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ABSTRACT

As one of the main agents of globalisation, Information and Communication Technologies (ICTs) have been revolutionising many aspects of human life, affecting among other things, how wealth is generated and distributed. Due to the potential role of ICTs in generating growth, developing countries are struggling about how to implement effective strategies to foster growth and eventually ‘leapfrog’ steps of development. In this process, the state has, with its presence or absence, an unquestionable role. During the last decade in Uruguay, the ICTs sector had a better performance than any other economic sector, maintaining its dynamism despite a severe economic recession that has affected the country since 1998. At first glance, there has not been a coherent, well articulated state policy to promote ICTs. What is more, some of the state initiatives on the sector were only partially implemented, or dismantled soon after created. However, assuming that there is no state role is a deep flaw. Based on the empirical evidence and on the analysis of the opinions of key actors involved, the paper argues that certain pre-conditions, where the state has a key role, made this performance possible. An early creation of high quality informatics tertiary education, an efficient public telecommunication infrastructure, and a regulatory framework that includes tax exemptions. Currently, further development of the ICT sector will require a new state role. This role, also applicable to other developing countries, has to do with increasing investment on education and R&D, strength the telecommunications infrastructure, defining a coherent state policy as a ICTs consumer, promoting capital risk investment, and facilitating private actors access to foreign markets.

Key words: Information and Communication Technologies – State Role – Embedded Autonomy Development Strategies– Uruguay

CONTENTS

ACRONYMS AND ABBREVIATIONS

ANTEL	National Administration of Telecommunications
BCU	Uruguayan Central Bank
CAITI	Academic-Industrial Centre for the Information Technologies
CASI	Centres for the Access to Information Society
CND	National Corporation for Development
CNSI	National Committee for the Information Society
CUTI	Uruguayan Chamber of Information Technology Enterprises
HPAE	High Performing Asian Economies
INCO	Computer Institute of the University of the Republic
INE	National Institute of Statistics
IRIC	Income Tax for Industry and Commerce Enterprises
ITU	International Telecommunication Union
MERCOSUR	Southern Common Market (Argentina, Brazil, Paraguay and Uruguay)
PASS	Programme for the Support Software Sector
PDT	Programme for Technological Development
SOE	State Owned Enterprise
UIVC	Uruguay International Venture Capital
URSeC	Regulatory Unit of Communication Services
UdelaR	University of the Republic
TCS	Tata Consultancy Services
USI	Uruguay Information Society

1 INTRODUCTION

The Information and Communication Technologies (ICTs) have been revolutionising many aspects of human life all over the world for at least the last quarter century. As one of the main agents of globalisation, ICTs are making the process technically possible and increasingly faster. Among other consequences, the global interconnection is affecting how wealth is generated and thus how it is distributed. Since development has to do with the allocation of resources in a society and among different countries and regions, the state is a key player in the arena of conflict and cooperation where the distribution takes place. So, with its presence or absence, the state has an unquestionable role in the development process.

The development of the ICT sector in rich countries has been strengthening their economic growth, moving them even further away from the underdeveloped world. Due to the potential role of ICTs in generating growth, the last decade has seen an important amount of literature focused on how poor countries can implement strategies strongly based on ICTs to fuel growth and eventually allow these societies to *'leapfrog'* steps of development. However, not that much critical mass can be found about the possible strategies of comparatively small, in size, population and GDP, developing countries situated in the upper level of this developing category. Countries possessing a certain level of human development and relatively low poverty rates which can be more than mere receptors of technology, but at the same time has not size and wealth levels to implement a big scale endogenous technological process.

ICTs in Uruguay

In 1950 Uruguay had a GDP per capita four times bigger than Korea and five times bigger than Taiwan. However, during the second half of the 20th century, Uruguay showed very low growth rates compared to its neighbours, just 1.8% average GDP growth rate against a Latin American one of 3.5% during that period (Torres, 2003: 24-27). The current South Korean GDP is more than four times the Uruguayan one. In spite of this poor general performance, when we go deep into recent Uruguayan ICTs sector performance, we realise that the situation is significantly different. Moreover, some analysts are talking about an emerging 'success story'.

The Human Development Report of 2001 was focused particularly on the impact of ICTs on development (UNDP, 2001). The report presented an Index of

Technological Progress that ranks the countries into five categories: 1. '*Leaders'*, countries such as USA, Finland or Sweden and the rest of G7 nations; 2. '*Potential Leaders'*, for example Spain or Mexico; 3. '*Dynamic Followers'*, with Uruguay being the first position of this category, the 38th place in overall ranking, ahead of big countries like South Africa, Brazil or China; 4. '*Marginalized'*, including countries such as Nicaragua, Senegal or Nepal; and finally 5. *'Others'*, for countries where no data is available, like Afghanistan.

In the regional contexts, Uruguay presented at the very beginning of this century several indicators that place it into a comparatively advantageous situation. Figures that correspond with the situation of 1999 showed that the quantity of computers per 1,000 inhabitants in Uruguay was 99.6, the highest in Latin America, well ahead of Chile (66.6) and doubling Argentina (49.2)[1] Considering telecommunications, 100% of the infrastructure was already digital, there were 400 telephone lines (fixed plus mobile) per 1,000 inhabitants, also being the highest telecommunication density of the continent (UNDP, 2001). Finally, an indicator of internet penetration normally used is the number of internet hosts per 10 thousand inhabitants. At that moment, there were 163,8 in Uruguay, doubling the figures of the nearest follower Argentina (73.8) and three times that of Chile (49.8).[2]

However, since 1998 Uruguay went into a deep economic recession with a constant drop of its GDP for five subsequent years. The crisis turned into a virtual collapse with the financial crack of its giant neighbour Argentina at the end of 2001 that provoked, in mid 2002, a severe reduction of foreign reserves and subsequently a devaluation of the local currency. Measured in current dollars, from a peak of $22.08bn in 1998, the GDP went into a tailspin down to $11.17bn in 2003, a striking constriction of 50%.[3]

It is easy to imagine that those mentioned technological indicators did not remain unscathed. In terms of computers Uruguay fell to the second place with 110 computers per 1.000 habitants after Chile, with 119. The situation is similar with telephone density, Chile being in the first place with 658 phone lines, ahead of Uruguay's 473. As for internet hosts Uruguay remains ahead with 257 per 10

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[1] Source: ITU <www.itu.int>, accessed 20th July 2003.
[2] Source: Internet Software Consortium <www.isc.org>, accessed on 23rd July 2003.
[3] Data from Uruguayan Central Bank (BCU) published in weekly *Búsqueda*, Montevideo, 16th September 2004.

thousands inhabitants, followed closely by Argentina (200,7) and Chile (137,6) (UNDP, 2004: 180-183).

