externally controlled firms. The research reach of firms is mostly limited to local research organizations. However, there is a high level of association among actors. Tohoku (Japan) is an example of a localist RIS in which the majority of the constituent industries are branch-plants while most R&D activities are located outside of the region.

Interactive RIS enjoy a reasonable balance of large and small firms and a mix of both public and private R&D. RIS of this type conduct research alternately employing regional research resources, extensively, and alternately, foreign innovation sources. The level of association among actors is high. Catalonia (Spain) is a good example of an interactive RIS; it has an entrepreneurial culture of industrial networks. The area has developed a stronger regional identity and has become more international in outlook (see Bacaria et al, 2004).

Finally, globalized regional innovation systems are generally dominated by large multinational firms that frequently support clusters of small and medium enterprises (SME). R&D resources are mostly private, and the scope of their research activities and sourcing is internal. The level of association among actors is high where SMEs are mostly under the direction of large firms. Brabant (Netherlands) is an example of a globalized RIS having participant world-class companies that enjoy the external incentives that accompany close proximity to other Dutch, German and Belgian innovation systems. Based on Cooke's conceptual model, a summary of the main characteristics of the business dimension of innovation is presented in Table 2.

Table 2 Business innovation dimension

Business innovation dimension	Size and type of Firms	Research reach	R&D resources	Level of Association among actors
Localist	Few or no large indigenous enterprises	Mostly local	Few public but some private	High (vertical and horizontal)
Interactive	Balance between small and large firms	Regional and foreign	Mix of public and private	High (vertical and horizontal)
Globalized	Large firms dominate with dependent SMEs	Internal	Basic or Mostly private	High (mostly vertical)

Source: Compiled by author with data from Cooke's (2004) conceptual model.

When seeking to apply regional innovation systems analysis there are no one-size-fits-all models. Regions need to be analyzed on a case-by-case basis to determine if they fulfill the main criteria to be considered a RIS. The concept is broad and flexible; most authors agree that one of the key issues in this approach is that it is difficult to establish precisely what should be considered a Regional Innovation System. Because it is not a theory *per se* and most of the work has been based on empirical studies more than conceptual work, makes clear definition even more complex.

However, this allows certain flexibility that is valuable given that systems evolve and technology itself changes. If there is instead, solely a closed concept regarding RIS it will more likely become anachronistic and less pertinent in a short period

of time, especially when we take into account globalization. In the former case, the RIS may be more difficult to identify. Nevertheless, a rightly flexible definition allows the RIS to adapt to the contemporary conditions.

1.5 Supranational innovation systems

The analysis of innovation systems provides for the identification of key actors and the interaction among them. Policies and measures implemented to increase the innovative capacity of regions as well as the level of administration can differ across innovation systems.

According to Charles Edquist (2001) the following two conditions should be that will justify public intervention in a market economy:

1. The market mechanism and firms must fail to achieve the objectives for mulated
2. The state and its public agencies must also have the ability to solve or mitigate the problem

Fernández-Ribas (2009) describes "externalities, scale economies and indivisibilities" as motives that have been put forward to justify the involvement of upper-level administrations. Without a doubt, the outcome of certain innovation

activities may generate wide-ranging economic benefits (externalities) to a nation or event to the world.

We should note at this point that in order to take advantage of scale economies, firms need robust amounts of public money. In addition, a centralized provision of public funding can actually reduce the costs of collective decision-making, by reducing inefficiencies derived from excessive fragmentation of initiatives and duplicate policy efforts (indivisibilities). Specifically, 'information' and telecommunication innovations provide worthy examples that fulfill all of the above criteria and therefore, participation of upper-level public entities is justified.

In Europe there exists a well-established multilevel[4] governance system that has become relevant for innovation. In fact, we observe an interesting phenomenon can be observed in the European Union (EU): on the one hand, European integration has transferred authority of innovation policymaking from member states to European level institutions; on the other hand, regionalization in some member states has shifted political authority from the national level down to sub-national levels of government (IRE, 2008).

The European multilevel governance system offers many advantages but also not insignificant challenges. One of the advantages is that the system offers the

4 The term refers to actors on the different policy or administrative levels.

possibility of generating a broad partnership with stakeholders at all levels (European, national, regional and local) to encourage the flow of resources and knowledge where it is most appropriate.

Another fundamental question for the design of public innovation policy is just what responsibility should be taken by the state or public sector and what should not (Edquist, 2001). An advantage is that to ensure that decisions are taken as closely as possible to the citizen and to justify action at the European level, the European institutions must act according to the principle of subsidiarity. This means that the EU does not take action (except in the areas which fall within its exclusive competence) unless it is more effective than action taken at the national, regional or local level.

The principle of subsidiarity may help identify which actions should be executed at the European, national, regional or local level to avoid duplication of efforts. Some of the challenges for the regions within a multilevel governance system have to do with the complexity and costs of coordination. Efficiency of the administration, the desired output, the impact of the measures and the coordination and exchange mechanisms at different levels are some of the major challenges that need to be addressed.

There are two main components in an innovation system: organizations (companies, academic institutions, etc) and an institutional set-up (rules, regulations, practices, customs, etc). Examining the EU institutional set-up and using as theoretical nodal points the self-generation of a system, the relationship of the system with its external environment, the dynamic relationship among institutions, the evolution of the system and its aims and boundaries, Susana Borrás (2004) concludes that in spite of recent and rapid formal institutional-building efforts at the EU-level and the clear process of system-formation within the supranational entity, it would be premature to identify a system as such. The author argues that a quick look at the patterns of institutional dynamics generated at the EU-level does not allow a completed and formed system to be discerned.

The question arises whether there is an increasing complexity and interdependence among regional, national and supranational innovation systems? From this perspective, the European Union benefits from a diversity of innovation systems that partake in the European Supranational Innovation System. This diversity may vary through time and interactions among systems.

In terms of skills and competencies, the most important input to any knowledge production system the object of which is specifically innovation is knowledge (Nielsen and Lundvall, 2003). According to Stein (2004), when analyzing the

European knowledge system, it is possible to discern both internal integrative and exogenous forces strengthening intra-European knowledge dynamics. In sum, there is a multi-level and overlapping knowledge system in Europe; but is there a European Supranational Innovation System?

The innovation systems approach is used to analyze this potential European Supranational Innovation System and to adumbrate its primary characteristics. Consequently, it will be determined if Latin America and the Caribbean could learn from the European experience and use it to create an enabling environment to support innovation in the region. In addition, a strategy to encourage innovation in Latin America and the Caribbean is proposed.

1.6 Multilevel Governance (MLG)

"Multilevel governance" (hereafter MLG) is an influential perspective that emerged in the early 1990s in the context of the European Union that provides a framework to understand the role of sub-national governments. The concept was initially used to describe the interaction of multiple actors in the EU Cohesion Policy (Marks, 1993; Hooghe, 1996). MLG was described as a system of continuous negotiation among nested governments at several territories tiers.

To date, the term is used to analyze the EU policy-making process more generally. On the one hand, scale flexibility ranks high among MLG's main benefits and it also allows tailor-to-fit jurisdictions. On the other hand, one of the main challenges of the MLG approach is the transaction cost of coordinating multiple jurisdictions. There are two dimensions of MLG: the vertical and the horizontal. The vertical dimension of MLG refers to the link between higher and lower levels of government, and the horizontal dimension refers to cooperation agreements among regions or municipalities.

According to Schmitter (2003) MLG can be defined as an arrangement for making binding decisions that engages a multiplicity of politically independent but otherwise interdependent actors – private and public – at different levels of territorial aggregation in more or less continuous negotiation/deliberation/implementation, but does not assign exclusive policy competence to any of these levels or assert a stable hierarchy of political authority.

Subsequently, Liesbet Hooghe and Gary Marks (2003) further developed the concept and distinguished two types of MLG. Type I bears a resemblance to federalism. There is a systemic institutional choice and the unit of analysis is the individual government. According to the authors, the salient features of Type I are:

general-purpose jurisdictions, non-intersecting memberships, jurisdictions organized in a limited number of levels, and a system-wide architecture. In this type of MLG (Type I), decision-making powers are dispersed across jurisdictions; such jurisdictions are defined by boundaries that do not intersect at any level; these jurisdictions are nested; and there is a basic structure that is relatively stable. Type I could alternately be described as "bundled multilevel governance".

Type II MLG is more complex. Within Type II we find innumerable jurisdictions that often overlap each other and are focused on specific policy sectors. According to Hooghe and Marks (2003), its attributes are: task-specific jurisdictions, intersecting memberships, no limit to the number of jurisdictional levels and flexible design. In this type, multiple and independent jurisdictions fulfill distinct functions; governance is organized across a large number of levels; the flexible design aims to respond to changing preferences and necessities.

Both Types are complementary yet different. On the one hand, Type I is oriented to intrinsic communities and to their demands for self-rule; it is predisposed to the resolution of conflict. On the other hand, Type II is appropriate to achieve pareto-optimality when redistribution is not salient.

Governance can be defined as a complex network of vertical and horizontal relations. However, it can also be considered a regulatory concept with the aim to improve the inadequate democratic function in western countries. The representation of institutions, the transparency of their actions, their performance and control are fundamental elements of the legitimacy of the political power because without them there cannot be democratic governance. Therefore the development of institutional capacities constitutes an essential requirement for good governance Morata (2004).

1.7 Foresight

The current global state of affairs calls for a need to cope with rapid technological developments and to anticipate new opportunities and threats. Foresight can be considered an effective tool to connect elements of the innovation system. This process is also a way to define the system with regards to its elements; for example stakeholders and system boundaries. The rationale relates to presenting alternative solutions to pressing challenges such as increasing competitiveness through innovation at the supranational level.

According to Schultz (1997) foresight is, first and foremost, a transdisciplinary, systems-science-based approach to consider alternative possible futures and to

plan the creation of a preferred future. Concerning Latin America and the Caribbean, this approach is used to generate a tailor-to-fit proposal. It is important note that foresight is used to describe a type of planning exercise that takes at least ten-years. As a flexible, multidisciplinary, technology, science and system based approach; foresight offers a long-term perspective and awareness for policymakers concerning innovation activities and opportunities. An important first step in relation to foresight is to situate the present and its vulnerabilities. Therefore, a SWOT analysis (strengths, weaknesses, opportunities and threats) of innovation in Latin America and the Caribbean and an overview of the main regional groups is presented as a basis for the above-mentioned proposal.

In sum, to realize the objectives setout in this thesis the innovation systems and foresight approach is used. These distinctive approaches are used to identify possible alternatives to encourage innovation activities in the region and used as a heuristic device to act as a problem-defining framework to adumbrate the main problems that need to be resolved. New technologies promise and create solutions. Mobile phones are used as an example of a key tool mainly in developing countries to enhance innovation.

1.8 Conclusion

Innovation is a complex process that involves a system of interactions and interdependencies between the structure of production and the institutional setup. The concept of innovation has evolved. A broad concept includes product, process, business model, design, marketing, branding, services, social, and organizational. The emerging European Supranational Innovation System has become more relevant and could become a source of inspiration for Latin American and Caribbean.

A multidisciplinary approach that includes different theories is employed to understand the source, nature and dynamics of innovation. After a review of the literature, the conclusion is that the innovation systems approach is the most appropriate framework to analyze innovation.

Chapter 2
The European Supranational Innovation System

For many years, the European institutions have put forward, influenced and implemented policies and programs to foster innovation in the EU. They have helped reinforce collaboration among different innovation actors and supported mutual policy learning between innovation policy makers and public innovation support bodies at different levels. In fact, the European Union has not only developed innovation strategies but also offers valuable resources for the implementation of their innovation policies. However, these efforts have not yet achieved the level of success expected, and there are still important performance gaps when compared to their main competitors (i.e. USA and Japan).

When looking into the literature on innovation systems, a reader would find that most of the research is focused on national, regional, or sectoral innovation systems. The aim in this chapter is to explore the emergence of a European Innovation System by analyzing the main elements that characterize this system and examining the different strategies implemented by the EU institutions and the interaction among these and national, regional and local levels.

The analysis of the advantages and challenges of this system could contribute to identify the factors that facilitate the creation, transfer and distribution of knowledge. Ultimately other regions could learn from the European experience and

implement similar regional strategies to encourage and facilitate the activities and efforts of innovation systems within the region.

For the purpose of this thesis the innovation systems concept is delimited geographically into national innovation systems (NIS), regional innovation systems (RIS) or supranational innovation systems (SIS). Additionally a broad concept of innovation that includes product, process, business model, design, marketing, branding, services, social, and organizational is employed.

An overview of innovation activities at the EU-level is used to illustrate the role and interaction of the elements that shape the European Union's innovation system. This chapter is divided in three parts; the first consists of a brief presentation of innovation at the EU-level. In the second part the construction of a EU-innovation system is analyzed; the different strategies implemented by the EU institutions, and three programs that are both driving innovation and examples of innovation such as Erasmus, European Space Agency and Framework Programs is presented. In the third part, an analysis of the advantages and challenges of this system is presented to identify the factors that facilitate the creation, transfer and distribution of knowledge. The conclusion is that the European experience is valuable, and by learning from the mistakes and achievements of the ongoing process, the EU can find innovative ways to attain the goals it has set out regarding innovation.

2.1 A brief review at the EU-level

When the six founding countries decided to build a European Economic Community (EEC), on 25 March 1957, they provided for the establishment of a common market, a customs union and common policies. Certain common policies were launched such as the common agricultural, trade and transport. However, at the time, the European Commission was not endowed with explicit powers to promote research, technological development, industrial or innovation policy. After the Paris Summit in 1972, the Community developed actions in various fields, among them, industrial policy.

Since then, many activities concerning innovation have taken place at the EU-level including programs and strategies. Figure 1 presents a timeline of several innovation activities that are briefly highlighted in this thesis. This overview of some of the innovation efforts in EU programs and strategies that have been implemented in the last thirty years demonstrates the evolution and increasing awareness of innovation at the EU-level.

[illegible]


COST program (European cooperation in the field of Scientific and Technical Research)
1971
Framework Programs for Research and Technological Development (RTD)
1984
EUREKA (Europe-wide Network for Industrial R&D)
1985
Green Paper on Innovation
1995
First Action Plan for Innovation in Europe
1996
Lisbon Strategy
European Research Area (ERA)
2000
Barcelona European Council
2002
Kok Report On the Lisbon Strategy
2004
Community Lisbon Program
2005
European Research Council
2007
EUROPE 2020
2010

[illegible]

[illegible]

established as a Europe-wide Network for market-oriented industrial R&D and innovation.

Community institutions have explicitly included innovation policies in their public documents since the early 1990s. The 1995 Green Paper on Innovation identified the challenges of innovation in the EU and proposed actions to overcome the obstacles that hinder innovation. Among their fundamental objectives to pursue are the following: strengthen direct research efforts towards innovation; reinforce human resources for innovation; improve financing conditions for innovation; foster legal and regulatory environment favorable to innovation; adapt the role and modalities of public action regarding innovation.

A year later, the First Action Plan for Innovation in Europe, referred to a limited number of priorities to be launched at the Community level and included a number of schemes identified as essential to the innovation process. The Action Plan identified three areas for action: to foster an innovation culture, to establish a framework conducive to innovation and to better articulate research and innovation. From then on, several strategies and policies have followed.

The European Research Area (ERA) was proposed by the European Commission and integrates the scientific resources of the European Union with a structure concentrated on multi-national cooperation in several fields. The creation of the ERA, in 2000, was endorsed by the EU at the Lisbon European Council and has led to several initiatives to encourage a more coherent research and innovation system in Europe. The ERA seeks to establish a European "internal market" for research, where researchers, knowledge and technology freely circulate combined with an effective European-level coordination of national and European research activities, programs and policies.

The Treaty of the European Union defined the rules governing research, innovation, and education/training institutions. Innovation is quoted in the title regarding Industry, which calls for action in "fostering better exploitation of the industrial potential of policies of innovation, research and technological development".

An important milestone for the Community's approach to innovation policy is the Lisbon European Council of 23 and 24 March 2000. The European Council launched an ambitious goal, the "Lisbon strategy", aimed at transforming the EU by 2010 into "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion". The strategy highlights the value of supporting small and medium-sized enterprises, disseminating best practices and ensuring

greater convergence among Member States. Since then, innovation has gained increasing importance in the EU policy framework. Innovation policies that were mainly framed within the context of research policy are now considered in other policy strategies such as enterprise and industrial.

This turning point reveals a shift in the theoretical perspective. For many years, innovations were perceived as a product of a linear process where research was the main source. Although in recent years European institutions have been influenced by several approaches such as evolutionary economics, learning regions and national innovation systems. As a result, a more holistic approach to innovation has favored a systemic approach; consequently the linear process was set aside. To illustrate this shift in the European institutions approach an explicit remark in 2003 by the Commission regarding innovation policy stated that "The evolution of the innovation concept – from the linear model having R&D as the starting point to the systemic model in which innovation arises from complex interactions between individuals, organizations and their operating environment – demonstrates that innovations policies must extend their focus beyond the link with research".

A further aim to close the gap between the EU and its major competitors in R&D and innovation was added at the Barcelona European Council in 2002. It decided to increase the overall spending with the aim of

approaching 3% of GDP on R&D and innovation by 2010 of which two thirds of this new investment should be financed by the private sector.

Nevertheless, most experts agree that, overall, the Lisbon strategy has been a failure. Among others, external events, for example the burst of the dot-com bubble shortly after the Lisbon strategy was signed and terrorist's attacks on the United States of America on 11 September 2001 have hindered the objectives. The review of the Lisbon strategy headed by Wim Kok (2004) concluded that even though some progress was made, most of the objectives were not achieved. The unsatisfactory results are mainly attributed to an overloaded agenda, poor coordination, conflicting priorities and mostly a lack of determined political action.

As a result of the above-mentioned report, the Community Lisbon Program[5] was launched in 2005 with the aim to make Europe's regulatory and economic framework more innovation friendly. The Program established a political platform for partnership between Member States and the Commission. The governance structure of the renewed Lisbon Strategy provided a forum for policy discussions and the exchange at the EU-level of best practices on innovation in the context of treaty-based multilateral surveillance.

5 See "Common Actions for Growth and Employment: The Community Lisbon Programme" – COM (2005) 330, 20.7.2005.

Ten years after the launch of the Lisbon strategy the European Commission's (2010) assessment is not straightforward. The main targets, growth and jobs, will not be reached despite the fact that the Lisbon strategy has had a positive impact on the European Union. The strategy has helped build a broad consensus on the reforms that the EU needs. Still, it was not equipped to address some of the causes of the crises from the outset, and the overall pace to implement reforms has been slow and uneven. Implementation has suffered from weak governance structures and not enough communication about the benefits of the strategy and implications of non-reform for the EU.

In early 2007, the European Research Council (ERC), the first EU funding body set up to support investigator-driven frontier research, was launched in Berlin. Its main aim is to stimulate scientific excellence by supporting and encouraging the best scientific efforts in Europe across all fields of science, scholarship and engineering. A few months later, the European Commission launched a broad institutional and public debate with the Green Paper -"The European Research Area: New Perspectives" a "broad institutional and public debate on what should be done to create a unified and attractive European Research Area".

At present, the main innovation policy of the Community is the broad-based innovation strategy[6] "Putting knowledge into practice". The Communication presents a framework to take innovation forward bringing together different policy areas that have a bearing on innovation. It also identifies education, research, knowledge transfer, entrepreneurship and finance are identified as innovation drivers. There are nine priorities identified in the strategy: Intellectual Property Rights, Standardization, Public Procurement, Joint Technology Initiatives (JTI), Lead Markets, European Institute of Innovation and Technology (EIT), Clusters and Cohesion, Services and Risk Capital. Additionally, priority actions are emphasized in a roadmap for action at both national and European levels.

At the end of 2007, the European Commission launched the Lead Market Initiative (LMI). In collaboration with Member States, industry and the European Commission, the Lead Market Initiative is the European policy for six[7] important sectors that are supported by actions to lower barriers to bring new products or services on to the market. A year later, the European Institute of Innovation and Technology (EIT) was established to reshape the European innovation landscape and to provide solutions to bridge the innovation gap; it launched its activities in Budapest in September 2008. The mission of the EIT is to grow and capitalize on the innovation capacity of partners from the knowledge triangle (higher education, research and innovation) from the EU and beyond.

6 COM (2006) 502.
7 Bio-based products, renewable energies, sustainable construction, e-Health, recycling and protective textiles.

Set up under Article 187[8], Treaty on the Functioning of the European Union (TFEU), Joint Technology Initiatives (JTI) are cooperative undertakings to establish public-private partnerships at the EU-level in the field of industrial research. Launched under the Framework Programs, at present there are five JTIs in place: Innovative Medicines Initiative (IMI), Nanoelectronics Technologies 2020 (ENIAC), Fuel Cells and Hydrogen (FCH JU), Embedded Computing Systems (ARTEMIS) and Aeronautics and Air Transport (Clean Sky). The JTIs are independent legal entities that manage research projects and provide a framework where public and private actors work and decide together.

In 2009, a communication from the European Commission (COM 442, 2009) reviewed the Community innovation policy and acknowledged innovation as a key driver for the strengthening of Europe's competitiveness. At the Union level the formation of the Competitiveness Council configuration and the Group of Commissioners on Growth, Competitiveness, Employment and Sustainable Development are responses to the need for innovation policies based on systemic principles.

8 This allows the EU to set up Joint Undertakings for the efficient execution of EU research, technological development and demonstration of programs.

On March 2010 the European Commission launched the "Europe 2020", a 10-year strategy that aims at smart (fostering knowledge, innovation, education and digital society), sustainable (making production more resource efficient while boosting competitiveness) and inclusive (raising participation in the labor market, acquisition of skills and fight against poverty) growth with greater coordination of national and EU-level policy. Europe 2020 replaces the Lisbon strategy, which covered the 2000-2010 period. It sets five targets that cover employment, research and innovation, climate change and energy, education and social inclusion.

Innovation has been more or less present since the European integration process began, but it is evident that in the last decade both member states and EU-level institutions have increasingly adopted strategies and instruments to stimulate innovation.

2.2 The Role of EU-level institutions

The European institutions, aware of the fact that innovations are key to growth, have been fostering the innovation process through different activities as those that have been previously described. One of the main elements in a system of innovation is a structure of production (i.e. institutions, organizations). In a supranational innovation system it is not an easy task to identify all of the actors involved in innovation activities. Even though it is important to identify the functions

of institutions (public or private) within the innovation system to understand their role in the achievement of innovative performance, an analysis would exceed the scope of this thesis. Nevertheless, the EU institutions are a key feature in understanding the European Supranational Innovation System; therefore, a brief overview of their main tasks is presented.

Member states have delegated some of their decision-making powers to the EU institutions. The 'institutional triangle[9]' generates the policies and laws that apply throughout the EU. In addition, the Treaty of Maastricht empowers the European Council[10] to settle difficult issues on which ministers meeting in the Council of the European Union fail to agree. The powers and responsibilities of these institutions, as well as the rules and procedures that they must follow, are laid down in the treaties. The Council of the European Union, the European Parliament, the European Commission and the European Council play a key role with regards to innovation at the EU-level. The main activities of these institutions as related to innovation are highlighted to establish their role in the EU-level actions.

9 The Council of the European Union, European Parliament and the European Commission.
10 It became an institution on 1 December 2009.

2.2.1 European Council

The European Council is the body that sets the overall policy agenda for the EU but does not exercise legislative functions. It comprises the heads of state or government of the member states, its President and the President of the Commission. Together they define the general political direction and priorities of the European Union.

With regards to innovation, the European Council plays a key role because it influences in issues that fall within the competence of member states (i.e. education, industry). Since the Lisbon strategy was launched, innovation policy has been becoming increasingly important in terms of EU policy priorities, and it is widely recognized as a key enabler of competitiveness, productivity growth and sustainability. In their summits, the European Council have acknowledged, debated, welcomed and called for initiatives and encouraged innovation activities.

For example, the conclusions of the European Council of 11-12th December, 2008 called, for "the launching of a European plan for innovation, combined with the development of the European Research Area and with the reflection on the future of the Lisbon Strategy beyond 2010. The plan encompasses all the conditions for sustainable development and the main technologies of the future (inter alia

energy, information technology, nanotechnologies, space technology and services derived from it, and life sciences)".

The conclusions of the European Council of 25-26th March, 2010, concerning "Europe 2020: a New European strategy for jobs and growth", agreed that the new strategy will focus on the key areas where action is needed: knowledge and innovation, a more sustainable economy, high employment and social inclusion. They also agreed to target the improvement of the conditions for research and development, in particular with the aim of bringing combined public and private investment levels in this sector to 3% of GDP.

National and regional innovation policies, resources and strategies are essential to the European Supranational Innovation System. To ensure the success of innovation policies leadership at the highest level is crucial. Regular monitoring is an important task to ensure that the objectives setout in the policies concerning innovation is attained. The European Council should perform this important exercise and contribute towards strengthening the European Supranational Innovation System.