On the other hand, the exports of high tech still show dynamism. In its best period, exports of ICT products had grown 1,330% between 1996 and 2001 and represented the latter year 2.5 % of total exports (CID, 2003: 304). During 2002, considering only the software sector, exports totalled $80m, 3.7% of total exports and an amount close to the level of some of the most traditional primary exports such as dairy products or textiles (Stolovich, 2003: 4). That year, software exports were more than ten times that of wine ($6.5m) considered a successful agro-industrial sector with several state promoted policies. In addition to this, between 1998 and 2002, while general exports fell 33% in current dollars, the value of exports of software products went up in exactly the same proportion (see figures 4.3 and 4.4).

Given these figures, in recent years, some specialised publications and analysts started to talk about Uruguay with the type of adjectives and comparatives that are used in the ICT jargon all over the world, such as *'Celtic Tiger'* for Ireland or *'Bombay Silicon Valley'* for India. In this regard, in specialised press articles and reports can be found expressions like: *'Uruguayan Massala'* (*Latin Trade* Magazine, January 2004), *'The Example of Software sector in Uruguay'* (newspaper *El Mercurio,* Santiago de Chile, 2003) or *'The Dublin of the South'* (Edelman;Regent, et al., 2003).

Even in the case of not wanting to use such strong labels to characterise the Uruguayan ICT sector performance, some questions arise about this phenomenon. For example, what are the main possible explanations of significant growth, particularly in such a recessive context, as the one mentioned. Is the result of a long run national strategy, or just the consequence of an efficient and competitive local private sector? Have there been any significant exogenous elements, like heavy foreign direct investment on the sector? In a broader perspective, which socio-economic characteristics of the country are contributing to make this phenomenon possible? There are some questions that particularly grab the attention of this research that is to what extent is the role of the state a key explaining variable? Is the state accomplishing things at the ICT sector that it is not doing at the other sectors in Uruguay?

Background

The few studies that already exist about the ICTs sector in Uruguay come from other approaches than development or policy analysis ones. Most are from economic or management related disciplines that base the analysis on the impact of the ICT sector on employment (Notaro, 2002), on how to improve its management performance (Edelman;Regent, et al., 2003), or on the export potential of Uruguayan software products (Gonzato and Arenas, 2001). Other studies come from scholars of the computer or telecommunication sphere, and are focused on hardware, infrastructure, or programming issues.

From the social science perspective, the literature of National Systems of Innovation, focused on science and technology policies, points out the importance of well articulated policies with adequate levels of public spending on R&D (Sutz and Arocena, 1998). Further works of the same authors analyse the relation of knowledge and innovation in Latin America in general and Uruguay in particular. From a north-south, or '*centre-periphery*', perspective they argue that the continent and the country are loosing innovative capacity (Arocena and Sutz, 2003). Other national works using the innovation approach, but more from an economic perspective, study a sample of the 20 biggest exporters of the Uruguayan software industry and find relevant levels of international competitiveness due to their innovation capacity (Mejía and Rieiro, 2002).

Closer to policy analysis literature, some other works have been centred on e-government initiatives in Uruguay and the process of incorporation of ICT inside the bureaucracy apparatus as part of the state reform paradigm of New Public Management (Frick, 2001). In a similar line of analysis, some studies of state reform and institutional analysis referred to specific initiatives inside the state related to ICTs such as the National Committee for the Information Society (CNSI) (Girard, 2001).

The literature that analyse the impact of ICT on civil society and institutions at the local levels should also be noted. A comparative study across Latin America includes the analysis of Uruguay and also provides general elements that can be applied to it (Bonilla and Cliche, 2004: ;Roggiero, 2004). One of the works, referred to the impact of ICT on local governments, from a sociological perspective, compares the capital cities of Uruguay and Argentina in terms of local government and the incorporation of ICTs by the NGOs. This is one of the very few studies that analyses the role of local NGOs in this field in Uruguay (Finquelievich and others, 2004).

In contrast, and in a certain way surprisingly, there is not a lot of academic production from policy analysis or development studies that, in the general context of the ICTs and development, specifically study the role of the state in the process. In this regard, it is necessary to shed some light generating theoretical and analytical elements to contribute to the local and regional debate on the topic.

Purpose of the paper

This paper analyses what had been hitherto the state role in the promotion of the Information and Communication Technology sector, particularly the software and telecommunications sub-sectors, in Uruguay during the last two government periods from 1995 to 2004. It will characterise how the different initiatives are articulated or not into a certain strategy and up to what extent they can explain the country's performance in this area. Finally, it will critically present the opinions of the key actors involved in the process regarding the state role, to say what it should and should not do, and what can be the consequences of the different types of intervention. In addition to this, alongside the analysis made during the paper, some generalisations for developing countries are provided based on the Uruguayan experience.

As limitations of the paper, it should be noted that the focus lies on telecommunication and software areas, not including other new technologies such as biotechnology. Furthermore, the paper scope is on the state role over the development of the sector itself, in terms of production and export levels, and not on the degree of incorporation of the ICTs into the general industrial and services structure that, the research is aware, also has a relevant impact on development.

Methodology

In order to achieve this purpose, a research strategy with three main components was applied. First, a wide and deep literature review; second, the analyses of the secondary data available for the country in a regional comparative perspective;

third, primary data generated through interviews to key relevant actors of the ICT sector in the country.[4]

In reference to the literature review, a significant amount of articles, journals, periodicals, books, reports from institutions and other specialised publications were reviewed to construct the analytical framework. Apart from the general bibliography which was useful in the different steps of the work, the specific ones that were incorporated into the paper are detailed in the 'References' list.

The secondary data can be divided into three main areas. First, laws and regulations that constitutes the legal framework of the ICT sector in Uruguay.[5] Second, updated socio-economic statistical data and technological indicators from several official Uruguayan statistical agencies, as well as regional or international ones.[6] Third, press reviews for what was used a previously generated database with the news related to the topic and complemented with a review of the news for the last year along the national and international press.[7]

In third place, a particularly relevant component of this paper, the primary data is constituted by the perspectives of the main actors of the Uruguayan ICT sector obtained through 15 interviews. The criteria to select the interviewees was the condition of qualified informers for their due to their position at the different areas of the ICT sector. They are high level hierarchical personnel that make the strategic and policy decisions at their respective institutions or enterprises, or in the case of experts, they have a wide and deep knowledge of the sector and their opinion is broadly accepted as a reference.