2.2.2 Council of the European Union

The Council is one of the EU's main decision-taking bodies. The minister responsible for the issue on the agenda (i.e. economic and financial affairs, competitiveness, and education) represents each member state. Responsible for coordination (i.e. broad economic policies of the Member States), decision-making (i.e. regulations, directives, decisions) and concluding on behalf of the EU international agreements (i.e. between the EU and one or more states or international organizations), the Council contributes to the future of European innovation policy.

In June 2002, the Competitiveness Council was created with the merger of Internal Market, Industry and Research in order to provide a more coherent, coordinated and integrated approach to foster competitiveness and growth in the EU. Among its tasks are to review, on a regular basis, horizontal and sectoral competitiveness issues based on analysis provided by the Commission and give input on how these issues can be considered in all appropriate policy initiatives.

During the 3035th Competitiveness Council Meeting that took place in Luxembourg 11-12th October 2010, the EU ministers discussed the key elements of a new strategy for innovation. They agreed on the value of identifying the main drivers

for innovation and to encourage private investment in innovation. Also, they addressed the most appropriate methods for implementing and monitoring "Innovation Union", one of the EU 2020 flagship initiatives.

Creating an innovation friendly environment in Europe is an important task that requires significant efforts by all stakeholders and especially by the EU institutions. There are still many obstacles at the EU-level that hinder innovation. The Council has been discussing, encouraging, approving and monitoring innovation initiatives. Aware that an effective Intellectual Property Rights (IPR) framework at the EU-level is important for innovation, the Council is working together with the European Commission to provide a EU patent that is cost-effective, simplified and ensures legal certainty.

2.2.3 European Commission

The European Commission is the EU's executive body; it manages and runs the European Union. Members of this institution are appointed by agreement between Member States for a five-year term and approved by the European Parliament. The Commission represents the common European interest; it is responsible for proposing legislation (to the Parliament and the Council), implementing decisions, enforces European law (with the Court of Justice) and it represent the EU

on the international stage (i.e. negotiates agreements between the EU and other countries). The Commission implements the decisions taken by the Council, and it has wide powers to manage the EU's common policies and budgets.

For the most part the Commission has helped to strengthen collaboration among different innovation actors and supported mutual policy learning between innovation policymakers and public innovation support bodies at different levels. In particular, a soft EU policy framework has been put in place to raise the level of excellence of clusters in the EU Member States and to promote cluster cooperation to improve innovation capability and strengthen positions in the global market (COM 442, 2009). Support programs for innovation can influence the behavior of specific actors in the innovation process. Several programs, instruments and policies managed by the Commission are supporting innovation activities.

Through the "Innovation Union" flagship, the Commission offers a clear perspective of where Europe should be by 2020 and what decisions and actions are needed to get there. The major areas of focus are energy efficiency and climate change. The aim is to improve conditions and access to finance research and innovation and remove bottlenecks to ensure that innovative ideas can be turned into products and services (COM 546, 2010).

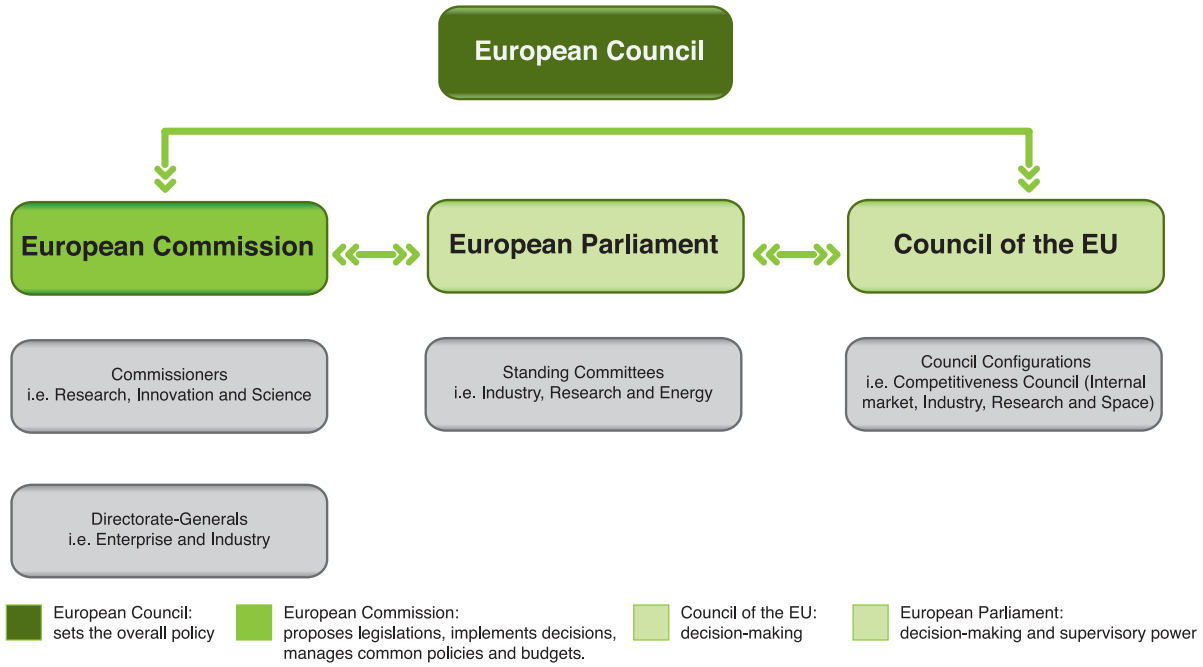
2.2.4 European Parliament

The only directly elected[11] body of the European Union, the Parliament, plays an active role in drafting legislation and represents the EU's citizens. This institution has important legislative, budget, control and supervisory powers. Together with the Council of the EU, they can amend and reject legislation. With regards to the EU budget, the Parliament has an equal footing to the Council with power over the entire budget.

According to the treaties, the Parliament "elects" the President of the European Commission upon the European Council's proposal. Subsequent to the approval of the Commission President, the members of the commission come before a parliamentary hearing. Afterwards, as a body, it can be approved or rejected by Parliament. In addition, the Parliament has the power to censure the Commission if they have a two-thirds majority, which forces the resignation of the entire Commission from office. Concerning supervisory powers, the Parliament can setup a Committee of Inquiry and call other institutions to answer questions.

11 Since 1979, its members have been directly elected by universal suffrage every five years.

Figure 2 Overview of the composition of the main EU-level institutions with regards to innovation activities.



Source: Compiled by author with data from the EU website: www.europa.eu last accessed on 10 November 2010.

2.3 EU27 Member States performance

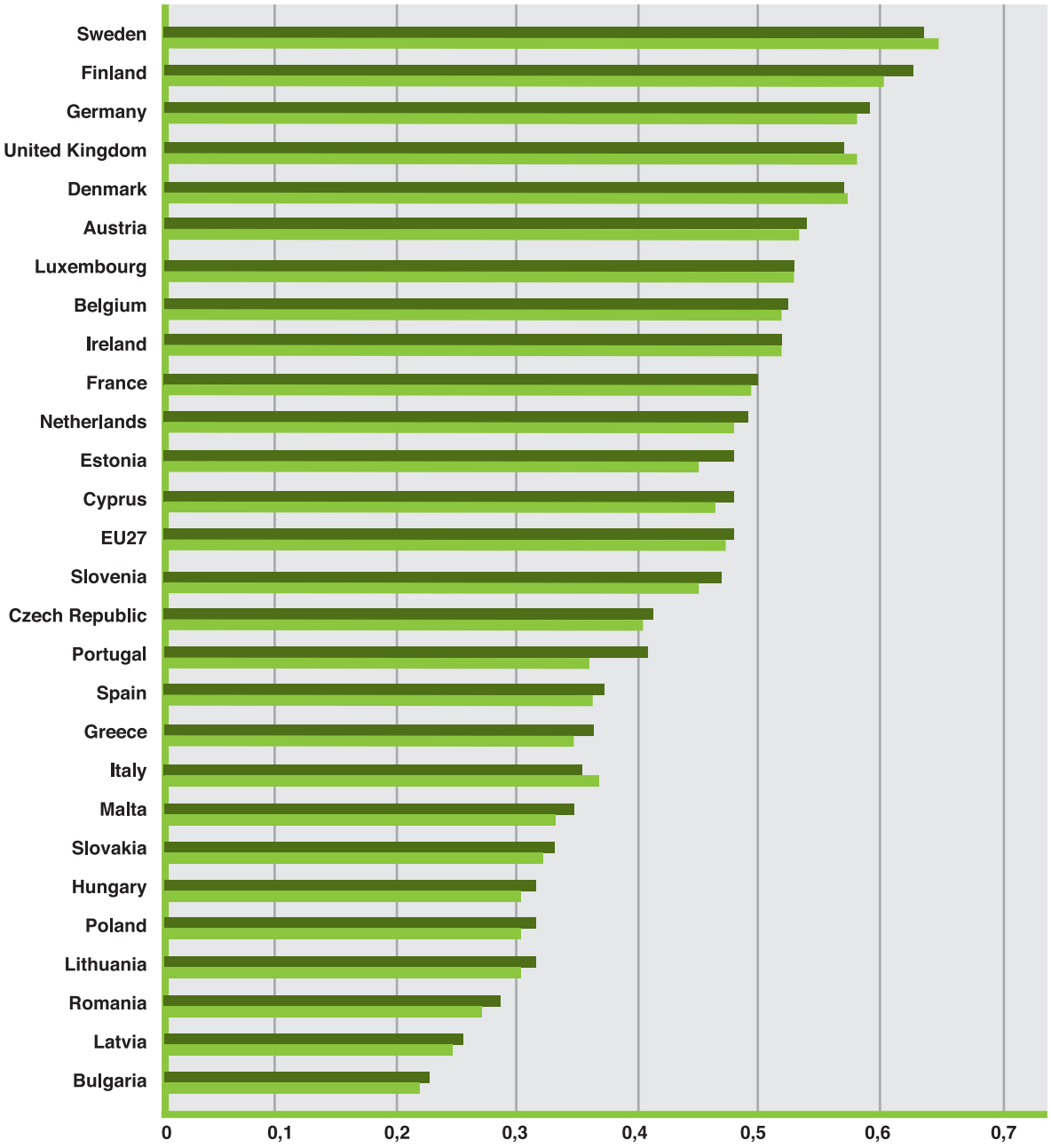
With regards to innovation indicators, the European Innovation Scoreboard is an instrument of the European Commission developed under the Lisbon Strategy to provide an assessment of the innovation performance in the EU27 Member States. The dimensions of innovation performance captured in the EIS are: enablers (human resources and finance and support), firm activities (firm investments, linkages and entrepreneurship and throughputs) and outputs (innovators and economic effects[12]) .

12 See "European Innovation Scoreboard (EIS) 2009" available at http://www.proinno-europe.eu

The Summary Innovation Index (SII) gives an overview of aggregate national innovation performance. The results for the 2009 compared to the 2008 SII are illustrated in Figure 3. The overall assessment, as shown in the chart, is that the EU27 are improving their innovation performance. Countries that are below the EU average are growing more rapidly than the rest but are still far behind.

In the European Innovation Scoreboard, EU Member States are divided into four groups according to their innovation performance: innovation leaders (Denmark, Finland, Germany, Sweden and the UK), innovation followers (Austria, Belgium, Cyprus, Estonia, France, Ireland, Luxembourg, the Netherlands and Slovenia), moderate innovators (Czech Republic, Greece, Hungary, Italy, Lithuania, Malta, Poland, Portugal, Slovakia and Spain), and catching-up countries (Bulgaria, Latvia and Romania).

Figure 3 EU27 Innovation performance 2009, according to the Summary Innovation Index , which gives an overview of aggregate national innovation performance and it is calculated as a composite of 29 indicators.



Source: Compiled by author with data from the European Innovation Scoreboard 2009.

For many years, Europe held a strong lead in innovation performance but during the last years has been trailing behind its main economic competitors, the US and Japan (i.e. tertiary education, number of researchers and public-private cooperation). According to the Innovation Union Scoreboard 2010, the US is performing better than the EU27 in tertiary education (69%), license and patent revenues (222%), and public-private co-publications (94%). There are important gaps in the EU innovation policy concerning the Intellectual Property Rights and standardization. Also, the link between supply and demand side activities needs to be reinforced. These and other challenges are identified and addressed later on in this thesis after an overview of the construction of a European Innovation System.

2.4 An European Supranational Innovation System emerges

The European integration as a unique, complex and ongoing process reproduces similar characteristics in the European Supranational Innovation System. To date, it is the only example of a supranational entity that comprises a multilevel governance system where different actors at different levels and a range of competencies and resources regarding innovation interact. Regional Innovation Systems are, and will most likely remain, an important and discernible part of the European Supranational Innovation System; however, the same is not clear for National Innovation Systems. In the future, their role in the European Supranational

Innovation System could gradually and naturally fade away in favor of EU-level institutions.

As mentioned in the previous chapter, there is no consensus on the exact definition of an innovation system but, for the purpose of this thesis the innovation process is treated in a systematic approach by integrating actors (public and private sector players), knowledge (creation, diffusion and absorption), interactions (competition, transaction, networking and knowledge transfer), instruments such as policies and regulations (promote, regulate, incentive the relation and interaction between actors) and geographic boundaries. Private and public as well as formal and informal players are considered as central elements in an innovation system.

Susana Borrás (2004) acknowledges the efforts to construct an institutional setup and the incipient system formation but concludes that it is premature when looking into the institutional dynamics generated at the EU-level to identify a complete and formed European Supranational Innovation System.

Indeed, the Europeanization of R&D and innovation policies has not yet achieved a suitable level and many challenges lay ahead. Nevertheless, in the last years, the EU Member States and EU-level institutions have significantly improved and undertaken more initiatives in their efforts to shape and construct the European

Supranational Innovation System. Some endeavors have been more successful than others but gradually the system is emerging and its features are shaping the innovation actions at the EU-level.

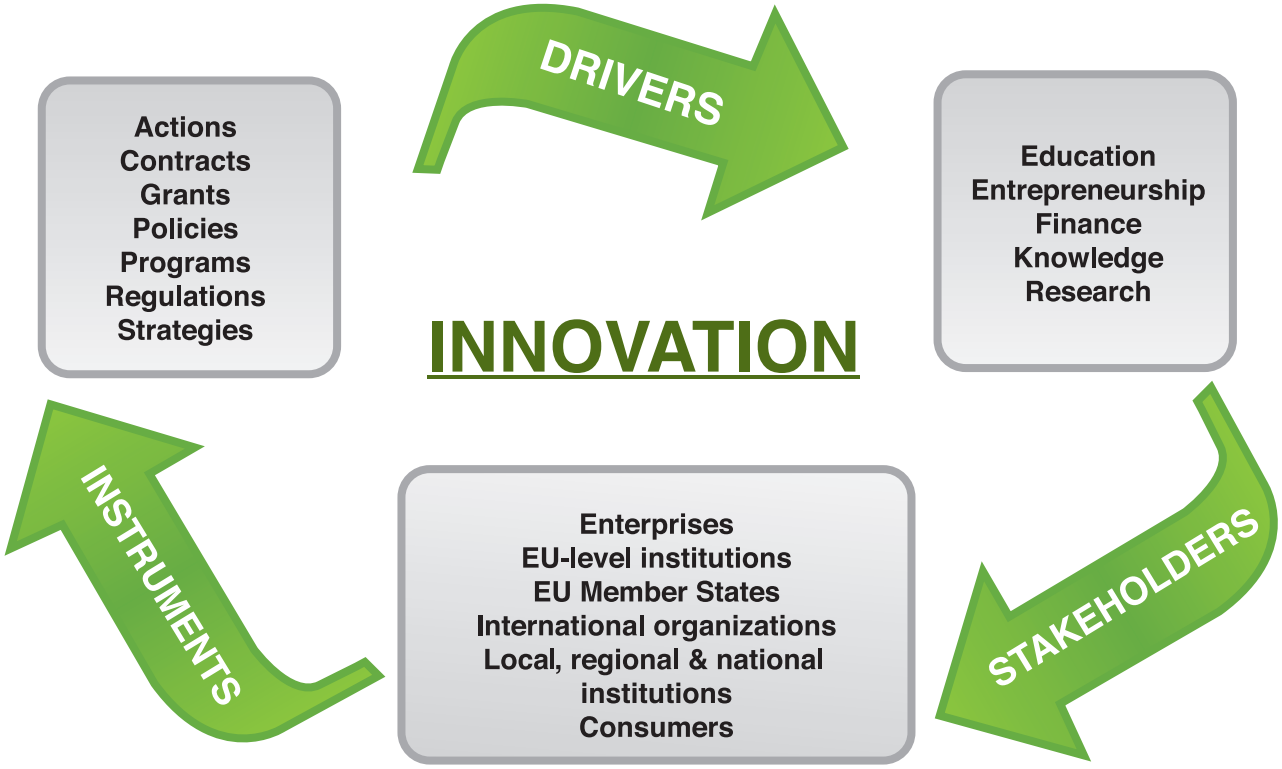
The lessons learned with the failure of the Lisbon Strategy and the recent attempt to revive the economy of the EU with the Europe 2020 strategy demonstrate the determination of the EU institutions and Member States to improve coordination of national and European policy. The establishment of the European Research Council, the European Institute of Innovation and Technology, the launch of the Lead Market Initiative and Europe 2020 with its flagship initiatives, particularly Innovation Union, are all examples of the resolve to boost innovation.

2.4.1 Key elements

Certain elements of the European Supranational Innovation System are interacting with increasing intensity within a flexible, growing and porous boundary. Concerning the instruments employed at the EU-level, the Lisbon Strategy is without a doubt important even though most of its goals have not yet been achieved. As mentioned before, there are several tools that are currently being used to enhance the innovation performance in the Member States.

Each innovation system has its own distinctive elements in Figure 4; some of the key elements that produce and support innovation at the EU-level are illustrated.

Figure 4 Drivers, instruments and stakeholders of the European Supranational Innovation System.



Source: Compiled by author.

An important characteristic of the European Supranational Innovation System is that it is not intended as a substitute of national or regional innovation systems. The aim is not to replace the existing innovation systems within its Member States but to build upon them and assist on their efforts to become more innovative.

The pooling of resources to encourage innovation, better protection of intellectual property rights, exchange best practices and standardization are some of the many advantages the European Supranational Innovation System offers. Still, a lot of work remains to be done. As mentioned before, the legal framework for the protection of intellectual property remains incomplete.

Among the instruments that the EU employs to foster innovation there are those that provide financial and services support to innovators. The financial support is mainly channeled by means of three funding programs: the Competitiveness and Innovation Framework Program (CIP), the Framework for Research and Technological Development and the European Structural Funds' operational programs. Concerning the service support, some are based on direct assistance (i.e. Business Innovation Centers) and others are provided via Internet tools (i.e. Business Plan development tool).

Pertaining to stakeholders there is a multilevel governance system in place that is complex. There are multiple actors at different levels with more or less competencies and resources to encourage innovation and that there are significant differences among Member States with regards to their innovation performance (as presented in Figure 2), research systems and industrial structure.

Overall, there is strong evidence of the emergence of a European Supranational Innovation System that is complex and unique. There are specific innovation support initiatives at the EU-level, such as the Europe INNOVA, PRO INNO Europe and i2010. However, there are other initiatives that even though they are not specific innovation support programs they notably contribute to foster innovation. To illustrate this, three EU-level programs that are innovative and enhance the European Supranational Innovation System are employed. In addition, other successful initiatives are briefly presented.

2.4.2 Innovative EU Programs[13]

There are common features that can be found in the three programs presented in this thesis. First, not only EU Member States participate in them but also other European and, often, non-European countries. Second, all of them foster innovation. Third, they demonstrate the effectiveness of EU-level actions in areas that increase Europe's innovativeness.

A brief description of the programs is presented to highlight how they enhance the European Supranational Innovation System and their visible success. Overall it is important to keep in mind that a broad concept of innovation that includes product, process, business model, design, marketing, branding, services, social,

13 All data concerning these programs was obtained from the European Union's web page http://europa.eu last accessed on 28 March 2010, unless otherwise stated.

and organizational is employed. In addition, the systemic approach introduced a different method that encourages analyzing the whole process of innovation instead of focusing on just one aspect. This is particularly important in the following synopsis of selected programs because they portray innovations that not necessarily stem from research.

2.4.2.1 Erasmus program

The Erasmus program (European Region Action Scheme for the Mobility of University Students) was established in 1987 as a EU student exchange program. To date, over 2 million students have participated in this highly successful Europe-wide program and around 90% of European universities take part in it. The target for 2012 is to reach 3 million students and teacher exchanges. Presently, this education and training program enables more than 180,000 students to study and work abroad each year, and supports cooperation actions between higher education institutions across Europe. The general aim of the Erasmus program is to create a Higher Education Area and foster innovation throughout Europe.

The systems approach employed in this thesis emphasizes that R&D activities are a part of a bigger system where other elements interact. Research is considered a driver of innovation but not the only or main source of it. Indeed, knowledge is

also an important driver. Tacit knowledge is generally classified in the broadest sense as any knowledge that cannot be codified and transmitted as information through documentation, academic papers, lectures, conferences or other communication channels. This know-how, often present in the form of skills, is more effectively transferred among individuals with a common social context and physical proximity (OECD, 2008b). Sometimes students are not aware of the knowledge they possess or how it can be valuable but the Erasmus experience offers the opportunity and encourages the development of different skills.

Without a doubt, Erasmus has become a driver for innovation in Europe and enthused the establishment of the Bologna Process. A study on the impact of Erasmus on European Higher Education (Vossensteyn et al, 2008) by a research consortium demonstrated that it has had a leading role in internationalization policies at national, European and international level. The most visible impact is the Bologna Process in terms of agenda setting, infrastructure and content. Overall, Erasmus has been valuable to the development of higher education in Europe, not only in teaching, learning and research but also in institutional and organizational development, profiling through internationalization and the development of student services.

Erasmus stimulates creativity and innovation through mobility and cooperation in higher education. The period spent abroad enables students to benefit from an educational, linguistic and cultural experience in other European countries. This experience not only enriches the student's academic life but also their personal life through the acquisition of intercultural skills that benefit both the home and host institutions. The European human capital, one of its most valuable resources, is a key element of the European Supranational Innovation System. Through programs like Erasmus, individuals are encouraged and supported to learn by moving across Europe.

2.4.2.2 Framework Programs

The establishment of the Framework Programs (FP) can be traced back to the early 1980's. The idea behind the creation of the first FP was to provide structure and a medium-term view to all of the research efforts that were taking place at that time. Since their launch in 1984, the Framework Programs played a leading role in European research. The first moment research policy appeared with a specific chapter on this subject was in the Single European Act (1987). This was important because the chapter gave a legal status to existing practices.

Overtime, Framework Programs have evolved in different ways. There is a continuous increase of the budget, extension of activities into new fields and diversification of mechanisms that support the different activities that take place. For example, the FP4 (1994-1998) had a budget of €13.10 billion compared to the FP7 (2007-2013) that has a budget of over €50 billion. As a long-term EU instrument to realize its research policies and the main funding channel, the Framework Programs are a key pillar of the European Research Area. High-level research is increasingly complex, interdisciplinary and costly; consequently, a European-wide program is warranted to address these challenges.

The seventh framework program (7FP) is the instrument for funding research over the period 2007 to 2013. Its main objective is to further the construction of the European Research Area and one of its specific goals is to enhance research and innovation capacity throughout Europe. In this respect, the EU complements the efforts of Member States and European industry.

2.4.2.3 European Space Agency (ESA)

In 1975, the European Space Agency was created as an international organization to shape the development of Europe's space capabilities. To date, out of the 18 Member States 16 are EU Member States. Hungary, Romania, Poland, Estonia

and Slovenia are European Cooperating States and other countries have signed a cooperation agreement.

The space industry is strategic for the EU and can directly contribute to the implementation of a large number of policy objectives, for example innovation. For many years, ESA has been working with the European Commission to build a plan for future activities in this field. The Space Council, a joint meeting of the ESA Council and the European Union Council, was established to coordinate and facilitate cooperative activities between them through their Framework Agreement. During these meetings, Ministers representing the EU Member States and ESA Member States jointly discuss the development of a coherent overall European space program.

The EU and ESA have worked together to outline a European Space Policy (ESP) that identifies and prioritizes objectives for space. The ESP was signed on 22 May 2007 unifying the approach of ESA with those of the individual European Union Member States. Jointly drafted by the European Commission and ESA's Director General, it creates a common political framework for space activities in Europe.

The European Space Program is a common platform including all activities and measures to be undertaken by the EU, ESA and other stakeholders in order to

achieve the objectives set by the European Space Policy. One of the aims of the above-mentioned program is to ensure that Europe maintains a strong and competitive space industry that is innovative and provides sustainable, high quality and cost-effective services

Among the main EU instruments that support the European Space Policy is the 7FP. It seeks to enhance the competitiveness of the European space industry and complements the efforts of member countries and stakeholders including the European Space Agency.