Even though it is not strictly a sample, the 15 interviews cover a reasonable portion of the public and private sphere. At least one interviewee of every public institutions involved in the ICT sector and the most significant private actors in their

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[4] The interviews and the press review were conducted by the author during the first semester of 2003 as part of his research activities at the Institute of Political Science of the UdelaR and were financed by a research fellowship from the Commission of Scientific Research (CSIC) of the UdelaR, Montevideo.

[5] Sources used: Uruguayan Parliament <www.parlamento.gub.uy>. The Decrees of the Presidency and other administrative dispositions were updated from: www.presidencia.gub.uy. Referred to the regulatory framework, URSEC: <www.ursec.gub.uy>.

[6] Sources: National Institute of Statistics (INE) <www.ine.gub.uy> and Uruguayan Central Bank <www.bcu.gub.uy>. For the regional and international level the United Nations Organisation for Telecommunications (ITU) <www.itu.int>.

[7] The two major national newspapers from Uruguay were reviewed: *'El Observador'* <www.observa.com.uy> and *'El País'*: <www.elpais.com.uy>. The international press accessible at the ISS library was regularly consulted since September 2003, principally *Financial Times* (London), *El País* (Madrid) and the weekly *The Economist* (London).

respective sub-sector. The distribution of interviews by area is as follows: local and foreign software and consultancy enterprises (5 interviews), private telecommunications and data transmission companies (2), the telecommunication SOE (1), public and private universities (3 and 2) and the Regulatory Agency (URSEC) in charge on communication services (1).

The interviews were conducted personally by the author and took place in Montevideo in July and August 2003. All but one, were personal interviews.[8] A semi-structured questionnaire was utilised and the interviews were recorded audibly, then translated and processed according to the research objectives. An agreement of confidentiality was made with all the interviewees in order to generate a reserve context that improves the quality of information they provide. As a consequence, when quoted in the text, their opinions will be identified with numbers (see table 4.1).

Structure of the paper

The present chapter 1 constitutes the Introduction and defines the scope and limitations of analysis of the paper, the methodology used, and the research instruments applied. In chapter 2, a theoretical discussion of the type of role, capacity, and degree of autonomy of the state to define and implement promotion policies in development strategies is presented.

Chapter 3 is centred on defining the concept of ICT itself and goes through some of the specific characteristics of the sector that are considered relevant to explicit. Also, a general overview of the literature from a comparative perspective about the main dimensions of the ICTs and its link with development is given.

Chapter 4 is divided into three parts. The first one presents the main ICT indicators from Uruguay. Secondly, the policies and initiatives of the last decade will be briefly described. Thirdly, the opinions and perceptions of the actors of the ICT sectors based mainly on the conducted interviews but also incorporating elements of other interviews that have appeared in the press.

Finally, chapter 5 presents the concluding remarks based on the literature review, the analysis of the interviews and the empirical evidence founded.

[8] Interview identified with No. 12, to the CEO of an International software company was done by e-mail.

Furthermore, some future lines of research of elements that exceed the scope of this paper will be suggested.

2 DEVELOPMENT STRATEGIES AND THE STATE

> They confuse the basic issue. In the contemporary world, withdrawal and involvement are not the alternatives. State involvement is given. The appropriate question is not, 'how much,' but 'what kind? (Peter Evans).[9]

2.1 Development strategies

The development strategy approach of Stephan Haggard (Haggard, 1990) and his subsequent works with Robert Kaufman (Haggard and Kauffman, 1992) provides useful analytical tools to understand why different development strategies are chosen, persist, and change in time and among countries. Haggard points out two elements about development strategies of developing countries that are relevant for the research objective. First, the idea that most of the time, development strategies emerge by-default, by trial and error, and are normally plagued by internal inconsistency which take years to crystallize. Second, the conceptualisation of strategies consisting of '*packages of policies'*; so disaggregating them is useful to identify different cleavages and conflicts (Haggard, 1990: 74).

Even in the cases considered successful on ICTs such as Costa Rica, scholars identify an erratic definition of a development strategy, as "not the result of any collective or explicit decision […]no grand national vision is responsible", but more as a result of multiple policies and events (Rodriguez-Clare, 2002: 79). So, for the purpose of this paper, we will consider a development strategy as an analytical construction ex-post rather than a pre-existent and clearly defined policy. In this regard, to characterise the strategy is necessary to analyse the different policies and instruments that are directly and indirectly intervening in the ICT sector performance in a particular space-time context. Before going into the analysis of the policies, it is relevant to briefly describe the socio-economic and policy paradigm context where these strategies are implemented in the Latin American continent.

[9] In: (Evans, 1995: 10).

Structural Adjustment

After the so-called "lost decade" of the 80's when the foreign debt burden stifled Latin American growth, all governments in the continent were strongly conditioned by the financial institutions and private bankers to implement severe Structural Adjustment Programmes (SAPs) under the "Washington Consensus" paradigm (Williamson, 1990). These adjustment programmes implied an extensive process of redefinition of the state-market borders, and so of what role the state should play in promoting development. Despite some country particularities, in general the policies aimed to liberalize capital flows in order to facilitate foreign direct investment (FDI); reduce fiscal deficit mainly by cutting public spending; promote total o partial privatisation of state owned enterprises (SOEs); dismantled any type of regulations that distorted market prices, and enhanced the institutional mechanisms that assure property rights.

The study of the characteristics and consequences of the process in Latin America is extensive in the literature, from more comprehensive and theoretical works (Haggard and Kauffman, 1992: ;Stalling, 1992) to others focused on specific dimensions of the political process of liberalization policies (Acuña;Smith, et al., 1994: ;Torre, 1998). Clearly, in most of the countries there were severe negative consequences to the reforms in terms of deterioration of Human Capital and growing inequality, poverty and unemployment (Stalling and Peres, 2000).

In terms of growth, South America achieved lower levels of economic growth in the 90's, than in the 60's and 70's. In the first half of the 90's, during the implementations of the SAP's, the GDP per capita growth rate was 2.5%, while in the second half the rate dropped to an average of 0.8% per year. In Uruguay, the contrast between the two halves of the decade was also strong: 3.2% for the first half, and 1.4% in the second, with four years of recession (Morley and Vos, 2003).[10] The severe consequences of the recession on ICTs indicators will be presented in chapter 4.1.

[10] Authors use as source for their calculations WB Data presented in table 1 page 4. In the foot note of that table, they define 'recession' as *"a year of negative per capita income growth"*.

Post Washington Consensus and the Neo-Institutionalism

The recognition to these effects, even from the multilateral and financing organizations, put into question the precepts of the pro-market orthodoxy, and allowed the emergence of a new paradigm called the “Post-Washington Consensus” (Stiglitz, 1998). This new framework brings the state back in with a central active role in implementing policies to promote development. There is a key state role in generating the regulatory frameworks necessary to promote competence and to improve the articulation between state and market, in order to “achieve growth with social equity” (Katz, 2000a: 49). In this sense, effective institutions became crucial for development.