The Treaty of Lisbon defines for the first time "space" as a shared competence of the Union, in particular, to define and implement programs in the areas of research, technological development and space[14] . The establishment of a space policy at the EU-level demonstrates the ability of the EU to lead in strategic areas that link different policy areas and entails a complex interaction of players at regional, national and international levels. Projects like Galileo, Europe's initiative for a global satellite navigation system, are also a good example of a successful joint initiative between the European Commission and the European Space Agency. European independence was the main reason for this initiative, to build an independent system under civil control, since European satellite navigation users either employed the US global positioning system (GPS) or GLONASS (Russian satellite) both military operated.

14 Article 4 of the Treaty of Lisbon.

2.4.2.4 Other EU-initiatives

A European success story is the Global Systems Mobile Telecommunications (GSM), the internationally accepted technical standard developed through EU research and deployment. Over 3.5 billion subscribers use GSM across 1,050 networks in 222 countries and regions[15]. This standard benefits, among others, consumers who can roam and switch carriers without replacing their mobile phones. The upsurge of mobile phones in Europe is mostly credited to this digital cellular telephony standard.

The eco-innovation[16] initiative, a program that supports eco-innovative projects in different sectors, aims to support the first application and market replication of some of the best eco-innovative techniques, processes, products or services in Europe. This program is part of the Entrepreneurship and Innovation Program (EIP), the Competitiveness and Innovation Framework Program (CIP) and contributes to the implementation of the Environmental Technologies Action Plan (ETAP). There are almost 200 million Euros available to fund eco-innovation projects for the 2008-2013 period.

15 GSM World Coverage 2009 available at www.gsmworld.com
16 Defined as eco-innovative products, techniques, services or processes that aim at the prevention or the reduction of environmental impacts or which contribute to the optimal use of resources.

2.5 Advantages and Challenges

The key innovation drivers (education, entrepreneurship, finance, knowledge and research) are an important starting point from which an appropriate strategy could be developed with its own instruments to ensure a successful implementation. The European Union has put into action different initiatives and programs to create an innovation friendly environment, foster an innovation culture and create framework conditions in Europe mainly based on these drivers. Concerning education, the lifelong learning (Erasmus), in research the European Research Area, in entrepreneurship the Entrepreneurship and Innovation Program, in finances the Competitiveness and Innovation Program, these are just some examples of the wide-range of instruments that the EU employs.

However, there are many challenges present in each innovation system and because of the nature of the supranational innovation system these challenges are even more complex and costly.

2.5.1 Obstacles reviewed: the importance of an EU-Patent

The European Supranational Innovation System is facing important challenges that could hinder the ongoing efforts to encourage innovation. Poor coordination of innovation policies, the need to improve the multilevel governance, the lack of political will, the failure to introduce an EU-patent and a standardization process that is not yet fully synchronized are among the obstacles.

While the role of a supranational entity is key to enhance innovation and promote projects that could impact the competitiveness of innovation systems the lack of political will could hamper all efforts. As it was pointed out, the failure of the Lisbon strategy was also attributed to an overloaded agenda, poor coordination and conflicting priorities. Another example is the failure to introduce an EU patent, which does not provide favorable conditions for the development and diffusion of innovation. The European Patent Office (EPO) merits a more detailed description to understand one of the main challenges that EU innovators are facing.

The Convention on the Grant of European Patents, known as the European Patent Convention (EPC), is a multilateral treaty signed in the 1973 conference in Munich that instituted the European Patent Organization. In 1977 the Convention came into force and in 1978 the first applicants filed for a European patent

protection. At present all 27-Member States belong to the European Patent Organization, established to improve cooperation on the protection of inventions within Europe. The EPC provides a legal framework for the granting of European patents via a single and harmonized procedure before the European Patent Office.

Even though there has been discussion towards the creation of an EU patent, there is currently no single and centrally enforceable European Union-wide patent. In other words, infringement is almost entirely remitted to national law and courts. An European patent regulation is crucial to reinforce innovation and the failure of the European patent system is affecting the dynamics of innovation and the internal market. Compatibility between institutions at the national and the European level is a key issue and the development of the European patent system is a clear illustration of this (Gregersen and Johnson, 1997). Certainly, the complexity and high costs of the validation process for EU patents is a foremost barrier for innovation. In sum, as Van Pottelsberghe and François (2006) stated, the European patent system is costly and fragmented, discouraging innovation compared to the US and Japan.

On December 2009, the conclusion of the Council of the European Union on an "Enhanced patent system in Europe" asserts that "the EU patent regulation should be accompanied by a separate regulation, which should govern the translation arrangements for the EU patent adopted by the Council with unanimity in accordance with Article 118 second

subparagraph of the Treaty on the Functioning of the European Union. The EU Patent Regulation should come into force together with the separate regulation on the translation arrangements for the EU patent." The EU Council reached an agreement on key elements constituting the future of the EU patent system that could help overcome the existing impasse. A proposal for a Council Regulation on the EU patent, renewal fees for EU patents and their distribution, enhanced partnership under the EU patent system and certain features of the envisaged unified patent litigation system.

With regards to standardization, the process is not yet sufficiently synchronized with research results and market needs. Standardization offers many benefits; it allows a type of product to be interoperable with other types of products, the removal of barriers through harmonization, and the safety and health of citizens. This process not only benefits consumers but also industry and governments. Some efforts have been made concerning standardization in Europe but a lot of work remains to be done. A good example of a successful EU-level synchronized standardization can be found in the telecommunications sector. The liberalization of the telecommunication market in Europe combined with the GSM standard developed through EU research and deployment played an important role in the success of mobile phones. This example demonstrates the importance of standardization in the innovation cycle.

The needed synergies between policies and instruments at different levels have not yet been created across the European Union. The coordination of policies to support innovation at regional, national and EU-level needs to improve significantly and an enhanced governance system is needed, based on the principles of subsidiarity. By better exploiting the added value of setting common objectives, agreeing on common actions and sharing best practices among Member States these goals can be achieved.

Another important challenge for the European Supranational Innovation System is the fact that national and regional innovation systems are for the most part disconnected. The question arises whether the existing European framework conditions are hindering or encouraging the innovation process? Moreover, is the process of innovation in the European context properly understood?

Among the obstacles to innovation in the EU we also find strong disparities in the innovation frameworks and performance, risk aversion, under-investment in R&D and limited research-industry cooperation. Without a doubt, the above-mentioned challenges do not outweigh the benefits that the European Supranational Innovation System offers.

2.5.2 Advantages of a Supranational Innovation System

Some of the advantages offered by the European Supranational Innovation system are the possibility of generating a broad partnership with stakeholders at all levels, the pooling of resources, reduce the risk of duplication of research, economies of scale, positive spillover effect and the fact that the EU institutions must act according to the principle of subsidiarity. These benefits offset the endeavors that are necessary to overcome the obstacles.

The European multilevel governance system offers possibility of generating a broad partnership with stakeholders at all levels (European, national, regional and local) to encourage the flow of resources and knowledge where it is most appropriate. Another advantage is that to ensure that decisions are taken as closely as possible to the citizen and to justify action at the European level, the European institutions must act according to the principle of subsidiarity. Therefore, innovation activities that are costly, complex and where the objectives would be better achieved if action is taken at a higher level, the supranational actions may be justified to ensure the success of the proposed activities.

Complex innovations require a high expenditure but at the same time could lead to lower cost of research. If the developing product can be sold everywhere in Europe, the profits will be larger than if the same product could only be sold in a single country. Also, two or more institutions or enterprises might conduct the same research, which could turn into a waste of resources. A Supranational Innovation System can reduce the risk of duplication of research and extend large spillovers to other projects.

2.6 Conclusions

To close the gap between the EU and its major competitors in R&D and innovation an action and development plan was established in the Lisbon strategy. Despite the fact that most of the goals set out in this strategy were not achieved, it is without doubt an important milestone. Ever since, the European institutions shifted their theoretical perspective on innovation from a linear process to a systemic approach and innovation has been key in the EU policy framework.

After an overview of innovation in the EU and analyzing the main elements that are present, there are strong indications of the emergence of a European Supranational Innovation System. As it is with the ongoing and complex integration process the innovation system is still emerging and there are some flaws.

Nevertheless, the evolution is promising and as the elements that conform and shape the European Supranational Innovation System continue to facilitate innovative activities within the system it will enhance the innovative performance of the European Union as a whole. As a result, a distinct and clear innovation system could materialize with the understanding that it is in constant evolution. A framework that is open, flexible, expanding and porous is essential in the European context.

The Erasmus program, the Framework Programs and the European Space Agency are excellent examples of successful European-wide initiatives that are not only innovative but encourage innovation. These initiatives provide the starting point from which a closer union among the Member States has been established in specific areas.

Concerning the degree of Europeanization of innovation policies, there is still work to be done. There is a need for more coordination and coherence between levels (EU, national, regional and local) and domains (higher education, research and science, environment, industry and entrepreneurship, health, etc). A more strategic and integrated approach is required to deliver more efficient policies.

Governments should act as facilitators within the innovation system and make certain that there is a horizontal (across sectors), vertical (across governance levels) and systemic coherence of innovation policies. The EU offers a good example of the challenges and advantages present in a supranational innovation system. Despite the obstacles, the innovative EU-level projects and programs are proof of the existence and the added value of actions at the supranational level.

Though the construction of the European Supranational Innovation System is at an early stage, the elements identified by Lundvall (1992) that compose the system, a structure of production and an institutional set-up, are present and there is constant interaction among them. Some of the main characteristics identified in the European Supranational Innovation System are summarized in the following list:

- The aim is not to replace the existing innovation systems (national, region al or sectoral) but to build upon them and assist on their efforts to become more innovative.
- It is a complex, unique and ongoing process.
- European institutions must act according to the principle of subsidiarity.
- It is essentially an open system (other European and non-European countries can participate in some of the programs and projects).
- There are multiple actors at different levels with some competencies and resources to foster innovation.

To close the investment gap in R&D between the EU and its main competitors, particularly in times of economic crisis when resources are scarce, the EU needs to enhance its ability to translate scientific knowledge into profitable innovations, pool resources, avoid fragmentation, enhance research and innovation systems, and monitor the progress of innovation.

Chapter 3
Innovation in Latin America and the Caribbean

Analyzing the European Supranational Innovation System and exploring the possibility of adapting useful elements to their own needs is an interesting experience for a region such as Latin America and the Caribbean. Even though both regions have considerable differences concerning the level of economic development, infrastructure, and institutions, there are also similar obstacles that bring them closer concerning innovation such as the low supply of private risk and seed capital, limited research-industry cooperation and the fact that there are strong disparities in the countries' innovation frameworks and performance.

Aware that there are other countries that could also be considered as a valuable example of a thriving innovation system from where Latin America and the Caribbean could draw best practices such as the United States of America, the world's largest economy[17], a brief research was carried out to determine if this model would be the best option for the region. Taking into account the strengths of the US national innovation system and also its vulnerabilities it was concluded that the disparities in culture, economy, challenges, strengths, development, education and research are such that this was not the optimal model to analyze in order to adapt and launch a proposal for Latin America and the Caribbean.

17 GDP over USD 14 trillion and GDP per capita of USD 46 400 in 2009 (OECD, 2010)

The European Supranational Innovation System is more adequate considering the characteristics of the region that will be presented and analyzed in this thesis. Nevertheless a brief overview of the US innovation system could shed some light to understand the reasons why the European Supranational Innovation System is a more appropriate model.

The US National Innovation System has benefited from the large size of its economy, university excellence, availability of capital and sophistication of financial actors, networked firms, strong intellectual property system with strict enforcement and highly mobile employees. Indeed, US capital markets are deep and provide opportunities for financing and strong incentives for successful innovators. Their universities possess a culture of openness and challenge that attracts the brightest minds; produce a large pool of well-trained university graduates and PhD researchers to the benefit of innovative firms; have a high rate of external collaboration; and a variety of funding resources.

All the same, there are important challenges such as the future of the American science and technology workforce, high risk of litigation and intense competition from other countries. The US has relied on highly skilled foreigners but with visa restrictions, the strengthening of foreign research universities and the intensifying competition for talent it has become more difficult. The risk of litigation deters risk taking that is necessary for innovation.

The US is facing more competition besides the usual suspects (Europe, Japan, Russia) from countries such as China. In the last decades, China has achieved a high rate of economic growth over a sustained period and has identified innovation as a main engine for this new growth model. The Chinese government launched a national strategy to build an innovation-driven economy and society by 2020 (OECD, 2008a).

The US innovation system is considered one of the strongest in the world. However, to encourage the kind of innovation in which the US excels certain elements are essential. Diverse organizations that are present such as multinationals headquartered in the US and highly innovative small firms, venture capital, and first-rate academic and research institutions, contribute to strengthen the system. However, as it is established in this chapter, these elements are limited in most Latin American and Caribbean countries.

The aim of this chapter is to review where the region stands with regards to innovation. Four phases are identified through the different economic policies implemented that had an effect on innovation; also brief assessment of innovation in the region is presented. The results of the research conducted show the potential of innovation to help them overcome their weaknesses. In addition a state of the art and a SWOT analysis of innovation in the region is presented.

3.1 The Latin America and Caribbean landscape

From Mexico in the north to Argentina and Chile in the south, the region comprises the countries in between including most of the islands of the Caribbean. The population of Latin America and the Caribbean is 588.6 million (ECLAC, 2010) and GDP per capita (current US) is $6,942.6 (World Bank, 2010). There are several regional groups, among them: Caricom[18], Andean Community[19], Mercosur[20], ALADI[21], ALBA[22], and UNASUR[23]. The region not only shares a geographical space but also cultural and historical roots, and common problems. Latin America and the Caribbean is a region full of contrasts, although rich in culture, biodiversity and natural resources it is also, one of the most unequal regions in the world with an average Gini coefficient of 0.52 (Lopez and Perry, 2008). Overall governments in the region have a poor track record and historical deficit of strong public policies.

With regards to innovation, Latin American and Caribbean countries do not stand out when compared to other countries. In general, private and public decision makers in the region have been slow to recognize innovation as a driver of growth and competitiveness. According to the Global Innovation Index Ranking, out of 132 countries assessed, Costa Rica is the highest placed (41) and Bolivia is

18 Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname and Trinidad and Tobago.
19 Bolivia, Colombia, Ecuador and Peru.
20 Argentina, Brazil, Paraguay and Uruguay, Venezuela is not yet a full member; it is pending ratification from the Congress of Paraguay.
21 Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.
22 Venezuela, Cuba, Bolivia, Nicaragua, Dominica, Honduras, St. Vincent and the Grenadines, Ecuador, and Antigua and Barbuda.
23 Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela.

the lowest (129). In most of the countries in the region there is inefficient governance, poverty and corruption, among other challenges.

In recent years, the impact of innovation on business, politics and society has been more evident. Governments and business leaders are increasingly aware of the role that innovation plays in economic growth, development and competitiveness and of the fact that innovations come in many forms (i.e. products, business model, organization, marketing, branding and social).

There are imperative challenges for Latin America and the Caribbean, among them, poverty, social inclusion, sustainable development, climate change, natural disasters, productivity, improve the quality of education and health. Innovations are essential to drive economic growth and prosperity in the region.

On the whole, four main phases[24] can be identified through the different economic policies implemented by most of Latin American and Caribbean governments that had an effect on innovation. The first started after the Great Depression of the 1930s, one of the most relevant policies adopted during this period was the import-substitution[25] policy. The second phase, from 1982 to 1990, is known as the 'lost decade' a reference to the financial period of crisis in the region. The third phase initiated in the early 1990's and ended in 2002 when many Latin American

24 These phases were identified by Lourdes Casanova in Global Latinas (2009).
25 Tariff protection, direct state intervention in the production structure and regulation of the private sector.

and Caribbean governments encouraged by the Washington Consensus[26] embarked in a reform path accentuated by trade liberalization and/or privatization[27]. The fourth phase is in progress (from 2002 to date) but some specific characteristics define it such as the direct effects of globalization, higher interaction among worldwide economic agents, major technological advances and the increasing role of emerging economies.

One of the regional leaders, Brazil, has been actively implementing strategies and undertaking important reforms to enhance its innovation performance. A broad innovation plan action linked to industrial policy and the private sector, have been key to achieve the objectives. Brazil enjoys a high entrepreneurship spirit and companies with capability for technology and business model innovation. In fact, Brazilian firms have innovated on international scales in sectors such as aeronautics, automobile engines and agriculture.

Brazil is a regional leader, in 2007 accounted more than half (59.7%) of total R&D investments in Latin America and the Caribbean; in terms of GDP it is the biggest investor in the region with a 1.02% of GDP invested on R&D activities (RICYT, 2008). Among Brazil's competitive advantages are: a large domestic market, biodiversity, a sizeable pool of multinationals, substantial industrial capacity, natural resources and a well-developed telecommunications infrastructure.

26 Among the recommendations were fiscal policy discipline, tax reforms, trade liberalization, privatization of state enterprises and deregulation.
27 Banks, telecommunications, public utilities, oil and gas were among the businesses that were privatized.

In order to illustrate the above-mentioned four phases of public policy in the region, Brazil, the largest economy in the region, will be used as a case in point underlining some of the most relevant events that took place and had an effect on the national innovation system.

3.1.1 'State-induced industrialization' Phase 1 (1930-1982)

From the 1930's to the beginning of the 1980's, most governments in the region implemented industrial policies geared towards the creation of 'national champions'[28] in what they considered strategic industries to protect their domestic production from foreign competition. Several institutions were created to promote state-owned companies and/or finance infrastructure and basic industries in Latin America and the Caribbean, among them, Corporación de Fomento de la Producción (CORFO) created in 1956 in Chile, Banco Industrial de Argentina in 1944 and Mexico's Nacional Financiera in 1934.

At first, the import-substitution model of industrialization brought high GDP growth and high levels of industrial expansion but eventually it produced significant disincentives to innovation, decreasing growth rates of productivity and technological inefficiency. As noted by Edwards (2009), supporters of the import-substitution strategy argued that two conditions are required for it to succeed: on the one

28 Large companies dominant in their field and favored by the government of the country in which it is based.

hand, the protectionist measures had to be temporary and gradually reduced and, on the other hand, only selected industries should be protected. Instead of being selective and declining, protection became general, massive and increased through time.

During this phase, most countries shared two characteristics: the degree of openness to international trade was very low (both in goods and in financial capital), and in most countries social conditions failed to improve significantly (widespread poverty and unequal income distribution). At the end of this phase, most governments in the region undertook a comprehensive round of reforms that were largely completed in the early 1990s.

In Brazil, institutions engaged in scientific, industrial and technological projects were set up, among them the Aeronautics Technological Institute[29] (ITA) in 1950, the National Research Council[30] (CNPq) in 1951, the Brazilian Development Bank (BNDE[31]) in 1953, the Agency for Financing Studies and Projects (FINEP) in 1965, and the Brazilian Agricultural Research Corporation (Embrapa) in 1973. These institutions have played an important role in promoting, funding and developing innovation strategies and activities in Brazil.

29 Dedicated to provide high level education and research in Science and Technology areas of interest to the aerospace.
30 Its main assignment was the coordination and promotion of scientific research in Brazil.
31 Nowadays, BNDES.

During this phase, the Brazilian National Innovation System evolved as the country transformed from a traditional supplier of raw materials and crops (i.e. coffee and sugar cane) to an economy based on manufacturing industry. Brazilian firms became less competitive in international markets due to the barriers to inward technology flux that made it difficult for Brazilian companies to acquire new technologies and the failure to develop domestic human capital.

3.1.2 'The lost decade' Phase 2 (1982-1990)

During this period most of Latin America's economies stagnated, poverty increased, income per capita plummeted and the income distribution gap became wider during this phase. Ignited by Mexico's announcement that it was unable to meet its scheduled foreign debt payments it had a spillover effect in the region. Inflation was out of control in many countries and the region was immersed in an economic turmoil. Under the "Brady Plan"[32] countries were to implement market liberalizations in exchange for a reduction of the debt and, in some cases, new money from commercial banks and multilateral agencies. In response to the crisis, governments tried to restore macroeconomic equilibrium and devise new development strategies.

32 Named after the US Treasury Secretary Nicholas Brady.

In 1985, the Brazilian Ministry of Science and Technology was formed and it is currently the main agent of the Federal Government responsible for the implementation of the explicit innovation policy. The Ministry was mainly concerned with expansion of infrastructure. Import licenses and high tariffs were used to protect the Brazilian manufacturing sector.

Overall the Brazilian economy maintained a protectionist structure during this phase. Marked by high and increasing inflation, unemployment, and labor market disorganization, among others. During this period, with the fiscal crisis and the lack of definition of what development strategy they should pursue, there was an overall instability in the public support concerning innovation.

3.1.3 'Liberalization and privatization' Phase 3 (1990-2002)

Spiraling debt, inflation, corruption in state controlled industries and protectionism were damaging Latin American economies. In this context, there was a widespread adoption by Latin American governments of the Washington Consensus, which led to liberalization and the privatization of state enterprises. In the 1990's policymakers abandoned the import-substitution model, a series of processes of liberalization and privatization followed and led to important structural reforms. During this period, most of the state enterprises were sold to local or foreign groups.

The need to attract new technology, upgrade infrastructure, improve productivity coupled with the government's lack of the necessary resources to invest were also among the reasons behind the privatization and liberalization process that took place in the region.

The New Brazil Plan[33] (Plano Collor) aimed to introduce economic reforms and stabilization plans in the early 1990's was replaced by other Plans until the Real Plan was introduced and achieved the desired results. The Brazilian government came up with another program dubbed the Industrial and Foreign Trade Policy [34] (PICE), as well as a privatization program called the National Privatization Program (PND).

Following the Uruguay Round in 1991, the Trade-Related Aspect of Intellectual Property Rights (TRIPS) Agreement was signed and five years later, Brazil enacted the Intellectual Property Law. Meanwhile, one of the most important integration efforts in South America, MERCOSUR, founded in 1991 with signing of the Treaty of Asunción by Argentina, Brazil, Paraguay and Uruguay established a Common Market. Among its objectives, free movement of goods, services and factors; a common external tariff and a trade policy; coordination of macroeconomic and sectoral policies; and to strengthen the integration process. A broader analysis of MERCOSUR is presented in the next chapter .

33 The Plan failed and was replaced by the Collor Plan II, the Marcílio Plan and eventually the Real Plan.
34 This program aimed to raise real wages and promote economic openness and trade liberalization.

Also, one of the main trade agreements, the North American Trade Agreement (NAFTA) entered into force in early 1994 to remove tariff barriers and increase investment opportunities between the USA, Canada and Mexico. NAFTA was an important instrument to consolidate the economic reforms, the liberalization and privatization process in Mexico.

At the end of this phase, the Sectoral Funds for Science and Technology was created as a financing tool for research, development and innovation projects, the Funds are administered by FINEP. The aim is to stimulate the creation of knowledge and ensuring that the knowledge is transferred to firms.

3.1.4 'Globalization' Phase 4 (2002 to date)

The beginning of the 3rd millennium brought many challenges and tests for the economic and fiscal policies of the region. A hostile macroeconomic environment compelled governments in the region to implement reactive rather than proactive policies. Latin America and the Caribbean experienced the effects of the worldwide economic crisis. In spite of that, some governments in the region are playing an increasing role in the international arena but mostly individually not as a region or sub-region.

After the privatization of state enterprises, the phase began in Brazil with the implementation of long term plans that required large amounts of financial resources for investment. Later on, efforts were made to restore industrial and technological policies. A new agenda for development was elaborated in 2003 by a group of Ministries entitled "Guideline to a Development Agenda" and the priority established was to boost the innovative capacity of firms, with major export orientation. During this period Brazil witnessed a return to strong industrial policies with a new focus on innovation and its systemic processes. The Brazilian government encouraged increased competition of domestic enterprises by means of opening markets to trade and driving economic reforms.

In 2004, an innovation law was enacted that is national in scope and covers a range of scientific fields. The law has three main components: incentives to build and strengthen partnerships among universities, research institutes and private companies; incentives to encourage the participation of universities and research institutes in the innovation process; and incentives for promoting innovation within private companies.

The innovation law allows researchers in public research organizations and federal universities to leave their post for up to three years (preserving their pension benefits and career evolution rights) to create a technology-based start up.

The law established a new legal framework that allows access to innovation subsidies directly to firms. The same year, the Brazilian Agency for Industrial Development (ABDI) was founded to promote Brazilian industrial and technological development.

The Law 11.487/2007 is known as the 'Good Law', it authorizes the automatic use of fiscal benefits for firms that invest in R&D and fulfill the requirements without the need for a formal request. The Growth Acceleration Plan for Science, Technology and Innovation (GAP for STI) was launched in 2007 for the 2007-2010 period. The aim is to articulate five policies and programs to establish economic policy and growth.

Overall, among the Brazilian institutions, the efforts in relation to innovation of BNDES and FINEP are noteworthy. BNDES, one of the major institutions in Latin America for financing investment in production, currently considers innovation as a strategic priority for the concession of financing. FINEP (Research and Projects Financing), also known as the Brazilian Innovation Agency, has had a double role as a provider of grants to non-profitable institutions (i.e. universities and research centers) and it lends money to companies. In sum, FINEP concentrates in lending for innovative activities and BNDES specializes in financing the creation or expansion of productive capacity.

The role of the Brazilian government concerning the national innovation system was decisive for the industrialization and the establishment of the scientific and technological infrastructure. The full outcomes of the Brazilian efforts to encourage innovation and in particular the innovation law are still pending. In due time, a complete evaluation will be in order to assess the impact. At the moment, the country seems to be in the right track by encouraging innovation through legislation, implementing strategies and financing projects. The Brazilian government has demonstrated its willingness to engage in a productive dialogue with the stakeholders and to address the political challenges it encounters in the process. Latin American and Caribbean governments have valuable lessons to learn from the Brazilian experience and closer links among the different governments could trigger a dynamic exchange of best practices that could benefit all.

3.2 Assessing innovation in the region

According to the state of science policy, strength of business associations and labor unions, financial system, public training system, prestige and strength of universities and research institutions in a country or region different innovation systems can be identified. However, some activities that determine the diffusion of innovation have been recognized. Among them, knowledge inputs (i.e. competence building, engineering); demand-side activities (i.e. quality and new

product markets); provision of constituencies (i.e. networking); support services (i.e. incubators and financing); and knowledge outputs (i.e. patents and publications). It is important to remember that a broad concept of innovation that includes product, process, business model, design, marketing, branding, services, social, and organizational is employed in this thesis.

Innovation efficiency can be measured as the ability to translate innovation inputs into outputs. Inputs and outputs are normally used as measures to benchmark innovation performance. Among the inputs are expenditure on R&D and number of researchers. The outputs of knowledge commonly used are scientific production, patents and technology exports.

With regards to inputs, according to the World Development Indicators with data from UNESCO Institute for Statistics, the world average of R&D expenditure (% of GDP) in 2005 is 2% compared to 0.7% for Latin America and the Caribbean. R&D covers basic research, applied research and experimental development. In 2007, the world average increased by 0.2% but data is not available for Latin America and the Caribbean. Also, according to the same database, the world average of researchers[35] in R&D (per million people) in 2005 is 1,271.7 in contrast with 495 in Latin America and the Caribbean.

35 Includes PhD students.

To illustrate the innovation output in the region, the number of patents will be used. Aware that patents should be considered as part of other outputs in order to measure innovation and since there was no data available to establish a more comprehensive instrument with recent statistics, Latin American and Caribbean obtained US patents is used in order to portray the innovation output in the region. In Figure 5 the US patents by Latin American and Caribbean inventors are classified in three periods.

Figure 5 US Patents, includes utility patents and other types of US documents (i.e. design, plant, reissue of patents) granted between 01 January 1977 and 31 December 2009, distributed by country of origin (the origin of a patent is determined by the residence of the first-named inventor) of Latin America and the Caribbean inventors.

	1977 -1989	1990-1999	2000-2009	TOTAL
Antigua & Barbuda	2	7	1	**10**
Argentina	265	317	520	**1102**
Bahamas	57	55	86	**198**
Barbados	7	2	20	**29**
Belize	0	0	1	**1**
Bolivia	9	3	5	**17**
Brazil	356	666	1336	**2358**
Chile	42	79	177	**298**
Colombia	61	58	99	**218**
Costa Rica	54	58	135	**247**
Cuba	12	18	43	**73**
Dominica	0	0	3	**3**
Dominican Republic	8	8	21	**37**
Ecuador	10	20	30	**60**
El Salvador	9	3	9	**21**
Guatemala	12	16	17	**45**
Guyana	1	2	0	**3**
Haiti	10	2	0	**12**
Honduras	3	12	7	**22**
Jamaica	12	8	16	**36**
Mexico	533	542	917	**1992**
Nicaragua	1	2	1	**4**
Panamá	14	7	14	**35**
Paraguay	4	2	1	**7**
Peru	20	33	36	**89**
Saint Kitts & Nevis	0	3	6	**9**
San Vicente & the Grenadines	0	1	0	**1**
Suriname	0	2	1	**3**
Trinidad & Tobago	21	14	13	**48**
Uruguay	80	20	20	**120**
Venezuela	173	286	204	**663**

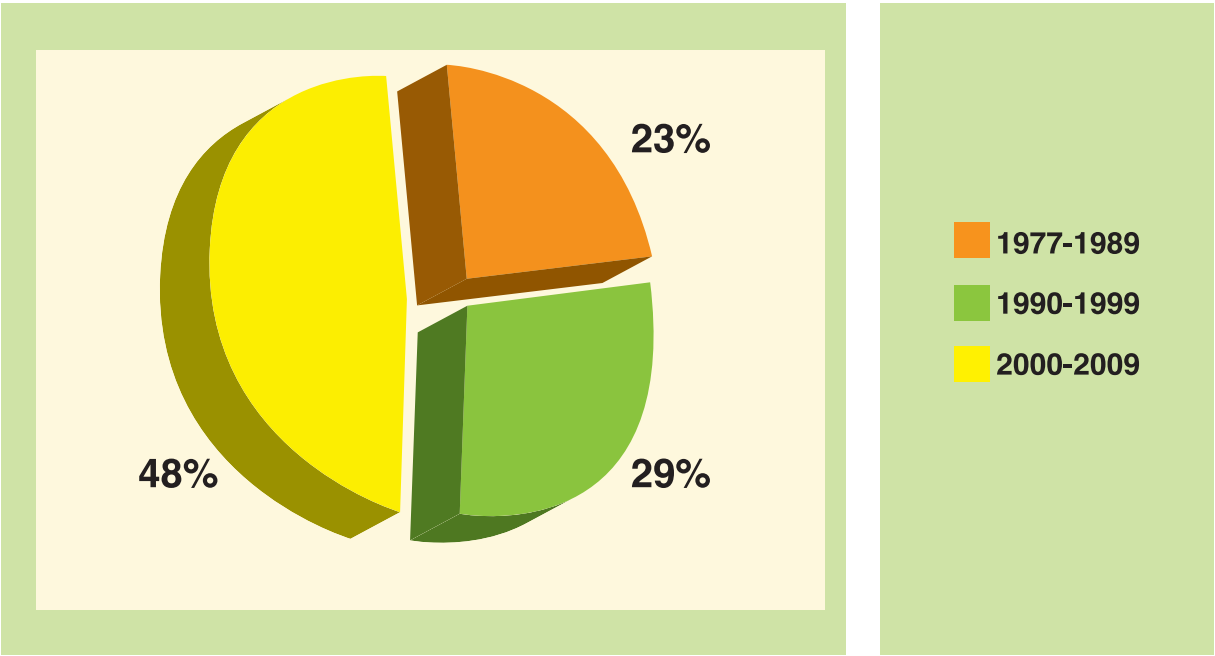
Source: Compiled by author with data from the United States Patent and Trademark Office (April 2010).

The total of US patents by inventors from 31 countries from Latin America and the Caribbean for the period 1977 to 2009 is only 7,761 compared to 11,282 for Danish inventors during the same period. This illustrates the low innovation performance of the region in contrast with other countries that have demonstrated their ability to innovate and translate those innovations into patents.

In the first period, from 1977 to 1989, the number of US Patents by inventors from the region reached 1,776. During the second period, from 1990 to 1999 the number increased by 26% with respect to the previous period. In the last period, from 2000 to 2009 the number of patents reached 3,739. Brazil, Mexico and Argentina account for over 70% of these patents and more than half of them where acquired in the last decade.

Latin American and Caribbean governments, aware of the challenges brought by the era of globalization, have redefined some of their policies. Competitiveness; technological, economic and institutional efficiency; productivity; promote competition; encourage development; and modernization of infrastructure are some of the reasons behind the strategies adopted in most countries in the region. The following chart, based on data from Figure 5, illustrates the percentage of US patents obtained by phase and points out that most of the patents were acquired during the ongoing phase.

Figure 6 Percentage of US Patents acquired by Latin American and Caribbean inventors in the three main phases previously identified.



Source: Compiled by author with data from the United States Patent and Trademark Office (April 2010).

The information presented in Figure 6 shows that, in the last decade, the innovation performance in the region has slightly improved. Governments are increasingly conscious of the role innovation plays in their economic performance and efforts are being channeled to improve their innovation performance. Especially, through their agencies that promote and/or support innovation and are driving the efforts to enhance the country's performance such as FINEP and EMBRAPA in Brazil, Fundación Chile and Foro Innovación de Chile and CONACYT in Mexico.

Each of the various types of innovation previously identified require different modes of support. According to Ruelas-Gossi (2004), Latin American and the Caribbean companies' main competitive advantage reside on innovation in their business model not in technology innovation. Entrepreneurs in the region have demonstrated their ability to innovate in business models.

A book by Lourdes Casanova "Global Latinas" discusses the emergence of Latin American companies that have been performing successfully in developed markets. A chapter in the book is dedicated to explore the innovative business models developed by the Global Latinas[36]. The author concludes that these business innovation models have driven the success of the Global Latinas in their home markets and abroad.

A case study by Casanova and Rullán (2008) about a regional telecommunications giant entitled "América Móvil: The Making of a Global Latina" (Annex I), analyses its swift international expansion and transformation, how it has been able to extend its footprint throughout Latin America and consolidate its position in the region's wireless telephone market in just eight years. This Global Latina is an example of a successful internationalization strategy in its natural market (Latin America) and business model innovation (prepaid model[37]).

36 Casanova defines them as companies that have emerged from Latin America and that have successfully made the transition to doing business in the developed world.
37 Also known as pay-as-you-go, customers purchase credit in advance of use for mobile phone services.

This ability to adapt technology to facilitate innovation could be used to develop solutions that could help alleviate some of the problems of the region. If a Latin American or Caribbean country finds a solution to a problem it could be adapted and implemented to benefit the region as a whole.

3.3 SWOT Analysis

Concerning innovation, there is no such thing as a one-size-fits-all model that is ready made and can be implemented in any country with success. Therefore, it is important to consider the context (i.e. cultural, political, economic) and to adapt to the specific needs. There are, however, certain basic steps that bring near the desired objective, but each case merits its own strategy. Also, there are different levels of risks and costs involved in the various types of innovations. A tailor-to-fit model is warranted for Latin America and the Caribbean based on its competences, vulnerabilities, opportunities and potential.

In general, to enhance innovation it is important to identify drivers and stakeholders; reinforce the role of government as a facilitator, intermediary and consensus builder between the different actors; encourage a constructive interaction among the structure of production (i.e. enterprises and academic institutions); and an adequate institutional set-up (i.e. regulations, practices, standards, "rules of the game").

All the same, to provide an overview of innovation in Latin America and the Caribbean, the current state of affairs, history, obstacles, challenges, assets, prospects and risks need to be taken into account. This exercise is also useful to ensure the best outcome and achievement of the objectives set out with regards to innovation. To portray the present situation and to illustrate the strengths, weaknesses, opportunities and threats (SWOT) concerning innovation in the region the SWOT method of analysis was used. In Figure 7 the results of the analysis are presented.

Figure 7 SWOT analysis of innovation in Latin America and the Caribbean

STRENGHTS	WEAKNESSES
Natural resources	Inefficient governance
International Openness	Weak Intellectual Property Rights culture
Resilient entrepreneurs	Poor performance of the primary education system
Ubiquity of mobile telephony	Low availability of scientists and engineers
A sizeable pool of Global Latinas	Low level of University-industry collaboration in R&D
High entrepreneurship spirit	Insufficient infrastructure including technological
Burgeoning microcredit system	Slow absorption and application of existing knowledge
Incipient innovation governance	Lack of regulation on innovation
Low carbon emissions	Overdependence on natural resources at the expense of innovations
	FDI mainly directed towards low-tech business
	Weak regional innovation actors
	Low supply of private risk and seed capital

OPPORTUNITIES	THREATS
Young and urbanized population	Intensifying competition for talent
Good neighbors spillover effect	Natural disasters
Insertion in global knowledge networks and technological platforms	High economic and technological dependence
Natural markets (language, culture and history)	Organized crime
Diversification of production and trade	Political differences
Encourage knowledge transfer	Diplomatic conflicts
Attract more FDI	Competition from emerging economies (mostly Asian countries)
Enhance human and social capital	
Create a innovation culture	
Exploitation of environmental advantages	

Source: Compiled by author based on OECD, ECLAC and World Bank publications.

This analysis provides a depiction of innovation in the region that could be useful for policymakers to develop a tailor-to-fit strategy and to focus on key issues. However, a thorough examination of the SWOT analysis would exceed the scope of this thesis. The weaknesses of the region are mainly: poor education, inefficient governance, lack of legal framework, and low level of private-public partnerships.

Strengths are mostly linked to resilience, entrepreneurship and a set of top quality academic institutions. Concerning opportunities, there are for the most part associated with human and social capital, geographic and economic, among others. Most of the threats are of a criminal, diplomatic or economic nature.

Overall, Latin American and Caribbean countries have not excelled in innovation. Low investment in R&D, weak intellectual property rights protection, low level of University-industry collaboration coupled with a general lack of regulation concerning innovation are some of the weaknesses that are present in the region. In addition, there are also added costs that result in the process of product development from the weak institutional framework and inadequate legal enforcement. These challenges are more or less present in most of the countries in the region.

A synopsis of the some of the main findings in the SWOT analysis is presented in order to portray the innovation landscape in Latin America and the Caribbean. Concerning threats, natural disasters, is perhaps one of the most devastating. Not only because of the constraint it puts on Latin American and Caribbean countries economic prospects but also because of the casualties. The region is vulnerable to recurring natural disasters that range from floods to earthquakes. In 2010, earthquakes ravaged one of the poorest countries in the region, Haiti, as well as one of

the richest countries, Chile. Even though some of the governments are improving their prevention programs a lot of work still remains to be done and it is a constant threat for the region. Since it is hard to predict disasters, it is therefore important to prepare a plan and invest in disaster prevention.

Another of the threats that the region is facing includes intensifying competition for talent. This threat not only implies to avoid the 'brain drain'[38] but also the capability to attract the best talent available. The ability to attract talent is not exclusive to developed countries; some emerging markets are raising the stakes in this ongoing competition by increasing their R&D spending and their human capital resources. There are many factors that contribute to the flow of the talent such as economic incentives, career advancement, access to better research funding, higher quality research infrastructure, more freedom to debate and the opportunity to work with brilliant scientists (OECD, 2008b).

Competition for talent is growing and countries are aiming to attract the same pool of highly skilled workers. Latin America and the Caribbean governments need to invest and implement policies that tackle obstacles that include legal and administrative barriers, lack of funding and improve infrastructure to encourage the supply and flow of regional talent and also attract foreign highly skilled workers.

38 Also known as the 'human capital flight' refers to the large-scale emigration of individuals with technical skills or knowledge.

In addition, there is intensifying competition from emerging economies. The rise of the expansion of Chinese industrial production and its competitive exports represent a new challenge for Latin American and Caribbean. In particular, Mexico faces a greater challenge due to the fact that its exports are similar to those of China. However, countries that are exporters of natural resources, like Paraguay, Chile and Venezuela are much less exposed to Chinese competition (Avendaño and Bjerkhol, 2007).

On the bright side, there are many opportunities innovations can offer, such as diversification of production and trade. In emerging countries, economic development is sometimes associated with diversification of production and export diversification is on occasion correlated with positive growth. This reduces vulnerability to external shocks and creates learning opportunities. In a region that has traditionally relied on natural resources, investments in innovation can help them diversify their production and trade by creating new products that can be introduced into different markets.

Via innovations human and social capital can be enhanced. As mentioned before, for the purpose of this thesis a broad concept of innovation that includes product, process, business model, design, marketing, branding, services, social, and organizational is employed. Certainly, social innovations[39] (i.e. microcredit)

39 Refers to new strategies, concepts, and ideas that meet social needs of all kinds.

can contribute to extend and strengthen civil society. Innovations in communications, education and other services can be socially relevant. Human and social capitals are crucial for innovation and yet are also dependent on innovation. They are embedded in society and have and effect on its development.

The above-mentioned opportunities innovations offer can also generate a good neighbor spillover effect. Natural markets, as defined by Casanova (2002), are those that have the same linguistic sphere, geographical proximity and common historical links. According to this definition, Latin America and the Caribbean fulfill the criteria and can be considered a natural market. If a country in Latin America and the Caribbean finds a solution to a challenge through innovation, enhances the quality of life of its citizens, offers new services that are relevant for development and/or contributes towards sustainable growth, it can be easily replicated in other countries in the region. For this to succeed it is important to establish a continuous and dynamic exchange of good practices, generate relevant data, and adapt the solution to the specific context.

Nevertheless there are significant weaknesses that need to be addressed in order to create an innovation friendly environment. The low supply of private risk and seed capital in most of the countries is a financial challenge for small and medium enterprises in the region. The scarcity of seed capital inhibits the start of

promising companies. In general, Latin America and the Caribbean countries underperform in terms of quantity, level of sophistication and diversification of financial products. Limited transparency and complex regulatory frameworks are some of the reasons behind the shortfalls.

Moreover there is inefficient governance in the region. The official and private corruption, traffic of influence, corruption and inefficiency of judicial organs, the influence of drug cartels, and rising levels of crime are some of the problems that affect more or less countries in Latin America and the Caribbean.

Important efforts need to be made to overturn the low level of University-industry collaboration in R&D in Latin American and the Caribbean. By encouraging the transfer of knowledge to small and medium businesses, the main production and source of job creation in the region, and establishing constructive links among them, the innovation performance could be enhanced and spur sustained wealth and growth in the region.

In relation to the strengths, natural resources have played a crucial role throughout the history of Latin America and the Caribbean. Coffee, oil, copper, silver, gold, sugar and grains are among the products found in the region that once made their colonial powers wealthy. At present, there is a strong demand for

commodity exports from emerging economies such as China and Latin American and the Caribbean may benefit from this trend (Sinnot, Nash and De la Torre, 2010).

There are resilient entrepreneurs in the region that have been able to transform their firms to achieve world-class status. A good example is Mexican tycoon, Carlos Slim, the richest man in the world. In 1982, during the Mexican debt crisis he began to invest heavily and actively. An opportunistic buyer that never overpays for anything, he purchases during times of crisis at low prices and transforms his acquisitions into high value companies. Mr. Slim's holding, Grupo Carso, controls more than 200 companies spanning industries from telecoms, banking, restaurants, real state and mining.

An additional strength, highlighted in Figure 7, is the high rate of mobile phone subscribers. Indeed, in the last decade, mobile penetration has significantly increased in Latin America and the Caribbean with the prepaid model as the driving force behind the growth in emerging markets. In the next chapter, a broad analysis is presented concerning mobile phones and development.

3.4 Conclusions

From the four phases that were identified through the different economic policies implemented that had an effect on innovation it can be determined that historically, the Latin American and Caribbean region has overcome important obstacles but has been relatively slow and has not yet achieved appropriate innovation performance. The Brazilian experience provides a good example of the challenges, policies and the institutions that were created during the different phases and it also illustrates the regional context.

Concerning the innovation performance, the region is lagging behind its main competitors. Therefore, it is not surprising to observe that innovation inputs are insufficient compared to the world average and consequently this has an effect on outputs. The main findings of the SWOT analysis portray a mix overview of where the region stands with regards to innovation. The region is full of contrasts, for example, natural resources is a strength but also a weakness because in some countries there is an overdependence to the detriment of innovations. This exercise is very useful to understand the cultural, political and economic context. Overall, the landscape of innovation in the region shows a portrait of an uneven group of individual initiatives and efforts instead of a strategic and comprehensive public policy program.

In the next chapter, new technologies, a potential driver of innovation in emerging markets is explored. The opportunities innovations and mobile phones can offer Latin America and the Caribbean are explored and a review of where the region stands with regards to mobile phones is presented. The results of the research conducted show the potential of mobile phones and innovation for the viability of the different strategies implemented in developing countries to help them overcome their challenges. Also, some examples of innovative mobile applications that are successful in other regions are presented to illustrate the mobile opportunities this technology offers that can be adopted and adapted to benefit citizens in Latin America and the Caribbean.

Chapter 4
Mobile phones: innovation and opportunities for developing countries

Considering that telecommunications enhance the flow of information and are central to competitiveness, economic growth, poverty reduction, productivity and development, access to information and communication technology (ICT) is usually considered an essential condition for the insertion of developing countries into the world economy. Investment in the telecommunication sector generates a growth dividend because it reduces costs of interaction, expands market boundaries and information flows (Waverman et al, 2005).

While in the 20th century the European and North American growth was mainly attributed to fixed-line telephones, in the 21st century mobile phones could play a similar role, as it is the main communication instrument in most emerging markets. It is important to highlight that the European Union also recognizes the value of information and communication technology (ICT) as an important driver of innovation and competitiveness that enables process and product innovation. However, the emphasis for European countries is on advanced technologies for a more sophisticated market with refined needs rather than basic mobile applications for development geared towards low-income segment of the population.

There is a significant evidence of a positive causal link between economic growth and telecommunications infrastructure, especially when a critical mass of the later is present (Röller and Waverman, 2001). Several studies demonstrate the link between mobile communications and development.

The main finding of a report by the World Bank (Zhen-Wei et al, 2006) on information and communication for development is that ICT plays a vital role in advancing economic growth and reducing poverty. Above all it is critical in rural isolated regions where the lack and the cost of communications is a real barrier to access the market economy. Although, fixed telephone penetration implied certain levels of income and other parameters, which made it possible to predict other indicators in the case of mobile telephones these associations are much weaker (Bonina and Rivero, 2008).

Technological progress has transformed mobile phones into an all-in-one instrument that is constantly being transformed into smaller, cheaper and lighter devices that can be used almost anywhere at anytime. As the predominant mode of communication in the developing world, most of the countries skipped fix-line infrastructure and leapfrogged into mobile technology. This is the first technology to reach the poor with enormous success. Latin America and the Caribbean embraced this technology as the main mean for communications. When used in an appropriate manner, mobile phones can become important tools to alleviate certain problems. Among others, it reduces distances, provides access to information, mobility and security to owners. Mobile phones offer a relatively affordable and accessible tool for economic empowerment.

The explosive growth and increasing coverage of mobile telecommunications provide an opportunity to reach and interconnect poor urban and rural populations. It is important to note that mobile growth and wider coverage does not automatically imply that users have full access to all the benefits this technology can offer. Mobile penetration must go hand in hand with mobile services.

Mobile technology is the means through which innovative mobile services in Health, Education, Government, Financial Services and other services that require high transaction costs (i.e. transport and time) could be facilitated at lower costs. For example, groups that were excluded from financial services could be reached through mobile services. Indeed, new technologies offer and promise solutions that could alleviate some of the problems.

The current challenges that most countries in the region face call for a more proactive stance by all actors. In general, the region has been slow in the adoption of new technologies compared to the success achieved by the Four Asian Tigers[40], which, according to Perez (2001), used intense learning, emphasized on human capital and active absorption of technology to leap forward. In contrast, in Latin American and the Caribbean a more passive approach towards technology is usually adopted and it follows and imitates first world countries such as the United States and other European countries, which have largely invested in research and development.

40 Hong Kong, Singapore, South Korea and Taiwan.

In a survey conducted by experts in the region, results revealed that the poor in Latin America and the Caribbean represent a significant market for mobile operators, with higher than expected average per capita expenditure (Galperin and Mariscal, 2007). In developing countries a mobile phone is not a luxury item but a necessity as it is sometimes the only means of communication available to them. Currently, access to basic services such as health, financial and educational are limited in rural areas. Mobile services could offer them the possibility to access essential services through their mobile phones.

The aim of this chapter is to demonstrate the opportunities that new technologies, such as mobile phones offer to create an enabling environment to support innovation, to extend its benefits to all citizens and to enhance their competitiveness. The conclusion is that this technology is an essential tool for the viability of innovation strategies and activities in developing countries.