The neo-institutional approach argues the determinant role of institutions in explaining economic performance of nations in the long run, coining the claim “institutions matter” (North, 1990). The central argument of this perspective is that effective institutions setting generate a stable and predictable structure of human interaction, which would reduce transaction costs thus improving economic performance. The transaction costs are “measurement” to set value to what is being exchanged; and “policing” to protect rights and assure the fulfilment of agreements (North, 1990: 27). The weaker the institution, the higher the cost of measurement and policing, because institutions “provide the structure for exchange that (together with the technology employed) determines the cost of transacting…” (North, 1990: 34).

The characteristics of social, political and economic institutions will determine which way the state is capable to orientate the private actors into a certain collective goal by setting a framework of rules that “define the way the game is played” (North, 1990: 4). In this theoretical framework, recent works from the IADB have shed light over the type of necessary institutions for ICT development in Latin America (Valenti, 2002). In this regard, during the description of ICT policies in chapter 4.2, as well as the interviews analyses of key actors in chapter 4.3, the paper pays special attention to the characteristics and functions of the institutions involved in the ICT development process.

2.2 State roles and development

In this context, Latin American states shift to a more pro-active development approach. National and local governments have tried to carry on public policies in different sectors which allow nations to strengthen economic growth and improve their position in the world economy. Peter Evans proposed a categorization of state roles that would help us to analyse the type of interventions, at distinct moments and among different sectors, the state can perform. The author characterised two pairs of state roles as being “custodian and demiurge” and “midwifery and husbandry”.[11]

- *Custodian*: A role associated mainly with minimal states, which acts as a regulator. The state clamps down on certain private sector practices or activities that are considered unwanted, so it privileges policing over promotion. Some custodial regulations can also have “promotional facets” (Evans, 1995: 78).
- *Demiurge:* Implies a direct intervention in production of normal commodities replacing local private capital. The state goes into the market “based on a stronger assumption about the limitations of the private capital” (Evans, 1995: 79). The author highlights the *“expansionary logic”* of the demiurge role, identifying the SOEs as the illustration par excellence of that role.
- *Midwifery:* In a context of weakness of local companies, the state does not substitute them, like in the demiurge, but tries to encourage or induce them into a certain sector or strategy that they would not get into by their own initiative “creating the conditions that led entrepreneurial groups to identify their interests with the growth of the sector and commit resources to it” (Evans, 1995: 210). Through instruments like a green-house of tariffs, the state protects a sector from foreign competition which reduces the “risk or uncertainty” which allows the private sector to invest and grow (Evans, 1995: 80).
- *Husbandry:* A role to motivate and assist private entrepreneurial actors, develop certain organizations to be in charge of complementary areas that involve risk such as R&D. It’s a *“combination of support and prodding”* (Evans, 1995: 81). This role overlaps with midwifery, but the private counterparts in that particular sector are already existent.

As we will see in the analysis of the Uruguayan state role in the ICT sector, these ‘ideal types’ of state roles do not appear in pure condition. So, in a certain ‘weberian’ methodology approach, we contrast these ideal constructions against

[11] This taxonomy of state roles is used by Evans throughout his work, but is mainly explained in Chapter 4, particularly pp. 77- 81 (Evans, 1995).

reality. The characterisation of a state role arises from the analysis of the combinations of instruments and how articulated they are into a certain strategy. This combination of instruments, not always coherently articulated, is what defines the role of the state in a particular economic sector during a certain period of time. Furthermore, the state can play, and normally does, different roles according to the type of sector that it refers.

2.3 State autonomy and the capacity to promote growth

Evans put into question the neo-utilitarian vision of the state which considers that an increasing state intervention with developmental policies also increases the generation of rents. So, the private actors will be more interested in seeking those rents rather than generating value with entrepreneurial effort. From his perspective, and particularly in the ICT sector, evidence shows that the type of relation set between bureaucrats and ‘clients’ that the neo-utilitarian vision claim, is in “sharp contrast” with reality (Evans, 1995: 223). In this virtuous articulation of the state intervention and entrepreneurial effort, the issue of autonomy of the state to design and implement policies becomes crucial.

State autonomy

The concept of *‘embedded autonomy’* elaborated by Evans allows us to interpret how states are able, or not, to design and implement their policies in a context of self determination of goals, with an effective application of instruments to achieve them. The author develops the concept comparing what he defines as ‘predatory states’ such as Zaire, against successful ‘developmental states’ such as Japan, Taiwan and Korea. He defines embedded autonomy as a particular articulation of bureaucracy and society in an “apparently contradictory combination of Weberian bureaucratic insulation with intense immersion in the surrounding social structure” (Evans, 1992: 154).

From this perspective, in order to achieve successful implementation of policies, it is necessary to consider not only the institutional framework, qualifications and the degree of autonomy of civil servants in charge of designing the policy, but also their formal and informal links with the private sector. Considering autonomy and embeddednes as an indivisible pair, one without the other can “produce perverse results” (Evans, 1997: 68). As the author recognises, “embedded autonomy is a useful analytical guidepost", not an "engineer formula" that can be implemented despite the context, the type of state or the historical times (Evans, 1995: 244).

In this particular combination, the internal ties that give coherence to the bureaucracy and efficiency to the civil service are key issues, but the "external networks connecting the state and civil society are even more important" (Evans, 1995: 49). More recently, other authors are starting to apply this approach of '*embedded autonomy'* to the ICT policy analysis in local governments in India (Kaushik and Singh, 2004).

Complementary to these perspectives of autonomy and efficiency, the works of Alice Amsden suggest lessons for Latin America that can be learned from the 'High Performing Asian Economies' (HPAE).[12] Taking the case of Taiwan, the author focuses the attention to the role of state intervention and the interaction with the private sector in promoting the high tech sector (Amsden, 2004). In this regard, the "reciprocal principal " (Amsden, 1994: 632) constitutes a key issue to analyse types and consequences of state role in promoting the ICT sector.

This concept is a basic component of the virtuous cycle in the relation between the public and private sphere. The idea is that state gives protection to strengthen the domestic market, as well as other incentives and guidance, defined to be coherent with the export led growth strategy. Along the same lines of "public private synergy", are the works that analyse the division of labour between state and private sector, generating a better output than the simple aggregation of efforts of both actors, in a logic of a win-win game (Evans, 1996a: ;1996b). The synergy approach implies a certain grey border zone between the public-private spheres, seeing them more in a complementary role, conciliating the traditional state–market dichotomy. In this sense, they are "more suitable to develop positive ties between state and society" (Evans, 1996a: 1036).