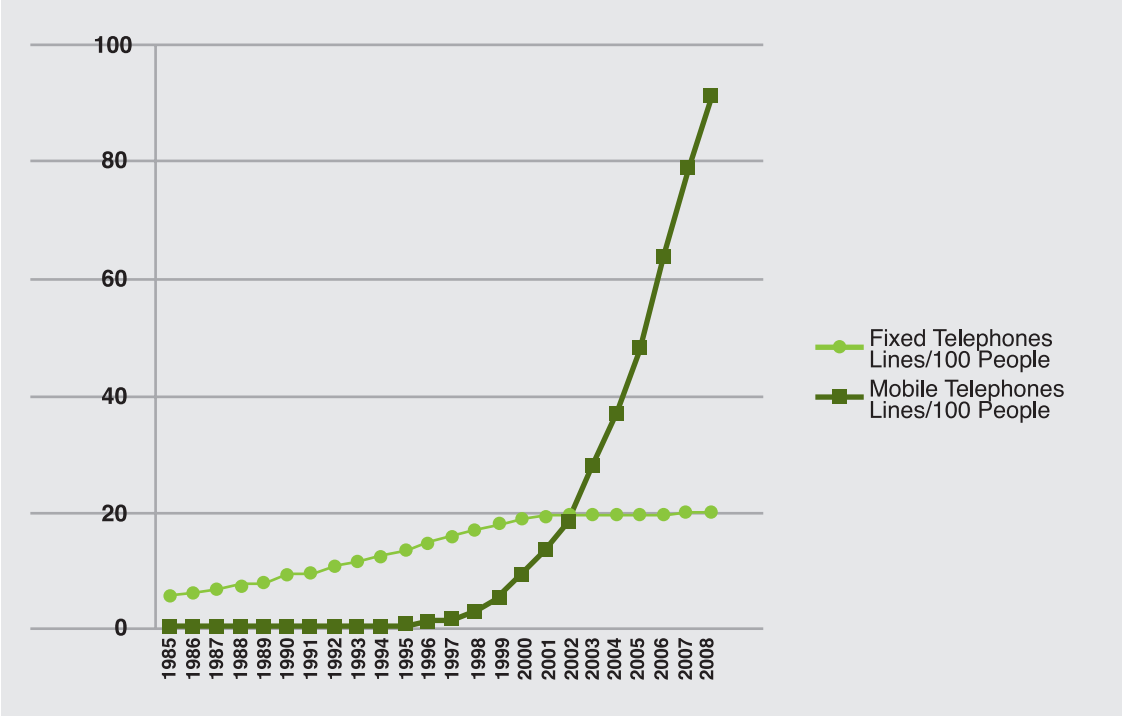
4.1 Region in focus: Latin America and the Caribbean

Mobile telephones in the region had a late start compared to the developed world; in 1999-2000 there was an explosive growth of the mobile market. By 2002, the number of mobile telephones (per 100 people) surpassed the number of fixed telephones in Latin America and the Caribbean (see Figure 8). The prepaid model

played an important role and it has been the driving force behind the extraordinary growth in emerging markets. This can be explained by the advantages it offers operators and users: for operators, it reduces the rate of invoice default and collection costs and for consumers they could control their expenses and eliminate the risk of escalating debts (Mariscal and Rivero, 2006).

Mobile penetration in Latin America and the Caribbean is, at the beginning of 2010, around 90%. By adopting, adapting, modifying and exploiting telecommunications and other technologies, all sectors of society could benefit from the various opportunities this tool offers and especially poor people that are in most cases excluded from fundamental services. In the near future, efforts should be made in order to ensure that coverage is extended to rural areas where poor people highly value mobile services as it is generally the only means of communications they have.

Figure 8 Fixed telephones vs. Mobile telephones (per 100 people) in Latin America and the Caribbean 1985-2009.



Source: Compiled by author with data from the International Telecommunication Union (ITU), World Telecommunication Development Report and database, and World Bank estimates.

4.1.1 Major Mobile Telephone Operators

The swift development of the mobile market in Latin America and the Caribbean has been mostly attributed to technological development and the prepaid model; over 83% of customers are prepaid. Competition in the region is fierce among the major players that dominate the regional mobile phone market and currently

there are four major regional players in the region: América Móvil, Telefónica, Millicom International Cellular and Digicel.

Table 3 Major regional mobile phone operators, customers and presence in Latin America and the Caribbean as of December 2009.

COMPANY	CUSTOMERS	COUNTRIES
America Móvil	211 million	Mexico, Guatemala, El Salvador, Nicaragua, Honduras, Puerto Rico, Dominican Republic, Jamaica, Colombia, Panama, Ecuador, Peru Brazil, Chile, Argentina, Paraguay and Uruguay
Telefónica	134 million	Argentina, Brazil, Chile, Colombia, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Peru, Uruguay and Venezuela.
Millicom International Cellular	21.7 million	Bolivia, Colombia, Paraguay, Guatemala, Honduras and El Salvador
Digicel	11 million	Anguilla, Antigua & Barbuda, Aruba, Barbados, Bermuda, Bonaire, The British Virgin Islands, The Cayman Islands, Curacao, Dominica, El Salvador, French Guiana, Grenada, Guadeloupe, Guyana, Haiti, Honduras, Jamaica, Martinique, Panama, St. Kitts & Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Turks and Caicos and Trinidad & Tobago

Source: Compiled by author with data from company websites last accessed 10 November 2010.

From the information presented in Table 3 it is evident that the two mobile operators in the region that dominate the market are América Móvil and Telefónica. Between both of the companies they serve more than 65% of the population in Latin America and the Caribbean with over 345 million mobile subscribers.

In order to understand the reach of the two main mobile firms in the region, América Móvil and Telefónica, an overview of their operations and expansion strategies in Latin America and the Caribbean is presented.

4.1.1.1 América Móvil, a Global Latina

Established in September 2000 in a spin-off from Telmex[41], the aim was to help both companies to improve their ability to address challenges and develop the wireless business. Basically, the spin-off entailed the separation of the fix-line from the wireless business. Based on the number of subscribers América Móvil is the largest wireless telecommunications provider in Latin America and the Caribbean. It has operations in 17 countries in the region with more than 211 million mobile subscribers (see Table 4).

Faced with strong competition at home and a domestic market that was saturating, the company decided to expand in the region. Overall, the regional expansion of América Móvil was a combination of organic growth and strategic acquisitions. In addition, the internationalization strategy set off under favorable conditions with the liberalization of economies in the region and auctions of the wireless spectrums by governments.

41 A telecommunications operator headquartered in Mexico that provides telecommunication services in Latin American countries.

To become the leading communications company in the region América Móvil seized the opportunity to acquire assets from major European (i.e. France Telecom, TIM International) and US operators (i.e. ATandT, BellSouth, Verizon) when they retreated once the Internet bubble burst in 2000. For some, their business strategies had failed in the region, and others were facing financial difficulties at home.

In the last decade, the evolution of telecommunications technology and the market demands has brought about a convergence of wireless and fixed networks. From its inception, in 2000, it was a mostly wireless entity. Ten years later, the company is transforming into an integrated telecom company. The new structure gives América Móvil access to fiber-optic and cable networks that will allow them to provide their clients integrated offers of fixed, wireless telephony, broadband and video services.

Table 4 América Móvil's subsidiaries and affiliates by country, wireless penetration, market share and subscribers in Latin America and the Caribbean as of 30 June 2010.

Country	Wireless Penetration	Wireless market share	Wireless subscribers (in millions)
Mexico	80%	71%	61.3
Brazil	95%	25%	46.9
Ecuador	106%	70%	10.0
Peru	77%	42%	9.0
Colombia (comprises Panama)	95%	63%	28.3
Chile	111%	22%	4.0
Argentina (comprises Paraguay and Uruguay)	123%	32%	19.1
Central America (comprises Guatemala, El Salvador, Honduras and Nicaragua)	91%	33%	10.0
Caribbean (comprises Dominican Republic, Puerto Rico and Jamaica)	94%	43%	6.4

Source: Compiled by author with data from company websites last accessed 25 January 2011.

4.1.1.2 Telefónica, conquering the Latin American mobile phone market

A Spanish telecommunications provider present via its Movistar brand in 13 countries in Latin America, Telefónica has over 134 million wireless accesses of which 80% are prepaid and more than 175 thousand employees. It is the leading operator in Brazil, Argentina, Chile and Peru.

Latin America was a natural choice for Telefónica's international expansion. The company established its first footprint in the region with the acquisition of a controlling stake in Compañía de Telecomunicaciones de Chile (CTC) in 1990. Later on, it acquired assets in other Latin American countries such as Argentina, Venezuela, Peru, and Brazil.

At the beginning, Telefónica's strategy was achieved through mergers and acquisitions (M&A) and later on with organic growth. The company followed an entry strategy that consisted on acquiring voting stakes and management contracts to ensure the management control of the companies it invested on. From 1990 to 1998 Telefónica invested US$10 billion dollars in South America (Argentina, Chile, Peru and Brazil) (Casanova and Meseuger, 1999).

When foreign telecommunications operators started retreating from the region, in 2000, Telefónica did not waver from its strategy and instead continued to increase its presence. The expansion strategy has paid off and at present over 40% of the group's revenues is generated by the Latin American business unit.

Table 4 Telefónica's presence via Movistar by country, wireless penetration and accesses in Latin America and the Caribbean as of September 2010.

Country	Wireless Penetration	Wireless accesses (in millions)
Argentina	123%	16.4
Brazil	95%	57.7
Central America (comprises Guatemala, El Salvador, Panama and Nicaragua)	91%	6.1
Chile	111%	8.2
Colombia	95%	9.7
Ecuador	106%	4
Mexico	80%	18.7
Peru	77%	12.1
Uruguay	123%	1.6
Venezuela	101%	9.8

Source: Compiled by author with data from company websites last accessed 25 January 2011.

Global Systems for Mobile Communications (GSM) is the de-facto standard for mobile telephone systems in Latin America and the Caribbean. The success of this leading technology in the region could be attributed to its low-cost and the fact that it is functional. From the onset, América Móvil favored GSM to expand its customer base throughout the region using the same technological platform (Casanova and Rullán, 2008). Meanwhile, Telefónica built a patchwork of technologies (TDMA, CDMA and GSM) that could operate simultaneously and overlap. To improve its competitiveness and halt the advance of its main competitors, Telefónica migrated its main Latin American subsidiaries to GSM. This allowed it to achieve economies of scale and more freedom to negotiate with providers (ECLAC, 2007).

In spite of the intense competition in the region's mobile market, the low-income segment of the population has not yet fully benefited from all the opportunities that this technology offers. Mobile applications and services for the poor are still in its infancy. Additionally, according to Galperin (2010), Costa Rica is the only country in the region where there is an adequate affordability of mobile telephone services for low-income users because of low tariffs and low levels of inequality in income distribution.

Worthy of note is the fact that, in Costa Rica, there has been a long-standing telecommunications monopoly held by the state-owned Costa Rican Electrical Institute (ICE) and its subsidiary RACSA provider of all telecom services except for pay TV. The mobile telephone penetration rate in Costa Rica is almost 79% with over 3.6 million subscribers. Even though, mobile telephone services are affordable, ICE has been inefficient in the delivery of mobile telephony services, penetration is low compared to other Latin American and Caribbean countries and there are long waiting lists for mobile services.

Signed in 2004, the United States-Dominican Republic-Central America Free Trade Agreement (DR-CAFTA) entered into force for Costa Rica in 2009. Under this agreement, Costa Rica committed to open important segments of its the telecommunications market including mobile wireless services. A public auction was completed in 2010, for new operators to enter the mobile market. The liberalization process should bring substantial benefits to consumers with increasing mobile penetration rates and improve the quality of mobile services. If they are able to continue to improve affordability and enhance their mobile telephone business, Costa Rica could become one of the most advanced mobile markets in the region.

Governments play an important role in the wireless telecommunication policy. This policy should be linked to other relevant policies such as innovation, development, competition, taxation, education and health. A more holistic approach is required to encourage the development and deployment of mobile telephone services that enhance innovation in Latin America and the Caribbean.

The influence of governments to encourage innovation in the wireless telecommunication sector should not be underestimated. Laws, regulations, licensing, construction, sale, resale and interconnection arrangements of the wireless telecommunications systems in Latin America and the Caribbean are in general regulated by government or regulatory authorities. Also, the adoption of policies concerning competition and taxation of communications services is in their hands.

The entry of new players in the regional mobile telephone market can have a positive effect with significant reductions in tariffs and higher level of mobile penetration. In view of the fact that two major regional players exercise market dominance in the region and considering the potential benefits of mobile telephone services, the role of key actors such as governments is essential. A regional strategy to encourage mobile telephone services for the poor could facilitate this important task.

Difficult times can become windows of opportunities through which countries can leap forward. New technologies of a revolutionary nature open up new opportunities for learning and catching up (Perez, 2001). According to the Inter American Development Bank (Anta et al, 2009) of the 360 million who live in Latin America on less than US$300 per month, almost half, 160 million are mobile phone subscribers. There are strong indications that the potential benefits of mobile services are significant and that it can be considered a tool for improving the standard of living of people in urban and rural populations.

In spite of the increased penetration and use of mobile phones in Latin America and the Caribbean, at present, mobile services are at an early stage in the region, it is therefore difficult to asses the economic and/or social impact. Nevertheless, there are many potential benefits that mobile services could offer and some examples in other emerging markets are encouraging. To illustrate the potential of some mobile services that have been deployed in other developing countries like the Philippines and Kenya are presented.

4.2 Success stories in Africa and Asia

Most experts believe that the future is mobile broadband. However, to date, in developing countries, voice and SMS[42] are the most common technology used in mobile phones. They offer many advantages because they can be used on a wide range of devices low-end as well as high-end phones (Hellström, 2010). Also, they can reach the broadest possible audience and offer opportunities to interact and access different kinds of services.

In a study about mobile telephones and financial development in Latin America (Ontiveros et al, 2009) the authors noted that some of the most analyzed success stories in the literature are the Philippines and Kenya. As these countries share similarities with Latin American countries the lessons drawn from them will be more valuable than those found in developed countries. For example, some of the countries have a similar penetration of banking services, low-income users that lack access to traditional financial services, mobile phones are the most common means of communication, their geography makes it difficult to reach remote areas and sizeable migrant populations that generate a high remittance flow.

42 A telecommunication protocol that allows the sending of short text messages of 160 characters or less.

In the following section, examples of innovative mobile services (M-Goverment, M-Banking, M-Health and M-Commerce) in the Philippines and Kenya are presented in order to illustrate how new technologies are being used to put forward solutions to major challenges aimed at the poor in these countries.

4.2.1 Philippines

Composed of over seven thousand one hundred islands with a large population of immigrants working overseas it is sometimes referred as the SMS capital of the world. Motivated by the ubiquitous use of text messages and growth of mobile phones, many actors have rapidly developed services to take advantage of the opportunities offered by wireless technology (Mendes et al, 2007). The Philippines has a population of around 92 million with over 73 million mobile phone subscribers, a mobile coverage of 80% and more than 95% prepaid customers (Paul Budde, 2009b).

Indeed, mobile services bring advantages to a wide set of stakeholders that include: users, operators, consumers, banks, retailers, micro-finance institutions, service industries and utilities. As a result, one of the most important factors behind the success in the Philippines has been the development of mobile services such as M-Commerce and M-Government. In the Philippines mobile

phones have been transformed into an "electronic currency tool" used to send and receive payments via text message. There is fierce competition between the two leading operators, Smart and Globe. As a result, it spurred a mobile market where they continuously strive to be creative in order to win market share. Both companies have launched their M-Commerce services.

In 2000, Smart Money was introduced by Smart Communications in cooperation with Banco de Oro and Mastercard and offers a wide range of services that include bills payment, money transfer, reload airtime, ATM withdrawal and purchases. Users of this service deposit money into a Smart Money account even if they do not have a bank account and then use their mobile phone like a debit card or electronic pocket to pay for goods and services. It is important to note that account balances are stored in a centralized host system, not in the phone.

By 2003, Smart introduced Smart Load; an over-the-air prepaid reloading service based on Smart Money. Transactions are done electronically thus reducing costs and making product distribution faster, safer and more efficient (Anderson et al, 2005). A large dealer network was built with the numerous small entrepreneurs that became resellers. The success of the business model innovation introduced by Smart has been not only translated into profits for the company itself but a

positive spillover effect has been achieved for retailers, entrepreneurs and customers who have benefited from this new business model.

Globe Telecom launched a similar service, GCASH, as a cashless and card-less method to facilitate money transfers, donations, loan settlements and other payments via text message for their customers. Remittances, one of the main money transfer activities in the Philippines as well as in Kenya, is also important for the Latin America and the Caribbean economies.

Another product of wireless technology is M-Government, a channel created to deliver government services to citizens in a more effective, direct and cheaper way. The provision of information to users is achievable through a commercial mobile service that allows users to send bulk text messages to mobile users via computers and the Internet. In 2001 the Philippines launched TXT CSC a text message service by the Civil Service Commission (CSC) to increase the efficiency and speed of delivery. Citizens can send their complaints and it became easier to track corrupt government employees and services which needed improvement (Ghyasi and Kushchu, 2004). Notwithstanding the fact that, according to Lallana (2004b) there were minimal public announcements and promotions, TXT CSC was receiving an average of 1,000 to 1,500 messages per month.

Some services have been more successful than others. In 2002, the Philippines National Police launched a text messaging system called PNP TEXT 2920 to allow citizens with a mobile phone to report criminal offences. At the beginning this service was receiving about 6,000 and sometimes as high as 20,000 messages per month. However, in recent years the number of messages has decreased due to the lack o information and publicity about its operation. Another mobile service delivered via text messages allows citizens to help enforce antipollution laws by reporting smoke-belching public buses and other vehicles (Lallana, 2004a).

According to the report "The innovative use of mobile applications in the Philippines –lessons for Africa" (Mendes et al, 2007), the success in the Philippines was mainly due to the appropriate regulatory policies, low cost of SMS, critical mass of users, a developed retail network and predominance of the prepaid model, among others.

4.2.2 Kenya

With a population of around 40 million, 18.5 million mobile phone subscribers and a mobile coverage of 84% Kenya is the most successful economy in East Africa. Many mobile phone projects and pilots are taking place in this country. There are a number of research and development units such as Nokia Research Africa, Ericsson Innovative Centre and iHub that are operating in Kenya.

In March 2007, Safaricom in partnership with Vodafone launched the M-PESA system in Kenya, one of the most successful M-Banking applications targeted at the unbanked. This system transforms the mobile phone into a virtual bank where you can deposit and withdraw funds through the value stored on their mobile phone. Available to all Safaricom subscribers, registration is free and the application is installed on your SIM card.

With more than 9.6[43] million subscribers and over 18,000 agents in Kenya, M-PESA handles around US$10 million transactions per day. Customers can buy airtime, save money, store money before travelling, make donations, receive payments, buy goods, withdraw money from an ATM, pay bills, receive and pay salaries. A large network that includes banks, government agencies, microfinance institutions and insurance companies was created with Safaricom's partners who accept payments using M-PESA. At the end of 2009, M-PESA launched the International Money Transfer (IMT) service. Citizens from the United Kingdom can send money to family and friends in Kenya.

Another interesting example is the Health Tips service offered by Mobile for Good (M4G). Designed to provide subscribers with useful tips on various pertinent health issues for a nominal fee per SMS received. They offer a service, MyQuestion, to allow customers to anonymously ask questions and receive answers about HIV/AIDS and breast cancer for a fee per question and per answer.

43 Data is as of April 2010 obtained from M-PESA Key Performance Statistics released on 13 May 2010 by Safaricom.

Mobile for Good is a social franchise project launched at the end of 2003 that uses mobile technology to improve the lives of people in Kenya. Mainly targeted at the low-income segment of the population, it offers content services via SMS on health (Health Tips and MyQuestion), employment (Kazi560), lifestyle (Her560) and community. With over 80,000 subscribers and more than 60,000 people who have found employment through the jobs service Kazi560, this franchise has had a remarkable success in Kenya.

Concerning M-Commerce, SMSoko is a SMS/Web based market place that enables buyers and sellers of anything to interact and transact (similar to e-bay but transactions can also be done through SMS). Using their Zunguka account, customers can buy and sell anything from vehicles to pencils. Vendors of goods and services are allowed to buy and sell unlimited items as long as they are registered Zunguka users. They can search directly for business contacts or search for products and services and the service will connect them to the qualified sellers. The selling and buying can be done either through SMS or through the web.

In Kenya citizens can contact their local Members of Parliament by sending an SMS. BungeSMS is a mobile phone based service by Made in Kenya Networks. The aim is to empower citizens to influence bottom-up governance. Through this service people can report corruption, violence, environmental degradation, crimes and concerns about projects and development activities among others.

4.3 Opportunities for Latin America and the Caribbean

The innovation systems approach is the framework put forward in this thesis to analyze and understand the dynamics of innovation. The concept of innovation systems emphasizes the constructive interaction between the structure of production and the institutional setup that transforms an idea into a product, a process, a business model or a design.

While innovations can transform mobile phones into devices that are more adaptable to the needs and services suitable to the community, mobile telephone services can contribute to enhance the innovation environment by encouraging the flow of knowledge and access to relevant information. Indeed, mobile telephone services could have a wide range of different direct or indirect economic effects. For example, productivity gains are a possible direct effect and increased flexibility for firms and workers could be an indirect effect.

There are potential benefits of innovative mobile telephone services for a wide-range of stakeholders that include: enterprises, government and consumers. Mobile phones could become a key instrument to establish a virtuous innovation circle. This instrument can perform two important functions in the innovation

process; first as a distribution channel of innovation and the second to increase the flow of knowledge.

4.3.1 Mobile Enterprises, seizing opportunities

Enterprises can seize the opportunities mobile phones offers to develop and deploy services, target consumers, and enhance their operations. There is a sizeable and attractive market in Latin America and the Caribbean for innovative mobile services. As mentioned before, the region shares cultural links; geographical proximity; and primarily Romance languages are spoken (i.e. Spanish, Portuguese and French).

There are many advantages for companies that invest in developing and deploying innovative mobile services in the region. Their products or services could be offered region-wide and access a lucrative market. Particularly if they are using SMS and aiming to provide functional services geared towards those who are at the bottom of the pyramid.

Mobile phones are communication devices that could be used by businesses to connect with existing and new clients, to offer and sell products or services, obtain feedback, advertise, and provide customer service. Marketing on or with a mobile device also called mobile marketing enables enterprises to communicate

and engage with their audience at virtually anytime and anyplace. SMS has become a legitimate advertising channel in some parts of the world to reach consumers.

Businesses can innovate in mobile services to enhance their operations by facilitating mobility of their employees, the flow of data or information, receive and make payments, update inventory and other services that are valuable to the firm. Mobile phones are a suitable vehicle to deliver all kinds of innovation including business model innovations.

4.3.2 M-Government: delivering services via mobile phones

Most governments in the region have a bad track record with regards to the services they provide to the population. Corrupt, inefficient, time consuming, poor quality, unsatisfied demand and high costs are some of the adjectives used to describe some of the services provided by the public administration. Governments need to improve the manner in which they communicate and interact with their constituencies. Mobile phones could help them establish direct communication with its citizens by offering functional services that are pertinent and could enhance their quality of life. The strategic use of this technology could improve access and delivery of government services anytime and anywhere.

There are multiple drivers to develop the necessary infrastructure, tools and identifying the appropriate mobile services. There is a high penetration of mobile phones in the region that exceeds the penetration of computers with Internet connections and fixed telephone lines. In addition, this technology enables governments to reach a large number of people and interact with them.

Possible application areas of M-Government include: notifications, information campaigns (i.e. healthcare and education), disaster prevention and management, complaints, submit requests, and alerts for payments. For example, in case of an emergency the Government could have an efficient tool to reach as many people as possible to inform them about the situation and take the necessary precautions.

4.3.3 Consumers of mobile innovations

Most of the population in Latin America and the Caribbean highly values mobile phones and this is reflected in the high proportion of their incomes devoted to this service. The pervasiveness of this technology makes it the most used mode of communication. Voice calls and SMS are, to date, the most common mobile services in the region. Considering that there is a need to improve access to information, financial and other services, especially in rural areas and for the low-income segment of the population, innovations in mobile services could bridge the gap.

When used appropriately, mobile phones can become useful tools to empower people economically and/or politically. They open up opportunities to improve the dissemination of knowledge, communication, participation, health care, education, banking, and gender equality. They significantly decrease the cost of accessing and disseminating information by enabling remote access.

Security, a great concern for most of Latin American and Caribbean's, could be substantially improved with the wide-spread use of mobile phone services, particularly those used to report crimes and corruption, make financial transactions through the mobile phone and avoid carrying large amounts of cash (i.e. pay bills, wages), and emergency calls (i.e. accidents)

However, there are some constraints such as illiteracy, unequal distribution of power and poverty that could hinder the potential benefits that mobile services offer. Nevertheless, there are strong indications that the appropriate use of valued innovative mobile services with the potential of enhancing people's quality of life will have a positive impact by empowering them. Thus, boosting a virtuous innovation cycle.

New technologies are constantly transforming, an interesting example is the revolutionary system that has been designed to offer services that will enable emerging market telecoms to make the Internet a truly global and universal experience.

The O3b Networks Limited is the developer of a new global, high-speed, satellite Internet network for telecommunications operators and ISPs. The O3b satellite technology will deliver Internet connectivity to any location on the planet and enable millions of consumers to enjoy reliable, low-cost, low-latency broadband connectivity. The aim is to enable individuals, families, communities and nations to enrich their quality of life through greater interactivity with the global community.

4.4 Conclusion

Mobile phones are the predominant mode of communication in Latin America and the Caribbean, and it is the first technology to reach the low-income segment of the population with great success. The explosive growth and increasing coverage opens up many opportunities. However, to fully access all the benefits it is important to promote the development of innovative mobile services.

Mobile operators in Latin America and the Caribbean have been very successful in their regional expansion but this has not necessarily translated into direct benefits for the citizens. Penetration of mobile telephones is high in the region but affordability of mobile telephone services is still at a low level. Governments should play an active role to expand access, increase affordability and develop mobile services. Different policies such as telecommunications, innovation, competition,

development and others should be linked in order to support the development and deployment of innovative mobile services.

The experience in Kenya and the Philippines provide a good example for Latin America and the Caribbean of the different opportunities that a wide-range of innovative mobile telephone services offer and their potential benefits. Particularly the low-income segment of the population could make use of this technology to enhance their quality of life.

Consumers, firms and governments are among those who could potentially benefit from this technology. There are numerous opportunities that have not been ascertained yet and extensive work remains to be done but the prospective outcomes are encouraging for Latin America and the Caribbean. In the following chapter, the prospects for a supranational system in the region are analyzed. First, it is determined if the region is prepared to establish a supranational system. Second, the essential elements to set up an appropriate framework to launch a regional strategy concerning innovation are presented. Third, some of the costs and benefits of a regional strategy are examined.

Chapter 5
Prospects for a Supranational System in Latin America and the Caribbean

In the midst of diplomatic conflicts[44] among some countries in Latin American and the Caribbean, in a summit that took place in Mexico in early 2010, the leaders of 32 countries from the region decided to create a new regional association, the Community of Latin American and Caribbean States (CELAC), parallel to the Organization of American States (OAS) with the main objective of advancing towards a unified continent. At present, the new mechanism has not yet been established but it should be defined during the next meeting that will take place in Venezuela in 2011.

This is a historical opportunity for the Latin American and the Caribbean community to create a regional mechanism to help them tackle the challenges the region as a whole is facing as well as to reinforce their positions in the international scene. The new mechanism could set the stage for synergies to develop spontaneously in support of innovation systems. But above all, it is important to avoid simple duplication –they must develop their own specific route to improve innovation capacity depending on their own unique set of assets. The region possesses valuable resources such as natural resources, young and urbanized population, and natural markets (language, culture and history).

44 Colombia vs Venezuela and Ecuador; Honduras vs Nicaragua

There have been many efforts to establish associations to unify and reinforce links between Latin American and Caribbean countries. Some of them have encountered important obstacles that have hindered their success, such as the lack of continuity, institutional stability and legal certainty. As a consequence, some agreements and decisions are not complied with and eventually they lose momentum and in some cases even fade away. Bargaining and compromise among its members usually determine the evolution of these associations. Political resolution is another important determinant of the intensity of the integration.

A synopsis of some of the most important regional groups (Andean Community CARICOM, MERCOSUR, ALADI, ALBA and UNASUR) is presented to portray the integration landscape. Additionally, by highlighting their main characteristics, challenges and outcomes the prospect of the establishment of a supranational system is assessed. The Summits, Meetings and Groups are excluded from this analysis because of their nature as mainly consultation and political coordination mechanisms.

5.1 Main regional groups

First of all, it is important to establish, taking into account the current regional landscape, if Latin American and Caribbean governments are willing and prepared to commit towards the creation of a supranational system. While it is true that their

track record is not encouraging, there are important lessons to be learned from these undertakings.

Latin American and Caribbean governments have been making important efforts to promote closer relations among them and there is a proliferation of different kinds of associations in the last decades. There are common traits with regards to the institutional setup and aims of the different mechanisms in place. Concerning the institutions, most of them are of an intergovernmental nature and as a consequence there is a general lack of autonomous institutions. With regards to the aims, most of them include social, political and economic integration (i.e. ALBA, UNASUR, Andean Community, CARICOM) and others mainly focus on economic integration (MERCOSUR, ALADI).

According to Andrés Serbin (2010), in spite of the legal tradition in the region, most of the multilateral organizations recently created are characterized by the lack of a consolidated and effective institutional structure. The proliferation of regional associations has led to a striking concentration of executive decisions that mainly convey the political will of governments, have limited financial support, insufficient institutional structures, confined citizens participation and lack of transparency.

Sanahuja (2009) identifies the 90s as the beginning of a new phase inspired by the strategies of the "new regionalism" during which the Centro American, Andean and Caribbean integration processes were reactivated and MERCOSUR was launched. In most cases an "open regionalism" model was selected. However, the preceding crises have affected the integration process and there is a new phase in place that can be characterized as "post-liberal". UNASUR and ALBA are an example of this last phase.

5.1.1 Andean Community

One of the oldest regional integration systems on the continent, the Andean Community, traces back its origins to the Cartagena Agreement signed in 1969 by Bolivia, Chile, Colombia, Ecuador and Peru. Seven years later, Chile withdrew from it and Venezuela was a member from 1973 until 2006. Since its inception, it has endured constant turmoil but one of its deepest crises was without a doubt when Venezuela announced its decision to leave the Andean Community.

The Andean countries adopted an open model of integration mainly governed by market forces in 1989. Member states eliminated tariffs on trade with each other and formed a free trade area in 1993. A common external tariff is in effect since early 1995. The Andean passport was created in June 2001 and member states agreed to phase in the new passports by January 2005.

Their objectives include seeking improvement of living standards of their citizens, reinforcing sub-regional solidarity, reducing their external vulnerability and improving their position in the international economy, facilitating the participation in the regional integration process, and fostering development through integration and economic and social cooperation under equitable conditions.

During the first 10 years of the integration process, most of the institutions and bodies were created. In 1979 the Andean Council of Foreign Ministers, the Andean Court of Justice and the Parliament were created. Four years later, with the entry into effect of the Treaty creating the Court of Justice, the principle of direct applicability of Community decisions, agreements and legislation, as well as, their supranational nature where put into practice. In 1997, new additions to the institutional structure included the Andean Council of Presidents, the Advisory Council of Foreign Ministers and the conversion of the Board of Cartagena into a General Secretariat.

A striking difference between most of the sub-regional associations and the Andean Community is the fact that the latter has a supranational element and it has adopted a common industrial property system that, among others, regulates trademark registration and patent issue.

The Andean Community is currently facing many challenges among them: political instability, lack of respect for human rights and the rule of law, sustainability of democracy, social cohesion, economic development and the fight against drugs. In addition, there is a potential risk of weakening the integration efforts if national affairs dominate the political agenda of the Community in favor of short-term objectives instead of long-term objectives.

5.1.2 Caribbean Community and Common Market (CARICOM)

In 1973, the governments of Barbados, Jamaica, Guyana and Trinidad and Tobago signed the Treaty of Charaguamas, which established CARICOM. Subsequently, Antigua and Barbuda, The Bahamas, Belize, Dominica, Grenada, Haiti, Montserrat, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, and Suriname became members and there are currently 15 member states. The main areas of activity are economic cooperation, coordination of foreign policy and functional cooperation including health, education, youth, sports, science, and tax administration.

Among the Community objectives are to improve standards of living and work, enhance levels of international competitiveness and expansion of trade and economic relations with third States. Coordinating economic policies and

development planning, operating as a regional single market and handling regional trade disputes are among its main activities.

According to the Revised Treaty of Charaguamas, the institutional structure of CARICOM comprises two main organs: the Conference of Heads of Government and the Community Council of Ministers; assisted by four organs: the Council of Finance and Planning, Trade and Economic Development, Foreign and Community Relations, and Human and Social Development; and three bodies: the Legal Affairs Committee, Budget Committee and the Committee of Central Bank Governors.

CARICOM is driving the creation of the Caribbean Single Market and Economy (CSME), a major policy instrument steering the economic integration activities in the region that came into existence in 2006. The Organization of Eastern Caribbean States (OECS) signed an agreement in 2007 to participate in the CARICOM single market. In early 2009, Antigua and Barbuda, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Saint Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname and Trinidad and Tobago introduced CARICOM passports. To fully enjoy the benefits of the regional economic integration process it is important to complete the implementation of the Caribbean Single Market and Economy and secure involvement of all member states in the activities.

5.1.3 Latin American Integration Association (ALADI)

ALADI is a trade integration association based in Montevideo, Uruguay. Signed by Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela on 1980, the Montevideo Treaty establishes a long-term objective for the gradual and progressive establishment of a Latin American common market. According to the Treaty, the political bodies of the Association are; the Council of Ministers of Foreign Affairs (supreme body), the Evaluation and Convergence Conference and the Committee of Representatives (permanent body). The technical body is the General Secretariat. In 1999, Cuba became a full member of ALADI.

Member countries established an area of economic preferences that comprised three mechanisms: regional tariff preference (based on tariffs in force in third countries), regional scope agreements (among member countries) and partial scope agreements (among two or more countries of the area).

5.1.4 Southern Common Market (MERCOSUR)

Founded by the Asuncion Treaty in 1991, this union between Argentina, Brazil, Paraguay and Uruguay was amended and updated in 1994 by the Treaty of Ouro Preto. The aim is to promote free trade, movement of goods, people and

currency, and to achieve a customs union. A common external tariff was fixed, as well as a common trade policy, coordination of macroeconomic and sectoral policies, and the harmonization of legislations in pertinent areas.

The institutional structure of MERCOSUR consists of the Common Market Council, the Common Market Group, Trade Commission, Parliament, Economic and Social Consultative Forum, Administrative Secretary. The Council is the highest-level authority responsible for the compliance with the agreements in the Asuncion Treaty and it is composed of the Ministers of Foreign Affairs and Economy. The Common Market Group is the executive body of MERCOSUR and it is coordinated by the Ministers of Foreign Affairs among its responsibilities are to comply with the Asuncion Treaty and take the necessary resolutions to implement the decisions made by the Council. The Trade Commission has decision-making powers and its role is to enforce common trade policies, administer intra-regional trade-related issues and run the new process of consultations. The Joint Parliamentary Commission and the Economic and Social Consultative Forum are exclusively counseling and advisory organs. The Administrative Secretary provides operational support to all MERCOSUR organs and help with the logistics of their meetings.

MERCOSUR has generated a high-level political dialogue but has made limited progress concerning the realization of a concrete customs union and a structured

common market. Among its main challenges are the improvement of its decision-making process as well as its capacity to implement and enforce common legislation and the achievement of the common market. Overall, MERCOSUR has opted for an inter-governmental instead of a supranational structure.

5.1.5 Bolivarian Alliance for the Americas (ALBA)

On December 2004, the first Summit took place in Havana and the President of Venezuela and Cuba signed the joint declaration for the creation of ALBA based on the idea of social, political and economic integration in the region. Subsequently a number of Latin American and Caribbean nations progressively adhered. Currently, Venezuela, Cuba, Bolivia, Nicaragua, Dominica, Honduras, St. Vincent and the Grenadines, Ecuador, and Antigua and Barbuda are members of ALBA.

In June 2007, the governments of Bolivia, Cuba, Nicaragua and Venezuela agreed, in a Memorandum of Understanding, to promote and impulse the creation of the Bank of the ALBA. Two years later, during the summit held in Bolivia, leaders from ALBA agreed on the creation of the "Sucre" (Unified System for Regional Compensation) as the "South's new currency". The governments of Cuba, Venezuela, Ecuador and Bolivia have set in motion an instrument that allows

making commercial transactions without using dollars. The treaty was signed in Cochabamba, Bolivia on 17 October 2009 and established a regional payments clearing house. The treaty constituted a Regional Monetary Council in charge with issuing and signing Sucres into circulation and governing the payments clearinghouse. Regional Compensation Chamber and a Territorial Convergence and Compensation Fund were constituted.

5.1.6 Union of South American Nations (UNASUR)

The South American Community of Nations was initiated on December 2004, when the heads of state or representatives of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela, signed, during the Third South American Summit, the Cusco Declaration. Three years later, during the First South American Energy Summit, the name Union of South American States was adopted for the South American integration process. On 23 May 2008 the UNASUR Constitutive Treaty was signed, at the Third Summit of Heads of State held in Brasilia, Brazil. The new treaty will enter into force thirty days after the date of receipt of the 9th instrument of ratification. To date, Argentina, Bolivia, Chile, Ecuador, Guyana, Peru and Venezuela have ratified the treaty.

The objective is to build an integration and union among its peoples in the cultural, social, economic and political fields, prioritizing political dialogue, social policies, education, energy, infrastructure, financing and the environment. In addition, energy integration, development of an infrastructure for the interconnection of the region, financial integration, economic and commercial cooperation, industrial and productive integration, definition and implementation of common or complimentary policies and projects of research, innovation, technological transfer and technological production, and cooperation among judicial authorities are some of the specific objectives.

According to the Constitutive Treaty, UNASUR has four bodies: the Council of Heads of State and Government, the Council of Ministers of Foreign Affairs, the Council of Delegates and the General Secretariat. The Council of Heads of State and Government is the highest organ and among its responsibilities are to establish policy guidelines, plan of action, programs, projects, and to decide on the priorities to be implemented. The Council of Ministers of Foreign Affairs adopts resolutions, proposes draft decisions and prepares the meetings of the Council of Heads of State and Governments, coordinates positions, develops and promotes political dialogue, oversees and evaluates the integration process as a whole, approves the annual program of activities and the annual working budget and approves the financing of common initiatives, among other functions.

The Council of Delegates prepares the meetings of the Council of Ministers of Foreign Affairs, implements the decisions of Heads of State and Government, prepares draft decisions, resolutions and regulations, and proposes the draft ordinary annual working budget along with other functions. The General Secretariat is the executive body; it prepares the draft annual budget and adopts the necessary measures for its proper management and execution and it prepares and submits the annual report and the respective reports to the corresponding organs of UNASUR, together with other responsibilities.

The Pro Tempore Presidency of UNASUR will be held for a year by each Member State in alphabetical order. Its responsibilities are to prepare, summon and preside over the meetings of the bodies of UNASUR, to represent UNASUR in international events, undertake commitments and sign Declarations with third parties, and to present the program of activities of UNASUR.

5.1.7 CELAC, a new regional mechanism

During the Cancun Summit in February 2010, representatives of Latin American and Caribbean governments announced the agreement to create the Community of Latin American and Caribbean States (CELAC), which will be the successor of the Rio group and the Latin American and Caribbean Summit on Integration and Development (CLAC).

Brazil and Mexico as natural leaders in the region could have seized this opportunity to become the equivalent of what the Franco-German Axis once represented for the European integration process. They could have turned into the motor that drove the efforts to unify the continent. The historical rivalry between them should have been set-aside in favor of a united stance towards the region and the possibility of playing an important role in steering the joint efforts towards an integrated continent.

However, the foreign ministers agreed that Chile and Venezuela would co-chair and have assigned the draft of the future statues for CELAC. This may seem an odd choice but it gives us some insight on the regional dynamics. For example, the fact that Brazil and Mexico, the two biggest regional powers in terms of economy and population, seem to be competing for regional influence and do not see eye to eye on some issues.

On the one hand, it was Brazil who advanced the establishment of CLAC, an initiative that managed to assemble all the countries in the region; Canada and the USA were excluded, to advance a different regional policy. For many years, Brazil has been actively promoting the creation of multilateral associations in the region such as the South American Summits and UNASUR. On the other hand, Mexico's foreign policy has been mainly focused on North America but during the second CLAC Summit held in Cancun, Mexico proposed the merger of the Group of Rio

and the CLAC, and became, in a sense, the creator of the new regional mechanism.

In Figure 9, the Member States of the Regional Groups presented in this chapter are highlighted. It is interesting to note that the Member States of MERCOSUR participate in the same regional groups, ALADI and UNASUR. In the case of Venezuela, it is important to emphasize that it is not yet a full member of MERCOSUR but should be ratified in the near future. The map shows that most countries in South America are actively participating in several regional groups at the same time, in contrast with Mexico, Central America and the Caribbean.

Figure 9 Member States of Selected Regional Groups in Latin America and the Caribbean.

Source: Compiled by author.

Overall, these regional groups have encouraged international openness, market liberalization, and intra-regional trade, among others. The fact that most of the institutions created within these agreements are of an intergovernmental nature it sheds some light on the primacy of the defense of national interests. Most governments reject the possibility of transferring powers to common institutions and pool their sovereignty in order to gain strength. As a consequence, most of the current institutional set-ups established in the different regional mechanisms lack autonomy and "teeth" or the power to enforce their decisions.

Due to the growing proliferation of regional groups, efforts and resources are fragmented. In fact, many of the regional institutions have to compete to obtain the few available resources and there is also an overlap of functions. Therefore, in this context, the establishment of a supranational system is not feasible. However, a specific regional strategy to promote innovation in mobile applications could be viable and contribute towards the construction of a supranational innovation system.

Integration is, generally, a complex and lengthy process among different nations and regions. There are numerous stages and types of integration. The European integration is a process that encompasses economic, legal and political integration. While the Free Trade Area (FTA) can be considered the simplest level of

economic integration, to date, the European integration process can be regarded as the most advanced level of integration. Since it has been established that Latin America and the Caribbean is not prepared to leap towards the establishment of a system where they would give up their national control in certain areas in favor of a supranational body a regional strategy is a good alternative that could pave the way to eventually establish in the future a supranational system in the region.

5.2 A regional strategy

By focusing on innovations that address the main challenges, using new technologies to create solutions, pursuing a broad concept of innovation and involving all actors in the innovation cycle, Latin America and the Caribbean can set up an appropriate framework to launch a successful regional innovation strategy. A strategic approach and a broad concept of innovation are essential.

The region can build on its key strengths and benefit from the opportunities that a tailor-to-fit approach to innovation can offer. Technological innovation usually requires substantial amounts of funds and qualified human resources. Even if Latin American and Caribbean countries concentrate all of their efforts in this type of innovation it would still be very difficult to compete with other countries that have

largely invested in research, human resources, technology and infrastructure (i.e. USA, Europe, Japan). However, taking into account that a broad concept of innovation also includes process, business model, design, marketing, branding, services, social, and organizational, there are many opportunities for Latin America and the Caribbean to innovate.

Sustained effort, close cooperation and effective implementation over a reasonable period of time are required for the strategy to succeed. The roles and responsibilities of each actor must be clearly defined and strong monitoring mechanisms put into place. A multiannual strategy with a defined limited number of priorities should be preceded by an analysis of strengths at national and regional level to provide a predictable policy framework. The strategy must reflect regional priorities; avoid duplication of efforts, and exploit opportunities for joint programming and cross border cooperation.

A concerted and prospective approach to public intervention, involving actions and removing obstacles could play an instrumental role in fostering innovation in mobile services in the region. Identify areas where public action is needed and an assessment of potential for lead markets. In addition, a clear and consistent strategy must be designed taking into account innovation as key to achieve a small number of objectives, determine precise priorities, fund allocation and

programs that need to be implemented as well as instruments to measure the progress. The strategy should be focused on a specific challenge that is shared across the region with clear and measurable goals. The regional strategy to encourage mobile services must fulfill a number of criteria and comprise certain elements:

- There is a large market potential for the industry;
- The pooling of resources and expertise at the regional level is key to find solutions more quickly;
- The market alone is unlikely to succeed;
- There is a major role for governments (as regulators, market participants, providers of funding, etc);
- Costs and/or complexity can only be developed at a regional scale;
- Active use of public procurement as a tool to encourage innovation;
- Determine the optimal tax mix and level for the region;
- Harmonize legislations concerning mobile phones;
- Ensure that the regional operators do not monopolize mobile services for development; and
- Digitize the information in the government departments.

A regional strategy on mobile services can be justified and comply with the above-mentioned criteria. In general, the perception of what is relevant and what is a sensible issue varies significantly among Latin American and Caribbean governments and this could be a major constraint. Although, innovation is not *per se* a sensible issue that would divide them, it is important for governments in the region to recognize the importance of innovation-related investments with the appropriate budgetary allocations. Innovative mobile telephone services could facilitate the location and development of knowledge and innovation investment platforms.

5.3 Costs and benefits considered

There are many costs and benefits that regional strategies to encourage innovation in mobile applications could generate for Latin America and Caribbean consumers. Concerning costs two types are identified, on the one hand there are those related to not having a regional strategy, and on the other hand there are those that are necessary for its implementation. The potential benefits of establishing a common strategy in the region to boost innovation in a specific sector could be a first step towards the construction of a supranational system and it certainly offsets the costs.

5.3.1 Heavy burden?

A report chaired by Paolo Cecchini (1998) estimated the costs of non-Europe. Published by the Commission, a group of experts examined the benefits and costs of creating a single market in Europe in accordance with the provisions of the Treaty of Rome. According to the report, the potential economies of scale which, at that time, had not yet been exploited by the European companies were substantial and it was estimated that about one third of the firms would be able to fully benefit from them. A similar analysis should be carried out in Latin America and the Caribbean to determine the costs and benefits of a closer integration.

Although there is a high penetration rate of mobile phones in the region there are, to date, limited services geared to the poor. In fact, innovative mobile services for the bottom of the pyramid have not yet fully emerged and as a consequence this segment of the population has not yet fully grasped the benefits this new technology could offer.

As mentioned in the previous chapter, there is a high degree of concentration in mobile markets in Latin America and the Caribbean. The two main regional operators, América Móvil and Telefónica dominate the regional mobile market. There is fierce competition among these regional operators but, to date,

this has not necessarily translated into benefits for customers.

According to a study on tariffs and affordability gap in mobile telephone services in the region (Galperin, 2010), overall mobile telephone tariffs in the region are significantly higher than those of OECD countries and other emerging markets. The average cost of prepaid low-usage basket in Latin America and the Caribbean (US$15) is high compared to the average in South Asia (US$3.60). The study also underlined that the few countries in the region that have tariffs comparable to those of South Asian markets are those in which new operators have entered with business models based on low tariffs and high traffic volumes (i.e. Digicel in the Caribbean and Millicom International Cellular in Bolivia, Paraguay and Guatemala).

Another factor is the heavy tax burden on telecom services (i.e. import duties, VAT and excise duties). The GSMA report on Global Mobile Tax Review 2005-2007 analyses the impact of reducing or removing consumer taxes on mobile services. The report shows that an average of 18.7% of the total cost of mobile ownership for prepaid services in Latin America is formed of handset (1.14%), connection (.04%) and usage (17.3%) taxes. And it concludes that removing mobile specific taxes would increase penetration, usage and handset sales in the poorest regions of the world.

Governments should play an active role to overcome the existing barriers to develop innovative mobile telephone services, establish clear policies of interconnection among operators, and harmonize the Latin American and Caribbean legislations to encourage tariff reductions in addition to regional standards. To achieve this, governments need to invest efforts and resources to create and/or reinforce their current institutional set-up to develop the necessary synergies among them.

5.3.2 Is it worth it?

Some of Latin American and Caribbean challenges are of such a scale that only a major coordinated approach at the regional level could provide a real opportunity of finding and deploying effective solutions. To determine when upper-level administrations should intervene the general principle of subsidiarity is very effective. They should act only if and in so far as the objectives of the proposed actions can be better achieved at the upper-level and cannot be sufficiently achieved at a lower level.

In addition, as identified by Fernández-Ribas (2009) externalities, scale economies and indivisibilities justify the involvement of upper-level administrations. Innovations in mobile applications for development fulfill the above-mentioned criteria. There is evidence of the potential benefits of innovative mobile applications in

developing countries that could not only offer solutions for Latin American and Caribbean citizens but to other regions with similar challenges, and as a result take advantage of scale economies. A supranational initiative could avoid unnecessary fragmentation of initiatives and duplication of efforts.

There are many benefits for all Latin American and Caribbean citizens and particularly for the poor that stem from the synergy effects from closer cooperation among governments that could contribute to reduce costs, improve overall framework conditions and contribute towards the construction of an autonomous and autochthonous regional governance system.

Taking into account the current mobile telephone regional landscape, where two mobile operators dominate the market, a collective regional strategy would be more successful in advancing mobile phone services for the poor than individual efforts by governments. This should be a priority and an opportunity for Latin American and Caribbean governments to level the playing field in benefit of their citizens.

5.4 Conclusions

There are important benefits that mobile phones and applications offer Latin American and Caribbean citizens. Productivity gains to individuals and businesses, inclusive financial services and remittances, empowerment of women and those at bottom of the pyramid, and emergency response in natural disasters are among them. In view of the current regional setting, the establishment of a supranational innovation system in the region is not feasible.

The regional integration record has shown, in the last decade, the lack of macroeconomic coordination coupled with mainly weak institutions have contributed to the relatively low success. Certainly, the lack of political will to transfer powers to common institutions, the proliferation of regional groups and overlap of functions result in duplication of efforts and split of scarce resources. All the same, there are important lessons learned from all these experiences.

Above all, Latin American and Caribbean countries have to coexist with their main competitors in other regions, especially Asia. Since they are mostly small economies, compared to the European Union, USA, India or China, the best alternative to enhance their innovation performance is to coordinate their efforts and resources. Even for countries such as Argentina, Brazil, Chile and Mexico it is costly to invest individually in research, development and innovation.

Overall, the costs of maintaining the *status quo* are higher than the costs of implementing the strategy. Certainly the benefits for all Latin American and Caribbean citizens are substantial, especially for the poor. A specific regional strategy could be launched to encourage innovation in mobile services and governments in the region could seize the opportunity to do so within the framework of the Community of Latin American and Caribbean States.