On the other hand, it should be noted that in the WB and other liberal perspectives, the 'Asian Miracle' is attributed to macroeconomic policies which generated a market friendly framework for investment (Campos and Root, 1996; Page, 1994; Porter and Takeuhi, 1999). In this perspective the market is the driving

[12] Apart from Japan, the HPAE includes South Korea, Taiwan, Hong Kong and Singapore: the *'4 Tigers';* and Indonesia, Malaysia and Thailand, considered as the *East Asian Newly Industrialised Countries (* NIC's).

force of this phenomenon, a view strongly aligned to the ‘Washington Consensus’. Even if they recognise “fundamental and selective interventions” (Page, 1994: 618) from the public sector, they consider the role of the state as being able to, “create a socio-political environment conducive to economic growth” (Campos and Root, 1996: 1).

After the East Asian financial crisis in late 1997, the role of the state intervention to promote economic growth was severely under question. Some focus the cause of the crisis on the process of liberalization of capital flow which increased vulnerability to external shocks (Bird and Milne, 1999; Wade and Vernoso, 1998). On the other hand, strongly liberal views support the idea that the crisis was mainly produced because of the strong state intervention (Porter and Takeuhi, 1999). As we will see in the interviews analysis, this debate between direct state intervention and a more indirect role generating a market friendly environment is also present among Uruguayan ICTs actors.

Finally, it is relevant to consider to what extent autonomy assures that the state is more capable of implementing certain development strategies or particular policies. Some authors argue that autonomy improves state capacity, but it is not the only element. Autonomy gives the state space and margin to act and decide independently from other non-state actors, but “you still need the capacity to take informed, coherent decisions…” (Polidano, 1998: 6). So, for the purpose of this paper we use the concept of ‘state capacity’, or more specifically, the ‘public sector capacity’ as, “the ability of the permanent administrative machinery of government to implement policies, deliver services and provide policy advice to decision makers” (Polidano, 2000: 805). Following the author’s argumentation we will pay particular attention to three key aspects of the state capacity: i) *despotic power* as the freedom to make decisions without major constrains; ii) *policy capacity* as the ability to make decisions in a coordinated process and considering all information available; and iii) *implementation authority* as the ability to put those decisions into practice and ensure the enforcement of law in general (Polidano, 2000: 809).

3 ICT AND DEVELOPMENT

> The Computer is not the only technological innovation of recent years, but it does constitute the common factor that speeds the development of all others, it will alter the entire nervous system of social organization (Simon Nora and Alain Minc, 1978).[13]

3.1 Definition of ICT

The possible definitions of Information and Communication Technologies (ICTs) are as vast as the literature that refers to it. A broad definition includes all the technical systems that generate process, transform and transmit information in any form. Despite including other sub-sectors, we will focus our analysis to software and telecommunications sectors that are the biggest and generally accepted as the most important ones included on ICTs sector.[14]

The software industry has changed significantly the last years. In the past there was a clear differentiation between software, hardware and other consultancy areas. Nowadays the borders are much less clear, and there is a general tendency to consider all of them the IT sector or in cases simply the software sector. Also the profitability of the different areas has changed dramatically. A traditionally hardware brand like IBM, nowadays obtains half of its revenues at world level from other products but of hardware.[15] Currently, the hardware production is not the only font of revenues at the IT industry, not even the biggest part of the pie. In this transformation process, the software and consultancy area became a more attractive, and easier to access, markets for relatively small companies and countries that would not be able to afford the necessary infrastructure for a huge hardware industry.

So, for the purpose of this paper we will refer to the software sector as all the companies, public or private, that generate products and services necessary for the ICT sector to work such as programmes, hardware, specific developments, consultancy, installation of infrastructure, etc. We will consider the

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[13] Quoted in: (May, 2002: 13).

[14] The telecommunications sector is the third biggest sector in the world, even ahead of oil and gas. The software sector is at the eight places globally with a global market of $ 693 billion dollars. The biggest software company, Microsoft, is the second biggest of the world in terms of market value. Source: 'Global 5000', in *Financial Times* 27th of May 2004, p. 6.

[15] Information provided in a personal communication with CEO of IBM Uruguay. In this particular country the proportion of the revenues from non-hardware products are even higher than world averages of 50% of the total.

telecommunication sector as the companies, public and private, that provide local and international phone connectivity, mobile and fixed and any type of internet access and data transferring services. Along the paper we will refer to 'ICT sector' as both, software and telecommunication sector, together.

Product cycle

If we want to critically understand the state role in the promotion of a certain economic sector, it is essential to deeply know the particularities of that sector. One of the main challenges of state at developing countries is to foster the export capacity of the ICT sector, so we must deeply understand the foreign trade dynamics of the product. In that sense, the classic work of Raymond Vernon about international trade and *'product cycle'* provides useful elements. Even though the work is almost forty years old, it is very relevant to explain the variables intervening when multinationals "vertically integrated and self-sustaining" (Vernon, 1966: 198) decide where to set its' production units. This is a key theoretical issue because is generally accepted that one of the main state duties in ICT promotion is to attract foreign direct investment.

The author explains the different stages of product development, and are easily applicable to ICT ones. As scholars and technicians agree to argue, software products are becoming a mature and standardised product, thus *"at an advanced stage in the standardization of some products, the less developed countries may offer competitive advantages as a production location"* (Vernon, 1966: 202). This perspective is useful to analyse why huge corporations decide to install their production units like Intel in Costa Rica or TATA Software in Uruguay. What is more, as we will see in chapter 4, the type of software produced in Uruguay is one of high levels of specification and a relatively reduced content of automatic programming, thus is a high income and labour saving products that generally is produced in developed countries "in the early stages of their existence and importing them later on" (Vernon, 1966).

The way how the states can identify the best place to insert the national ICT production in that developmental trajectory is a key variable that will explain which promoting role the state aim to play. As we will see in the interviews, companies would pursue the goal to be closer to the innovative side of the product cycle, as it is where the higher margins of revenues are located. Also, not surprisingly, is where only biggest world companies can afford to be. So, small companies from developing countries will require state support to change their position in the international division of labour, particularly at the ICT sector.[16]

3.2 ICTs and development

In order to understand the priority given by sates to that sector, and so the public policies implemented to promote it, it has to be noted the expected relation that it has with general development. The discussion over ICT and development was set in the global agenda since the first major documents of *World Development Report 1998* and the *Human Development Report 2001*(UNDP, 2001). These documents framed the discussion over increasingly sophisticated indicators of ICT, its components, ways of aggregating them and how to weight each of them in order to estimate the real impact that the ICT sector growth can produce over the general development of nations.