Suggestions for possible future research lines and recommendations for policy makers

The European experience concerning innovation, particularly the EU-level activities, provides an important and interesting illustration of the main characteristics and challenges of a Supranational Innovation System. The different strategies, policies and measures employed at the EU-level to enhance the innovation performance of the EU have had mixed results. In some cases they have achieved important successes and in others striking failures. All the same, there are important lessons for other regions.

As an ongoing, complex and unique system, more research needs to be carried out concerning the European Supranational Innovation System. At the moment it is in an early stage and future research could focus on the impact of the policies and strategies on National and Regional Innovation Systems. Also, a study on the functions and interactions of private and public institutions within a supranational innovation system to identify their role in the innovative performance would shed some light into the dynamics and interactions that take place and help identify the innovation drivers and appropriate framework conditions.

In the last decade, the EU's approach to innovation policy has shifted from a linear process to a systemic approach and there is a manifest turning point on innovation policy in Europe. Future research could focus on establishing if in practice the different policies, strategies and programs implemented at the EU-level employ the systemic approach.

One of the aims of this thesis is to determine if mobile technology offers an adequate tool for developing countries to enhance their innovation performance and if a supranational innovation system could facilitate this. The answer is yes, as one of the main means of communication in the region, it can be used to deliver innovative mobile services that could benefit all citizens, especially those in the low-income segment of the population. There are many studies that establish a link between new technologies and development. Future research could focus on establishing a link between mobile technologies and innovation in developing countries.

Latin American and Caribbean governments should prepare, launch and implement specific initiatives to create an innovation-friendly regional framework that could contribute towards the construction of a Supranational Innovation System. In order to increase the innovative opportunities in Latin American and Caribbean countries an efficient system of distribution and access to knowledge needs to be established.

While it is true that the region would greatly benefit from a supranational innovation system, in the current context this is not viable. Nevertheless, a successful regional strategy geared towards encouraging innovation in mobile services could create the synergies to contribute towards a closer union between Latin American and the Caribbean governments and eventually establish a supranational innovation system.

Overall, public policy should aim to stimulate innovation and create an innovation friendly environment that is favorable to generate interactions between players with a long-term vision for investments that deal with both the high risks and cost involved in the innovation process. In countries where there is a strong orientation towards free market principles such as the US and the UK, governments are actively involved in the development of policies to encourage innovation. Governments in developing countries need to play an even more relevant and direct role to promote innovation.

A thematic area should be selected and regional projects ought to be formulated with a strong coordination that employs institutional knowledge activities, needs and operational capacities of the players in the chosen area to stimulate innovation in Latin America and the Caribbean. Subsequently, a Regional Fund should be established to support innovation and encourage investment. It is important to propose a plan to use the available public tools, such as public procurement,

to encourage innovation. There are different instruments available that have a large potential to stimulate innovation, for example, intervention through regulation, funding of innovation projects, knowledge spillovers from public universities, and R&D subsidies.

Public procurement as an innovation policy tool can be used as a powerful incentive for businessess to develop innovative products, processes and services. Latin American and Caribbean governments should be thinking about procurement strategically and planning ahead. In particular, small firms could benefit since it provides them with the necessary planning reliability to engage in innovation activities that are generally costly and uncertain.

When designing innovation strategies, policymakers ought to include new technologies as an essential condition for their viability, regard mobile phones as a necessity and mobile applications as an important tool to offer innovative services particularly to the poor and rural populations. In addition, intervention through regulation should be encouraged along with an exchange of best practices among the different actors at all levels. As seen in the case of Brazil with the innovation law the government is trying to encourage innovative activities through regulation.

The region can learn from the Brazilian experience but must also keep in mind that there are other instruments that exist and can be employed simultaneously.

As long as there is a clear and coherent strategy with regards to innovation governments can innovate in the design and delivery of public services, procurement of innovative products and services, innovative procurement processes and models, among others. With the use of new technologies such as mobile phones, bottom-up economic development can be encouraged. Through entrepreneurship and innovation citizens can be empowered.

M-Government is a channel that should be developed to deliver relevant services to citizens in a more effective and cheaper way. As seen in the case of Kenya and the Philippines, it has been successfully used and could be adopted, adapted and developed in Latin America and the Caribbean.

Also, one of the simplest functionalities of mobile phones, SMS, has been used in Asia and the Africa to deliver innovative applications aimed at the poor. Without a doubt, sometimes less is more, the simplest device and solutions are in many cases more suitable to deal with the present challenges.

Even though, there are few studies that prove the benefits mobile applications offer Latin America and the Caribbean, due mainly to the fact that they are

in an early stage of adoption and implementation, there are indications, when looking at the experience in other countries, that they exist and are an important empowerment tool. More field research is required to determine the specific needs of the customers to develop new products that will enhance their quality of life.

There are encouraging results in public procurement schemes in the Netherlands (Small Business Innovation Research) and the UK (Small Business Research Initiative). These programs aim to use government procurement to drive innovation by engaging companies in open competitions for innovation; the programs bring innovative solutions to specific public sector needs.

The goal of the Dutch government is threefold: to solve public questions and concerns, stimulate innovation among SMEs and the valorization of public knowledge. The results of the first evaluation (2007) of the Dutch program are positive. From the 88 companies that sent in proposals 80 are SME. In sum, the results reveal that the program brings in new companies and new ideas and that the companies that were awarded contracts aim at R&D cooperation.[45]

If Latin American and Caribbean countries could establish a similar approach of the above-mentioned schemes and employ joint procurement by pooling their needs and resources to create a regional market it could considerably enhance innovation and stimulate growth of new innovative businesses.

45 Information available at http://www.senternovem.nl/english/ Last accessed on 5 October 2010.

Annex I

América Móvil: The Making of a Global Latina.

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América Móvil:

The Making of a Mexican Global Latina

This case was written by Samantha Rullán, visiting researcher at INSEAD, under the supervision of Lourdes Casanova, lecturer in the Strategy Department at INSEAD. It is intended to be used as a basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation

jaguar *(jag' wär'): fast and agile Latin American feline. Considered an opportunistic hunter with an extensive prey base which adapts to different habitats. Present in Mesoamerican culture as a symbol of power and strength.*

América Móvil[1] could be said to fit the above definition perfectly. This Mexican company has been able to extend its footprint throughout Latin America and consolidate its position as the king of the jungle in the region's wireless telephone market in just eight years.

It is the largest wireless telecommunications provider in Latin America based on number of subscribers, the biggest company as measured by revenue, and the most valuable corporation in the region with more than 40,000 employees in 17 countries, 153 million mobile customers and over US$28 billion in revenue[2]. In the wireless telecommunication services sector it ranks third in the world by market capitalization[3], behind China Mobile Limited and Vodafone Group.

As part of the holdings of business tycoon Carlos Slim (see Exhibit 1), América Móvil benefits from the synergies between the different companies of the group. All of Slim's trademark business strategies are present in América Móvil. With his solid leadership and strategic vision, the company has become a leader in the wireless telecommunications sector in Latin America. Since América Móvil began expanding in Latin America, wireless penetration in the region has increased from 13% in 2000 to above 66% in 2008, and its market capitalization has grown more than ten times since 2002. How did a Mexican wireless telecommunications company successfully become a Global Latina[4] in such a short period of time? Why has América Móvil focused its internationalization strategy mainly on emerging markets in Latin America?

While América Móvil's presence is currently limited to the American continent, it is a prime example of an innovation-driven, high-growth, agile Latin American company. So the question is: Will this jaguar continue to hunt? And if so, where, and what will be its next prey?

The Wireless Telephone Sector

The global wireless telecom industry in 2008 was worth approximately US$1.14 trillion. The top three companies worldwide as measured by market capitalization are, in ranked order: China Mobile (China) at US$275 billion, Vodafone (UK) at US$152 billion and América Móvil (Mexico) at US$93 billion[5] (see Exhibit 2).

1 This case study is based on the chapter América Móvil, going mobile: growth of a Mexican telecom giant, which is part of a report for the Inter-American Development Bank which support is gratefully acknowledged and INSEAD, coordinated by Lourdes Casanova. Working Paper. Inter American Development Bank. Forthcoming. 2008.
All data is as of December 2007 unless stated otherwise. Data source: América Móvil Annual Report, 2007.
2 As of June 27, 2008.
3 Refers to multinationals from Latin America with a presence outside the region as defined by Lourdes Casanova in the
4 report for the IADB.
Source of data Capital IQ, last accessed on June 27, 2008.
5

The Latin America and Caribbean region had a mobile penetration rate of over 66% in 2008 with more than 390 million subscribers, up from 4 million in 1995, representing approximately 12% of the world's 3.04 billion mobile subscribers[6]. It was not until 2001 that penetration rates of mobile phones in the region matched fixed telephone lines; since then mobile phone penetration has soared and is now nearly triple that of wire line telephones. Some estimates foresee the region's mobile penetration rate reaching 76% by 2012, or 476 million customers. Forecasts put total telecom revenues in Latin America at US$108 billion in 2010, with more than half attributed to mobile services. This marks a clear rupture with the 2005 figures, when more than half of the total US$79 billion in telecom revenues went to fixed line phone services[7], and the trend in favour of mobile wireless is expected to continue.

Over the period 2006-2010, Latin America is expected to be the fastest growing telecom market in the world, growing at a compound annual growth rate (CAGR) of 7.8%, followed by emerging Asia with a CAGR of 7.1%, Central and Eastern Europe with 6.9%, and Africa and the Middle East approaching 5.8%. In contrast, the US and Canada market is expected to grow at a CAGR of only 1.2% over the same period[8]. For this reason the major players are counting on emerging markets to drive growth. But while most of Europe's leading operators, such as Deutsche Telekom, are targeting countries in Central and Eastern Europe, Telefónica has chosen to focus on the Latin American market before looking towards the old continent.

Without a doubt, the driving force behind the growth of the Latin American mobile phone market is the prepaid model. Roughly 83% of customers are prepaid. The success of this model can be explained by the advantages it offered to both operators and users: on the one hand it reduced the rate of invoice default and collection costs for companies, on the other hand consumers could control their expenses and eliminate the risk of escalating debts[9]. The widespread availability of "calling party pays" also encouraged consumers to adopt the prepaid model.

Whereas it was difficult for new entrants to build out a network to compete with incumbents in the fixed line telephone sector, mobile telephony offered private investors the opportunity to enter a market with just two main barriers to entry: spectrum allocation through auctions[10] or beauty contests[11], and satellite regulation.

The wireless mobile sector in Latin America has two major players, América Móvil (Mexico) and Telefónica (Spain). Both companies were shaped under different models with the idea of creating a "national champion" to compete with foreign operators in their domestic markets, and both have implemented internationalization strategies to expand with a focus on Latin America. But whereas in 1989 Telefónica[12] first prioritized fixed-line telephony in South

6 Latin America – Mobile Market – Overview & Statistics. Paul Budde Communication Pty Ltd. 2008
7 América Móvil: Company Analysis, Stifel Nicolaus Equity Research, 16 May 2006.
8 The Top Ten Telecom Service Providers. Business Insight 2008.
9 Mariscal, Judith and Rivero, Eugenio. Mobile Communications in Mexico in the Latin American Context. Information Technologies & International Development; winter 2006, Vol. 3 Issue 2, p 49.
10 Awarded to the highest bidder.
11 Merit based evaluation on defined performance criteria.
12 For more on Telefónica's entry to Latin America, please refer to "Telefónica: The Making of a Multinational", by Lourdes Casanova and Mariola Meseuger. INSEAD case 300-003-1, Fontainebleau, 1999.

America and then entered new industry segments, América Móvil focused on mobile telephony from the start[13].

A Jaguar is Born

América Móvil was established in September 2000 as a spin-off from Telmex, Mexico's largest provider of local and long-distance telephone services, following the business model of most European telecoms at the time. The purpose of the spin-off was to improve the ability of both companies to address challenges such as executing independent operating strategies and allowing the expansion of the wireless business. During the process the following assets were transferred from Telmex to América Móvil: Telcel (Mexico), Cablevision (Mexico), Telgua (Guatemala), Cellular Comms (Puerto Rico), Topp Telecom (USA), CommSouth (USA), Prodigy (USA), CompUSA (USA), ATL (Brazil), Conecel (Ecuador) and Techtel (Argentina). The most valuable asset transferred was Telcel, with around 80% of the Mexican wireless market at that time.

Telcel traces its origins back to 1956, when Publicidad Turística, an affiliate of Telmex, then owned by the Mexican government, was established to publish telephone directories. In 1981, the government granted the company a concession to install and operate a wireless telephone system in Mexico. Publicidad Turística changed its name to Radiomóvil Dipsa in 1984, and in 1989 the company began operating under the Telcel trademark. At that time many factors hindered the development of the market: wireless telephones were not widespread, the company had not seen the potential of the market, and its concession required it to be second player in every Mexican region. Consequently, another company, Iusacell[14], seized the opportunity and became the early market leader. Iusacell targeted high-end customers since mobile phones were a luxury that few Mexicans could afford at the time.

Between 1989 and 1990 Telmex expanded its cellular network on its concession to cover the Mexico City metropolitan area as well as the cities of Cuernavaca, Guadalajara, Monterrey, Tijuana and Toluca. Telmex was privatized in 1990 and the Mexican government awarded a 20.4% stake to a consortium led by Grupo Carso (the Mexican group owned by Carlos Slim), France Telecom (France) and SBC Communications (US) as a vertically integrated firm[15]. There were many reasons behind the decision to privatize, among them unsatisfied demand, poor quality of service, high prices and limited coverage. The concession encompassed elements[16] that were traditionally incorporated when transiting from a regulated monopoly towards a competitive system. Exclusive rights to the long-distance service were awarded for a six-year period.

After the privatization of Telmex, Iusacell continued to be the market leader in the wireless sector with Telcel still in second place. However, the Mexican Peso crisis in 1994-95 changed

6 Economic Commission for Latin America and the Caribbean (ECLAC). Foreign Investment in Latin American & the Caribbean 2007.
7 Formerly owned by the Peralta family and now part of the Azteca corporate empire controlled by Ricardo Salinas.
8 Mariscal, Judith, and Rivero, Eugenio. New trends in the Latin American telecommunications market: Telefónica & Telmex. CIDE. Available online, 22 August 2005.Mainly commitments to build out their networks in a certain timeframe and to have their tariffs for basic services regulated.
9

the macroeconomic environment. While Iusacell continued catering to high-end customers, Telcel pioneered the prepaid model to reach an untapped market: low income Mexicans. As part of its strategy the Amigo[17] programme was created to boost sales of prepaid cards. As a result, by the end of the 1990s Telcel had become the leader in Mexico with over 60% of the market.

Today, América Móvil, the parent company of Telcel, is on the leading edge of mobile technology, operating Global Systems for Mobile Communications (GSM) networks in the region, a standard widely used in Europe. The high recognition of GSM allowed the company to expand its customer base throughout Latin America using the same technological platform. In so doing the company was ahead of the market because GSM handsets were rare in the region for many years. Now that the market has overwhelmingly gone GSM, América Móvil is credited with having had the foresight to make technology investments in networks as it has expanded throughout Latin America[18].

Above all, the successful marketing of prepaid cards in Mexico for the prepaid model offered by Telcel provided the company with valuable information about customer dynamics in the region and other emerging markets: prepaid model clients were less loyal and spent less money compared to post-paid clients, and thus the mobile market was being driven by volume. This insight was valid for all of the emerging markets where América Móvil was present and thus it focused on strategic marketing and aggressive sales tactics to boost revenues.

Specific prepaid plans were created in order to serve the needs of segments such as the youth market, families and customers with variable income, low income customers and those who preferred to pay in cash, among others. Compared to the average postpaid plan, prepaid plans involved lower customer acquisition costs and billing expenses, and low credit or payment risk but, at the same time, generated lower average revenue per user (ARPU). Today, more than 85% of América Móvil's customers are prepaid, in line with the 83% of total subscribers in Latin America.

The company's marketing and sales tactics had a major impact on subscriber growth. In Mexico, Telcel took a creative advertising approach by engaging vendors dressed in bright yellow jumpsuits to sell prepaid cards at all major intersections and on the street – you could even buy a prepaid card while waiting at a stoplight in your car. The model was an overwhelming success: in 2007 Telcel was the market leader with over 50 million customers, well ahead of Movistar, a commercial brand of Telefónica (with 12.5 million customers), former market leader Iusacell (3.9 million customers) and Nextel, the largest trunk carrier in Mexico (with 2.1 million customers).

17 Created as a subsidized handset in 1996.
18 América Móvil: Company Profile, Datamonitor, 5 April 2006.

International Expansion: the Hunting Season

> *"Because of our resolve and long-term investment horizon we can see opportunity where others detect only problems; we can be bold where others are hesitant at best. To be ahead of the curve…[is] one of the things management is all about."*
>
> América Móvil Annual Report, 2003

América Móvil had a number of imperatives to expand beyond Mexico. Its domestic market was becoming saturated and it faced stronger competition at home. The company decided that in order to survive it had to compete in the markets of its rivals. Its growth strategy therefore would have to look beyond the domestic market. As a result, América Móvil set a clear course which was based from the start on extending its operations within Latin America, putting the wireless telephony sector at the heart of the company's internationalization.

"Natural markets"[19], as defined by Casanova, are those that fulfill the following criteria: geographical proximity, same linguistic sphere, and common historical links. According to this definition Latin America is América Móvil's natural market. It is a region with great potential for growth where Romance languages are primarily spoken[20]. These characteristics, together with América Móvil's knowledge of the region and the geographical and cultural proximity to its home country, made it an attractive market in which to pursue its expansion strategy.

Conquering its Natural Habitat

> *"We are focused on executing a simple, clear business strategy: consolidating our wireless operations and expanding selectively throughout Latin America. It is a region we know well – it is our homeland!"*
>
> América Móvil Annual Report, 2002

The international expansion of América Móvil was initiated in a favorable setting, at a time when the ongoing liberalization of the Latin American economies coincided with governments conducting auctions of the wireless spectrum to raise funds for state treasuries and increase competition. Moreover, major US telecom players were selling off their Latin American assets once the internet bubble had burst in 2000. In addition, the region was once again going through economic turbulence, set in motion by the financial crisis in Asia (1997) and Russia (1998) crises, which were followed by the devaluation of the Brazilian Real (1999) and the Argentine Peso (2001).

Most of América Móvil's assets were purchased from multinational corporations (see Exhibit 3) who were leaving Latin America, including France Telecom (France), Verizon Communications (USA), TIM International (Italy), BellSouth Corp (USA), Bell Canada International (Canada), and SBC Communications (USA). Some of them retreated because of difficulties at home, others left after their business strategies

19 On "natural markets" see Lourdes Casanova, "Lazos de familia: Las inversiones españolas en Iberoamérica", Foreign
20 Affairs (Spanish version), vol. 2, n°2, May 2002; and Lourdes Casanova, "Telefónica, la creación de una multinacional", Síntesis, 29-30, 1998.
Spanish and Portuguese.

in the region had failed. América Móvil seized the opportunity to acquire these undervalued assets and then consolidate operations by making them more efficient and profitable.

In 2000, América Móvil also formed a joint venture, Telecom Américas, with partners Bell Canada International (BCI) and US-based SBC International, to exploit wireless and broadband opportunities in Latin America and to serve as the primary investment vehicle of expansion for the partners. América Móvil and BCI owned 44.3% of the joint venture and SBC 11.4%[21]. The three partners had high expectations for the joint venture, as Carlos Slim stated during a presentation:

> *"With its experienced management, financial strength and access to the extensive operational expertise of its shareholders, Telecom Américas is well positioned to become a leading player in Latin America's fast-growing mobile and data markets."* [22]

Once set up, the joint venture started acquiring assets to pursue its strategy in Latin America. First it bought a controlling 77% stake in Colombian wireless operator Comcel, followed by wireless operator Tess for US$950 million.

In December 2001, Telecom Américas was restructured to become a pure wireless Brazilian company with interests in wireless telecommunications operating in the different regions in Brazil with the following companies: ATL, Americel, Telet and Tess. As part of the restructure, a year later América Móvil bought out Comcel and Occidente y Caribe Celular (Occel) in Colombia from Telecom Américas.

But in 2002, the joint venture was terminated when BCI found itself in financial trouble and was unable to invest more money in Telecom Américas, while SBC could not keep up with the dynamic acquisition strategy of América Móvil. As a result, the latter seized the opportunity and bought out Bell Canada International's and SBC's interests in Telecom Americas.

The incursion into Brazil was strategically important because of the country's market size and its potential for growth. Moreover, América Móvil's nemesis, Teléfonica, was well positioned in Brazil and had been present in the country since 1996 when it acquired CRT, a fixed-line and mobile operator. Furthermore, when the state-owned telephone monopoly Telebras was privatized in 1998, Teléfonica had acquired part of the company. But it was not until 2004, when Telefónica bought BellSouth's Latin American assets, that it became the biggest wireless operator in the region.

América Móvil's regional strategy in Brazil was complemented, in 2002, with the purchase of wireless licenses to operate in various regions including São Paulo, and the acquisition of Brazilian wireless operators BSE and BCP in 2003, after which it controlled six wireless operators in the country. At the end of 2003 it

21 Lourdes Casanova, "América Móvil: Building a Wireless Leader in Latin America", INSEAD case 09/2005-5308, Fontainebleau, 2005.

22 América Móvil press release, 16 November 2000.

unified all of its Brazilian assets under the Claro brand to compete with market leader Vivo[23] and Telecom Italia's TIM. Claro continued expanding its reach in Brazil by acquiring licenses.

In parallel, Telmex, América Móvil's sister company, was pursuing a similar strategy to become the leading communications company in Latin America by also acquiring assets from multinationals retreating from the region. It purchased AT&T's telephone assets in Latin America for US$207 million and also acquired Embratel (the main long-distance operator in Brazil) from MCI for US$400 million. MCI had paid US$2.3 billion for its controlling stake in Embratel when it was privatized in 1998, and AT&T had spent US$2 billion building a 70,000km fiber-optic network in Argentina, Brazil, Chile, Colombia and Peru[24]. Both acquisitions are a good example of Carlos Slim's trademark – investments in undervalued assets at the right time, embedded in the acquisition strategies of his telecommunications companies (Telmex and América Móvil).

But the hunting season was still open and América Móvil was on the scent of another acquisition. With more than 7 million subscribers, the Argentinean wireless company CTI was the next target and in 2003 it was acquired for US$221.5 million. Next in line was Empresa Nicaraguense de Telecomunicaciones (ENITEL), the sole provider of wire line services in Nicaragua and one of three mobile operators in the country: a 49% stake was acquired in 2004 for US$49.5 million. The same year, Megatel, a wireless operator in Honduras was acquired. Enlarging its footprint in the southern part of the region, at the end of 2004 América Móvil launched mobile services in Uruguay and in 2005 it acquired Hutchinson Paraguay from Hong Kong-based Hutchinson Telecom. The same year it entered the Chilean market, acquiring a 100% interest in Smartcom from Endesa (Spain), and went on to acquire TIM Peru from Italian-based TIM International for US$503.4 million.

América Móvil was still hunting for opportunities in emerging markets when in 2006 it acquired its first operation in the Caribbean, Verizon Dominicana[25], for US$2.06 billion from US-based Verizon in the Dominican Republic. A year later it bought Telecomunicaciones de Puerto Rico for US$939 million. The same year it bought a Jamaican wireless operator, Oceanic Digital, for US$72 million from Oceanic Digital Communications.

The expansion strategy in Latin America and the Caribbean implemented by América Móvil had been very successful. By 2007 around 60% of revenues came from outside its domestic Mexican market. The company offered mobile services in Latin America under the brand names Telcel in Mexico, Claro in Argentina, Brazil, Chile, Dominican Republic, El Salvador, Guatemala, Honduras, Jamaica, Nicaragua, Paraguay, Peru, Puerto Rico and Uruguay, Comcel in Colombia, and Porta in Ecuador (see Exhibit 4). This multi-brand strategy was different from that of its rival Telefónica, which operated under a single brand, Movistar (except in Brazil, where Telefónica's joint venture Portugal Telecom used the Vivo brand). Subsequently, América Móvil progressively modified its branding strategy by unifying most of its wireless assets under the Claro brand.

23 Joint venture between Telefónica and Portugal Telecom.
24 Smith, Geri. "The Telecom King of Latin America?" Business Week. 29 March 2004.
25 The largest telecommunications service provider in the Dominican Republic with over 748,000 wire line and broadband subscribers, 2.7 million fixed-line subscribers and 130,000 broadband subscribers as of 13 December 2007.

Europe and the United States

> *"Internationalization accelerates when competition arrives. This means that competition has always made us better. When long distance came into Mexico, we tried to do likewise in the United States. It was very complicated. We could not do it. But both América Móvil and Telmex have accessed Latin America very quickly due to Telefónica coming into the Mexican market."*
>
> Carlos Slim Helú[26]

Before Telmex spun off América Móvil in 2000, it was already operating in the US market through Topp Telecom, a nationwide leader in prepaid wireless communications. In 1999, Telmex had acquired 55% of the company for US$57.5 million. Later on, as a result of the spin-off from Telmex, Topp Telecom was transferred to América Móvil. A year later its name transition to TracFone Wireless, Inc was announced. The company maintained its strategy of providing low cost wireless phones and prepaid services through major national retailers with an exclusive focus on prepaid wireless telephones. It provided services through two brands: TracFone and Net10. The main difference between the brands was the prepaid minute rates and service options. TracFone was the largest prepaid cell phone provider in the US but did not own any wireless telecommunications facilities or hold any licenses; it purchased cellular airtime for resale in the form of prepaid cards or codes throughout the United States, Puerto Rico and the US Virgin Islands. With approximately 9.5 million subscribers it represented only 5% of América Móvil's total revenues (see exhibit 5).

For some time, Carlos Slim had had his eye on the European market, waiting for the right opportunity. Everything appeared to be in place for a deal in 2007. With Telecom Italia struggling, an attractive target with good assets in Brazil, it seemed to be the right time for Slim to make a move on 'the old continent'. In April 2007, América Móvil and AT&T offered US$6.4 billion in a bid for Telecom Italia. However, the Italians were not ready for a 'New World' takeover and they set in motion a plan to maintain the former state monopoly in European hands. In the end, Teléfonica and a group of Italian investors paid US$5.6 billion for a controlling 18% stake in Telecom Italia – a double bonus for the Spanish telecommunications company as it expanded into the Italian and the Brazilian market at the same time.

Thus América Móvil's presence remained limited to the American continent and Carlos Slim's ambition to conquer the old continent had to be put on hold for the moment.

Looking Ahead

To date, the expansion of América Móvil has relied on a combination of acquisition and organic growth. From 2000 to 2007, the company made 16 international acquisitions in 16 different countries. While in 2007 it added 28.6 million subscribers, only 786,000 clients were obtained through acquisitions (in Puerto Rico and Jamaica).[27] América Móvil's organic growth is due to the successful operations of its subsidiaries, which are driving the company's expansion. The company has indicated that, after a long "shopping spree",

26 http://www.carlosslim.com
27 América Móvil's Annual Report, 2007.

it is now focusing on "profits".[28] Does this mean that it will put on hold its acquisition strategy to focus on organic growth? Or will it continue with the combination of acquisition and organic growth that has hitherto been so successful?

Moreover, the telecommunications sector is facing major challenges from rapid technological change, regulatory complexities, and the financial and competitive status of new players. With the removal of the industry's traditional frontiers, alternative companies have started to compete, such as cable operators. Innovative commercial services, including the bundled voice, data and video package known as 'triple play', are being offered in Argentina, Chile and Uruguay, although there is still limited progress in Latin America regarding convergent solutions.[29] Clearly, the synergy in Carlos Slim's holdings, particularly between its telecommunications assets América Móvil and Telmex, will yield a robust response to this challenge.

When, in December 2007, Telmex decided to create Telmex Internacional, the spin-off was designed to let investors take advantage of higher revenue growth rates outside of Mexico in a separate entity. Telmex Internacional is a Mexican holding company providing a wide range of telecommunications services, including data and video transmission, internet access and integrated telecommunications solutions, pay cable and satellite television, through its subsidiaries in Brazil, Colombia, Chile, Argentina, Ecuador and Peru, as well as print and internet-based Yellow Pages directories in Mexico, the US, Argentina and Peru. Could this be the beginning of a Carlos Slim's plan to conquer the new challenges of the industry such as technological convergence? Will there be a merger between América Móvil and Telmex Internacional in the near future?

All eyes are upon the jaguar's next move.

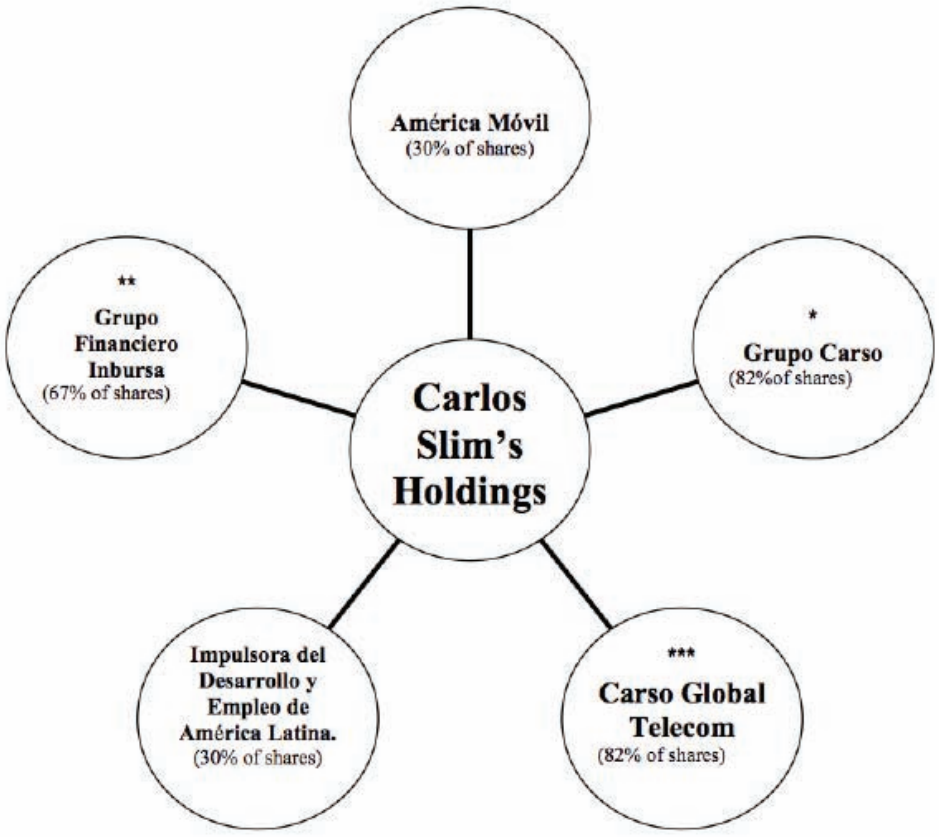
28 "América Móvil to focus on profits after shopping spree", Reuters, 22 March 2007.

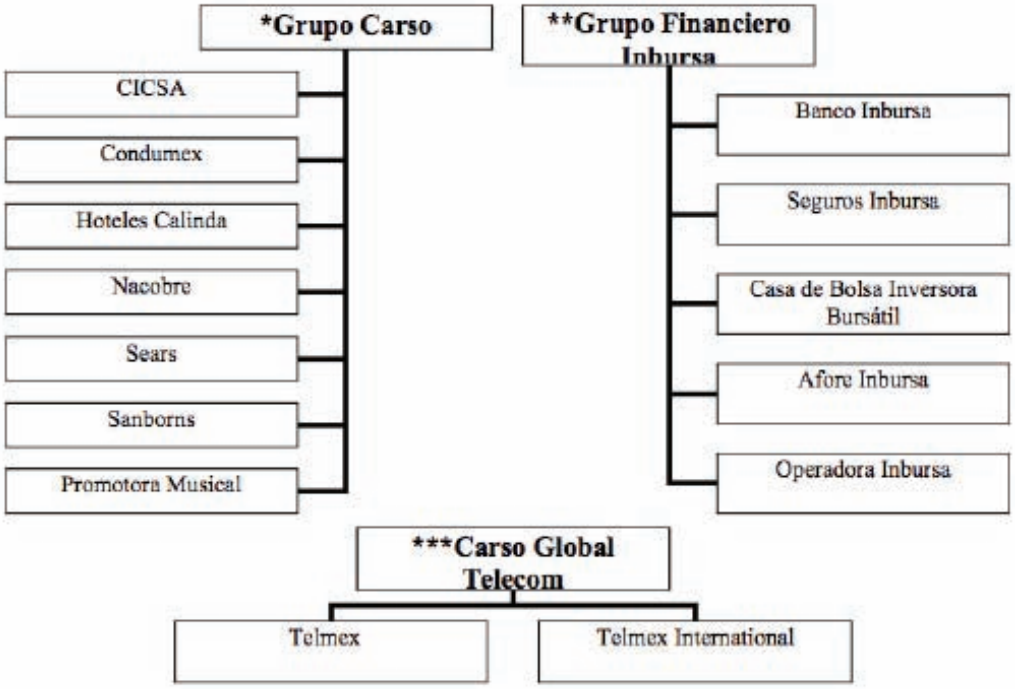
29 Economic Commission for Latin America and the Caribbean (ECLAC). Foreign Investment in Latin American & the Caribbean 2007.

Exhibit 1
Carlos Slim and His Holdings (2008)

Carlos Slim, a Mexican businessman, is the richest man in Latin America. In 1965, he began to build the foundations of Grupo Carso and during the 1982 debt crisis in Mexico he decided to invest heavily and actively. The strategy of buying during difficult times at low prices has allowed him to build a major business empire and is still being applied in his companies to date. Regarded as an opportunistic buyer who never overpays for anything, he has transformed his acquisitions into high value companies. With an eye for spotting business opportunities, he has substantial influence in the business world, particularly in the telecommunications sector. His thrift in both his businesses and personal life has set him apart from most Latin American businessmen.

The following chart shows his current holdings (in parenthesis) in the companies of the Grupo Carso.





Carlos Slim summarizes what he considers to be the Group's business principles in 10 points, which have been communicated to his relatives, colleagues, employees and workforce.

1. **Simple structures,** organizations with minimal hierarchies, personal development and internal training for executives. Flexibility and rapid decision-making. Operate with small company advantages; those that make great companies grow large.
2. **Maintain austerity** in good times in order to strengthen, capitalize and accelerate the development of the company, and thus avoid bitterly drastic adjustments in times of crisis.
3.Always be active in modernization, growth, training, quality and the simplification and continuous improvement of production processes. **Increase productivity and competitiveness;** reduce costs and expenses using global benchmarks.
4. Companies should never be limited by the size of the owner or manager. Do not be a big fish in a small pond. **Minimize investment in non-productive assets.**
5.There is no challenge that we cannot overcome if we work together, with **clear objectives** and **knowing the tools** we have at our disposal.
6. Money that leaves the company evaporates. This is why we **reinvest profits.**
7. **Corporate creativity** is not only applicable to business, but also to solving many of the problems our
countries face. This is what we do through the Group's Foundations.
8. Firm and patient **optimism** always yields its rewards. 9. All times are good for those who know **how to work** and have the tools to do so.
10. Our premise is and has always been that we leave with nothing; that we can only do things while we are alive and that **businessmen are creators of the wealth they temporarily manage.**

Source: Authors on the basis of information from Carlos Slim's website (www.carlosslim.com) accessed on 15 August 2008 and Fortune Magazine 20 August 2007.

Exhibit 2

Ranking of Wireless Telecommunication Operators by Market Capitalization (June 2008)

RANKING	COMPANY	COUNTRY	MARKET CAPITALIZATION (US BILLIONS)
1	China Mobile	China	275
2	Vodafone	UK	152
3	**América Móvil**	**Mexico**	**93**
4	NTT DoCoMo	Japan	61
5	Bharti Airtel	India	34
6	Mobile Telesystems OJSC	Russia	31
7	MTN Group	South Africa	30
8	KDDI	Japan	27
9	China Unicom	China	25
10	Rogers Communications	Canada	25

Source: Authors on the basis of information from Capital IQ accessed on 27 June 2008.

Exhibit 3

América Móvil's International Expansion Time Line (2000-2007)

Year	Country where it operates	Mode of Entry	Target Company/ Subsidiary/Regions (if applicable)	Sellers/Partners	Transaction Value (in USD) (if available)
2000	USA	Acquisition	49 % CompUSA[30]	Telmex	
2000	Ecuador	Acquisition 61.3%	Consorcio Ecuatoriano de Telecomunicaciones (Conecel)	Conecel shareholders	
2000	Guatemala	Acquisition	Telecomunicaciones de Guatemala	Government of Guatemala	
2000	Argentina, Brazil, Colombia and Venezuela	Joint Venture	Telecom Americas	SBC and BCI	
2002	Colombia	Acquisition	Comunicación Celular and Occidente y Caribe Celular	Telecom Americas	
2002	Brazil	Acquisition	Telecom Americas partners (39.1% BCI and 11.1%SBC)	Bell Canada International (Canada) and SBC Communications (US)	
2002	Brazil	Greenfield	Sao Paulo, Bahia-Sergipe and Parana-Sta. Catarina		
2003	Brazil	Acquisition	BSE	BellSouth Corp. (US) and Verbier (Brazil)	$180 million
2003	Brazil	Acquisition	BCP	BellSouth Corp (US) and Verbier (Brazil)	$643 million
2003	El Salvador	Acquisition	Compañía de Telecomunicaciones de El Salvador S.A. de C.V.	France Telecom (France)	$417 million
2003	Argentina	Acquisition	CTI Holdings	The Blackstone Group Private Equity Group (US), Verizon Communications (US)	$221.5 million
2003	Nicaragua	Greenfield	Sercom		
2004	Nicaragua	Acquisition	49% Empresa Nicaraguense de Telecomunicaciones (ENITEL)	Government of Nicaragua and workers of ENITEL	$49.6 million
2004	Honduras	Acquisition	Megatel	Government of Honduras	
2004	Uruguay	Greenfield			

30 In December 2003, America Móvil sold its 49% stake in CompUSA to US Commercial

Exhibit 3 (cont'd)
América Móvil's Iinternational Expansion Time Line

2005	Paraguay	Acquisition	Hutchison Telecommunications Paraguay	Hutchison Telecommunications International (Hong Kong)	
2005	Chile	Acquisition	Smartcom	Endesa (Spain)	$472 million
2005	Peru	Acquisition	American Móvil Perú	TIM International (Italy)	$503.4 million
2005	Brazil	Greenfield	State of Minas Gerais		
2006	Dominican Republic	Acquisition	Verizon Dominicana	Verizon Communications (US)	$2.06 billion
2007	Puerto Rico	Acquisition	Telecomunicaciones de Puerto Rico	Verizon Communications (US), Popular (Puerto Rico), Puerto Rico Telephone Authority (Puerto Rico)	$939 million
2007	Jamaica	Acquisition	Oceanic Digital Jamaica Limited	Oceanic Digital Communications (Jamaica)	$72 million

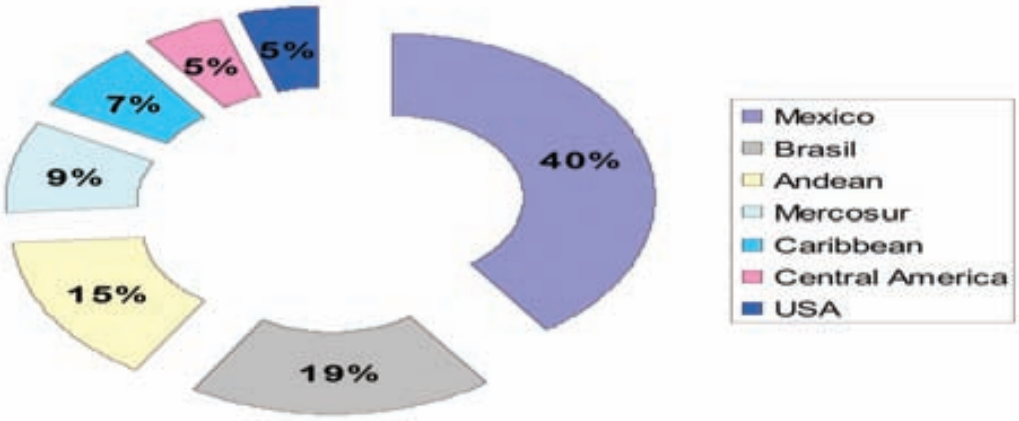
Source: Authors with data from América Móvil's annual reports and filings.

Exhibit 4

América Móvil's Presence in different countries in 2007 by Brand and Year of Entry

Source: Authors with data from América Móvil's annual reports and filings.

Exhibit 5
América Móvil's Revenues by Region, 2007



Source: Authors with data from América Móvil's annual reports and filings.

Exhibit 6
América Móvil's Subsidiaries (2007)

COUNTRY	WIRELESS BRAND	BUSINESS
Argentina	Claro	Wireless
Brazil	Claro	Wireless
Chile	Claro	Wireless
Colombia	Comcel	Wireless
Dominican Rep.	Claro	Wireless, wire line
Ecuador	Porta	Wireless
El Salvador	Claro	Wireless, wire line
Guatemala	Claro	Wireless, wire line
Honduras	Claro	Wireless
Jamaica	Claro	Wireless
Mexico	Telcel	Wireless
Nicaragua	Claro	Wireless, wire line
Paraguay	Claro	Wireless
Peru	Claro	Wireless
Puerto Rico	Claro	Wireless, wire line
Uruguay	Claro	Wireless
USA	Tracfone	Wireless

Source: Authors with data from América Móvil's annual reports and filings.

Exhibit 7

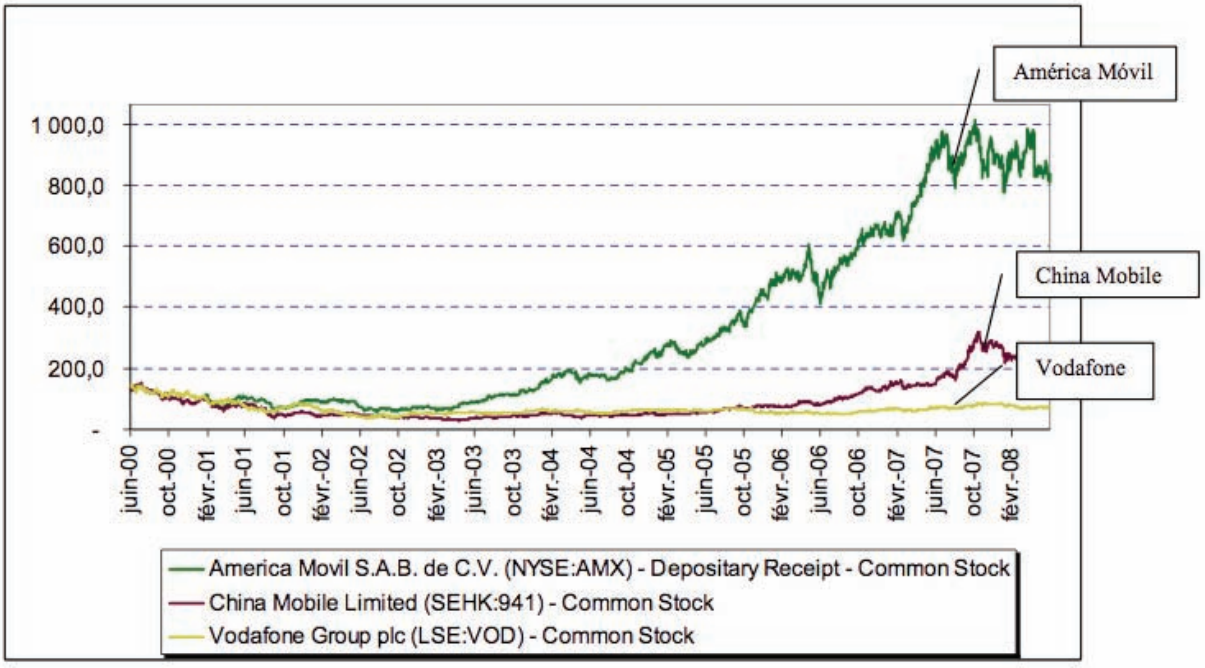
América Móvil's Relevant Financial Data (2007)

	US$ Millions
Total revenues	28,675
EBITDA	11,598
EBITDA Margin	40.4%
Operating Profit	7,841
Operating Margin	27.3%
Earnings per Share	.15
Earnings per ADR	3.11
Total Shareholder's Equity	11,674
Total Assets	32,128
Weighted Average of Common Shares Outstanding (millions)	35,149
Return on Equity	48.70%

Source: Authors with data from América Móvil's 2007 annual report.

Exhibit 8

América Móvil: Share Price Evolution Compared With China Mobile and Vodafone (2000-2008)



Source: Capital IQ accessed on 13 June 2008.

Exhibit 9

Wireless Penetration, Total Number of Subscribers and Operators in Latin America

COUNTRY	POPULATION (in millions)	WIRELESS PENETRATION	WIRELESS SUBSCRIBERS (in millions)	WIRELESS SUBSCRIBERS BY OPERATOR	
Argentina	39, 400	97%	38,384	Movistar	13,734
				CTI Móvil	**13,332**
				Telecom Personal	10,507
				Nextel	812
				Others	0
Brazil	189, 935	65%	122,262	Vivo	33,484
				TIM	31,254
				Claro	**30,228**
				Oi	15,984
				Telemig / Amazônia Celular	5,317
				Brasil Telecom GSM	4,262
				Others	1,733
Chile	16,600	88%	14,678	Movistar	6,283
				ENTEL PCS	5,638
				Claro	**2,672**
				Nextel	10
				Telsur	75
				Others	0
Colombia	44,207	75%	33,062	**Comcel**	**22,335**
				Movistar	7,865
				Tigo (Ola)	2,754
				Avantel	108
				Others	0
Ecuador	13,610	75%	10,169	**Porta Celular**	**6,936**
				Movistar	2,747
				Alegro	487
				Others	0
El Salvador	6,850	90%	6,138	Tigo	2,217
				Claro	**1,945**
				Movistar	1,374
				Digicel	559
				Intelfon	42
				Others	0
Guatemala	13,223	62%	8,204	**Claro**	**3,417**
				Tigo	2,810
				Movistar	1,978
				Others	0
Honduras	7,111	55%	3,911	Tigo	2,925
				Megatel	**925**
				Hondutel	61

Exhibit 9 (cont'd)
Wireless Penetration, Subscribers and Operators in Latin America

COUNTRY	POPULATION (in millions)	WIRELESS PENETRATION	WIRELESS SUBSCRIBERS (in millions)	WIRELESS SUBSCRIBERS BY OPERATOR	
Mexico	105,694	65%	68,854	**Telcel**	**50,011**
				Movistar	12,538
				Iusacell	4,165
				Nextel	2,140
				Others	0
Nicaragua	6,082	41%	2,478	**Alo PCS**	**1,776**
				Movistar	702
				Others	0
Paraguay	6,125	79%	4,808	Tigo	2,067
				Nucleo	1,537
				CTI	**808**
				Vox	395
				Others	0
Peru	28,782	49%	13,999	Movistar	8,067
				Claro	**5,455**
				Nextel	477
				Others	0
Puerto Rico	3,953	60%	2,372	Cingular	672
				Claro	**645**
				Centennial	452
				SunComm Wireless	355
				Sprint	155
				Movistar	92
				Others	0
Uruguay	3,324	96%	3,195	Ancel	1,249
				Movistar	1,200
				CTI Móvil	**746**
				Others	0

Source: Authors with data from Pyramid Research March 2008 (in bold América Móvil's subsidiaries).

Exhibit 10
History of América Móvil

1981	Publicidad Turística, a publisher of telephone directories, is granted a concession to install and operate a wireless telephone system in Mexico.
1984	Publicidad Turística changes its name to Radiomóvil Dipsa.
1989	Radiomóvil Dipsa begins operating in Mexico under the Telcel trademark.
1990	Privatization of Telmex, the state-owned monopoly.
2000	América Móvil is established as a spin-off from Telmex. Joint venture, Telecom Américas, formed with partners Bell Canada International (BCI) and US-based SBC International. Beginning of América Móvil's international expansion.
2001	América Móvil expands into Colombia.
2002	Telecom Américas is restructured to become a pure wireless Brazilian company. Five months later acquires Bell Canada International (BCI) and US-based SBC International participation in the joint venture. Telcel launches its GSM service with coverage in 56 Mexican towns and cities. Telecom Américas acquires new licenses in Brazil to provide wireless service in the city of Sao Paulo, in Parana-Sta. Catarina and in Bahia-Sergipe.
2003	América Móvil expands into Nicaragua and El Salvador. The company brings all its assets in Brazil under the Claro brand.
2004	América Móvil expands into Uruguay and Honduras.
2005	América Móvil expands into Peru, Chile, Paraguay and the state of Minas Gerais in Brazil.
2006	América Móvil's Chilean subsidiary begins offering wireless services with GSM technology and launches its new brand, Claro. Its Central American subsidiaries in Guatemala, El Salvador, Nicaragua and Honduras adopt the Claro brand name for their wireless service. The new national and international Calling-Party-Pays regime comes into effect in Mexico. América Móvil expands into Dominican Republic. On December 13th, América Móvil's and Telecom América's shareholder meetings approve the merger of Telecom América into América Móvil, effective as of that date.
2007	América Móvil introduces new 3G services in Brazil, Argentina, Paraguay, Uruguay, Chile and Dominican Republic. América Móvil expands into Puerto Rico and Jamaica.

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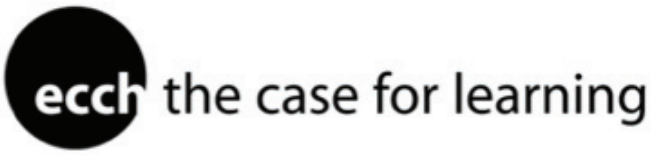

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