Among the more recent works on this area, it can be referred the works that tries to combine data of developed with that of developing countries (Archibugui, 2004), or the report of other multilateral organizations that provide increasingly sophisticated indicators to estimate ICT impact on economic (OECD, 2001, 2002, 2003). Particularly about Latin America some initial works relate strongly the growth of the ICT sector with development (Castells and Laserna, 1994). In the same line, several documents of ECLAC explore extensively that relation (CEPAL, 2000a; Katz, 2000b). Other works from the Latin American perspective support the strong correlation between ICT and development (Castaldi;Cimoli, et al., 2004) and specially a relevant comparative study focused on the digital divide for the whole continent made by ALADI (ALADI, 2003).

Other Uruguayan scholars analyse the relation of knowledge and innovation in Latin America from a north south, or '*centre-periphery*', perspective. Studying the characteristics and relations between universities and the entrepreneurial sector, they argue that far from converging, the current globalisation is increasing the gap in innovation capacity between Latin America and *centre* countries. This is what they call a '*de-learning*' process, where the continent, including Uruguay, is losing innovation capacities rather than acquiring them (Arocena and Sutz, 2003). We will

[16] The concept is analysed by Evans based on the work of Gilpin, Robert (1987) *The Political Economy of International Relations*, Princeton University Press; (Evans, 1995).

see in the interviews analysis in chapter 4 how this weak innovation capacity is perceived by many key ICT actors.

A fundamental contribution on this particular field of ICT and Development is the work of Matti Pohjola. Making a cross country analysis the author argues that ICTs have had a positive impact on economic growth in developed countries, but not in the same way at developing countries (Pohjola, 2001). Utilizing the growth theory analysis of Robert M. Solow, the author claim that there has been a limited impact of ICT over the development of poor countries, "You can see the computer age everywhere but in the productivity statistics" (Solow, 1987 quoted in Pohjola, 2001: 7). However, other authors consider that impact more significant, (Mansell and When, 1998) or even discuss the potential capacity of the ICT to 'leapfrog' certain phases of the development process (Primo Braga;Daly, et al., 2002). Particularly focused on the potentiality of software sector on exports and subsequently over development are the works of Richard Heeks (Heeks, 1999a ;1999b; Heeks and Nicholson, 2002).

An increasing amount of literature put into question in what extent the growing of ICTs are really generating an improvement in living conditions for the very poor (Saith, 2003) or if ICT are really being included in the general development programmes of nations (Schech, 2002). It has to be included into that sceptical view of the information society the work of Christopher May putting into question the real potentialities of ICT in terms of development and transformation capacity for the whole society (May, 2002). Finally, some works analyse with a critical perspective the already considered successful case of Ireland, which has been attracting foreign direct investment and reducing unemployment, but the relative household poverty has grown (Kirby, 2004).[17]

3.3 The role of the state on ICT promotion

Without doubt, analysing the role of the State in any type of economic transformation is quite a complex task. In contrast with the liberal view of natural comparative advantages, the dynamic or constructed perspective of comparative advantages open space for state intervention to shape a national strategy in order to

[17] Figures correspond to a relative poverty line of 40% of the average income. The data source that Kirby used is: Nolan, B. et.al. (2000). *Monitoring Poverty Trends in Ireland. Results from the 200 Living in Ireland Survey,* Policy Research Series No. 45, Dublin, ESRI.

insert a country into a certain international specialization. Many scholars argue that due to the amount of investment required as well as to the level of risk of every new activity, the presence of the state, particularly in small development countries, has been essential (Castells and Laserna, 1994; Evans, 1997; Katz, 1999). Since the beginning of the ICT revolution, even in big and developed countries the state played a key role in the process, as Castells argue analysing of Internet creation through the ARPANET project in the framework of national defence policies in USA (Castells, 2001: 17-25).

Some authors also argue that due to the particularly dynamic characteristics of the IT sector, "requires continuing technological efforts that strain the capacity of any individual firm, especially one located at a distance from the leading edge of the market" (Evans, 1995: 218). In developing countries, is difficult to imagine a national strategy to move the country into a different position in the international division of labour, without an active state role.[18] In a similar argumentative line of the key role of the State in the huge transformation of the Information Society, Christopher May argues "…the supposition that such a revolution can transpire without a central role for the State is mistaken" (May, 2002). The state role on generating human resources is also referred by many scholars.[19] We will see how this essential state role is strongly mentioned in the interviews.

The reference to the state role in the generation of ICT infrastructure is repeated along the specialized literature. Analysing the experience of the developed countries it is clear that the transition to the information society requires high level of investments "Without government action there will be too little investment in the production and adoption of the new technologies" (Stiglitz, 1998: 714). About Latin America, many scholars argue in the perspective of the unavoidable role of the state on infrastructure creation (Katz, 1999: ;2000b: ;Ramos, 1993). In the same line, Kirby argue that, "the most positive lesson that Ireland offers to Latin America is the active role the state has played […]in seeking to upgrade the technological profile of its industry" (Kirby, 2003: 52). On the other hand, specific works about countries like

[18] Evans even go further in certain institutional determinism: *"The character of state institutions helps determine weather and how countries change their position in the international division of labour"*. (Evans, 1995: 246)

[19] Analysing the Brazilian IT sector, Evans argue that *"Without connection between educational effort and industrial growth, NIC's can end up using scarce state resources to provide 'foreign aid' to the United States in the form of highly educated emigrants, as India has been doing for years"* Ibid.216).

Chile, stress the role of the state not by directly creating the infrastructure, but in facilitating the competitive markets to generate the adequate ICT infrastructure (Cominetti, 2002).

Finally, a huge part of the literature on ICT and Development analyse specific cases, mostly about countries considered as '*success stories'*. For example the case of India with works that analyse its software export growth levels (Tharakan and Van Beveren, 2003); or others focused on the eventual capacity of that growth to contribute to a broad economic development in a local perspective (Kaushik and Singh, 2004). The amount of literature on Ireland is extent, but the work of Peadar Kirby is particularly useful as he approach the case from the state role perspective and it's impact on the general development of the country (Kirby, 2004). In the Latin American context, it is also well referred the case of Costa Rica (Rodriguez-Clare, 2002).

For the purpose of our analysis, it is important to critically understand the *'successful'* cases and not just prescribe certain policy recommendations. As Rap notes "success depends upon the stabilization of a particular interpretation of events, that explains the origin, implementation and outcomes of a policy…" (Rap, 2003: 3). The author explains how that particular interpretation can be used to justify the need of a similar policy at very different contexts or situations because it "becomes a policy model" (Rap 2003:4). As "success is specially contagious**"** other scholars highlight the problem that many times success stories are "imitated blindly, attending to popularity rather than performance"(Strang and Macy, 2001: 155).

4 ICTS IN URUGUAY: INDICATORS, POLICIES AND ACTORS

> We only ask that the state doesn't generate obstacles, we know that if we ask for help, we are lost. (CEO of a Uruguayan software company).[20]

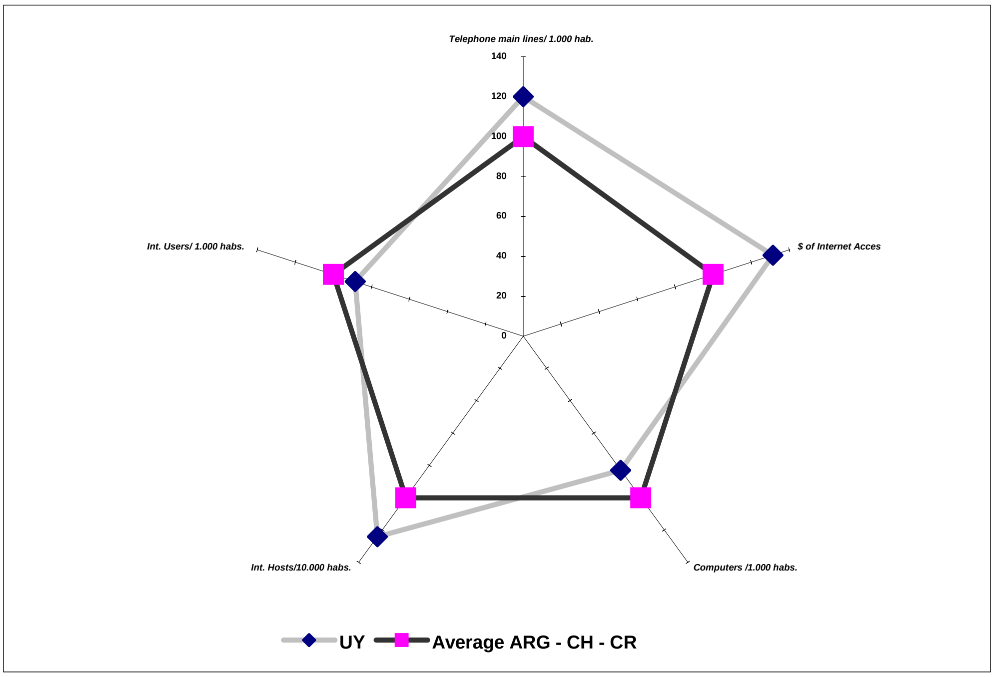
> The state is a key actor to define where the ICT sector can go, it should intervene with coherence. (CEO of a Uruguayan local software company).[21]

[20] Interview Nr.5b.
[21] Interview Nr.10.

4.1 Uruguayan basic ICT indicators in the regional context

Uruguay, with a population of only 3.4 million and a GDP of $12bn in 2002, is one of the smallest countries in Latin American and has traditionally shown favourable socio-economic indicators when compared to rest of the continent. In social capital it has been alternating the first place position with Costa Rica and Argentina for the last decade. Uruguay’s literacy rate is 97.7%, with the highest levels of secondary and tertiary education enrolment. Life expectancy is 75.3, ranking first in spending on public health, as a % of GDP, with 5.1% (UNDP, 2004: 156). Furthermore, it has the lowest level of income inequality of the continent, with a Gini coefficient of 44.6, much lower than the 57.1 of Chile (UNDP, 2004: 188). The political stability has been another relevant characteristic of the country, with the highest levels of confidence in democracy and comparatively exceptional public institutions that rank second best in the continent (CID, 2003: 33).

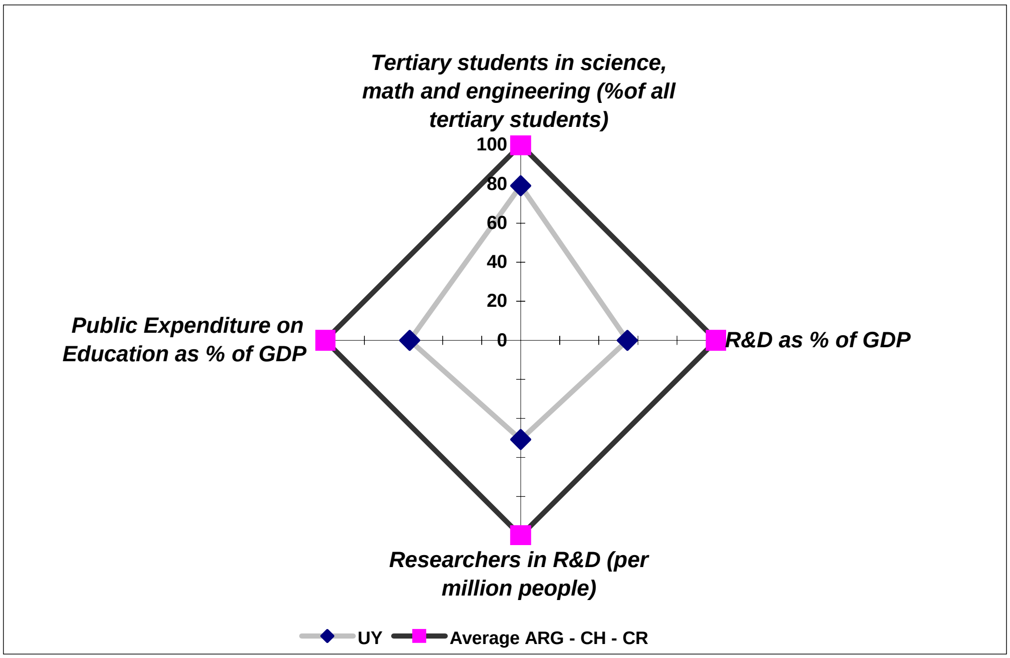
Figure 4.1
Tech Indicators of Uruguay
Compared to average of Argentina, Chile and Costa Rica = 100



Note: The Cost of Internet is calculated over the average cost of 20hrs of connection, a higher value of the index means lower cost. Sources: Calculus made by the author based on data from:: Telephone lines and Internet Users of ARG, CH and CR, source:(UNDP, 2004:180-183); for Uruguay, year 2002, is (ANTEL 2003:12); for Internet Hosts and Computers, year 2003, ITU <www.itu.int>; and for Cost of Internet, year 2002, source: (CID, 2003).

If we analyse the Uruguayan ICT indicators compared to the average of the continent, as many of them are associated with the socio-economic ones, it would easily appear in a favourable position. It is relevant to weight them adequately in order to acquire the knowledge of how suitable or not they are, in relation to an expected level according to its general development. In this regard, for the purpose of this paper the comparison is made with countries of similar development such as Argentina, Chile, and Costa Rica. From now on, the average of these three countries will be referred as the 'the region', unless indicated.

Figure 4.2
Education and Investment in R&D Indicators of Uruguay
Compared to average of Argentina, Chile and Costa Rica = 100



Source: Calculus of the index made by the author based on data from (UNDP, 2004: 172 and 180-183).

Telecommunications and internet access

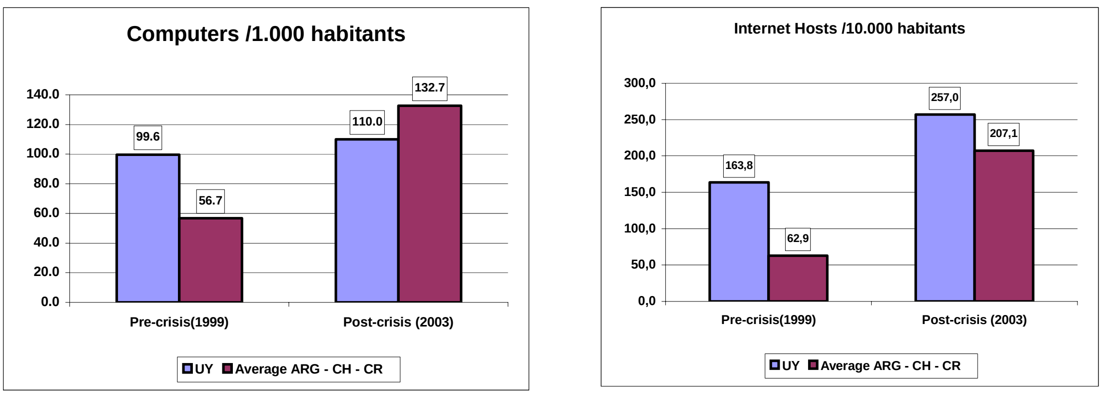
Uruguay is the first country in the continent to have a 100% digital telecommunication system and a broadly extended fibre optic network for data transmission. In the *Global Technology Report 2003*, the general ICT infrastructure of the country scored first place in the continent and 33rd in the world (CID, 2003: 42). Considering telephone density, since 2003, Chile takes first place due to a higher mobile penetration. However, as figure 4.1 shows, Uruguay is still ahead of the region in main lines telephone density with 281, compared to an average of 233.

The figures for internet access measured by households connected or by quantity of internet access over the total population varies heavily depending on the data sources. Official statistics generated by the National Institute of Statistics (INE) shows that 31% of the Uruguayan population normally use the Internet, a figure that goes up to 41% in the population aged 30 or under. There are important differences among the urban-rural areas. While in certain areas of the capital city of Montevideo, internet use is over 50%, and 20% of households have a computer, rural areas hardly achieve one quarter of these figures. Other intervening variables are the levels of income and education. Internet is used regularly by 60% of those on the upper fifth of the income scale and 61% of those with tertiary education (ALADI, 2003: ;Lescano and Stolovich, 2004).

As figure 4.2 shows, the cost to connect to the internet in Uruguay is the lowest in the region, with $13.4 compared to an average of $20, a monthly cost for 20hrs. This cost level, and the adequate quality of the infrastructure mentioned before are relevant elements to bear in mind when we consider that the investment to generate it as well as the operational management is in public hands. Generally, the dominant literature of ICTs is reluctant to analyse cases where high quality and low price services are associated with SOEs; this issue will appear again in interview analyses in chapter 4.3.

Finally, in figure 4.3 it can be seen how the long economic recession which began in 1998 affected the infrastructure related to internet access. The country is still ahead in density of internet hosts, but in relation to the quantity of computers per habitant, it lost the first place that it held in 1999 (ITU, 2003).

Figure 4.3
Technological indicators pre and post recession 1998 – 2003
Uruguay compared with average of Argentina, Chile and Costa Rica



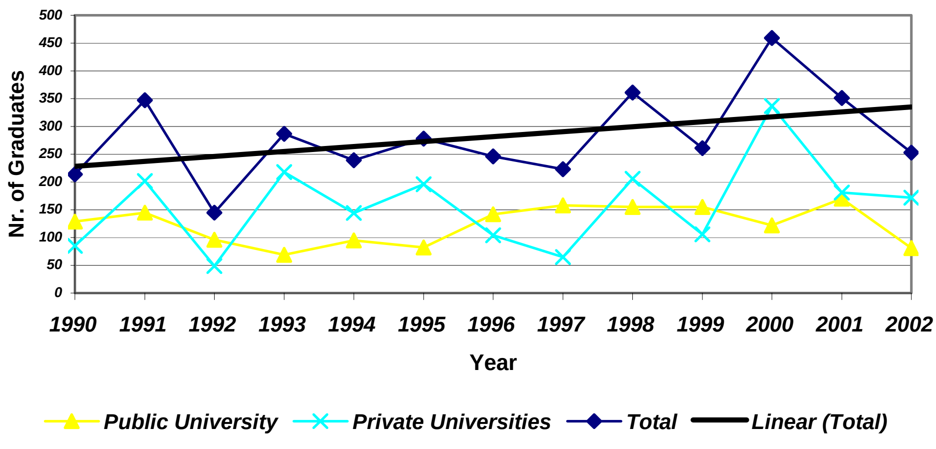
Source: Elaborated by author from data of (ICD, 2003) and ITU <www.itu.int>.

Human Resources for ICT

The total number of jobs in the sector in 2002 was 7.149, less than 1% of the Uruguayan work force.[22] During the severe economic crisis of 2002, while the general unemployment had risen to 18.6 (INE), the unemployment of the ICT sector was 5.5%, which can be considered frictional.[23] In the cost structure of software companies, labour represents 70% of the total production costs (Mejía and Rieiro, 2002: 137). A great proportion of the labour force is highly qualified. Aggregating the proportion of engineers, programmers, analysts and high level managing personnel, it accounts for 73% of the total (UdelaR, 2004: 13).

Even though Uruguay has a high rate of university students over the total population, the proportion of math, science and engineering students is lower than in the region (see figure 4.2). In Argentina and Chile, students corresponding to these areas are 30% and 43% of the total, meanwhile in Uruguay they constitute 24% (UNDP, 2004: 176). On the other hand, the country is quite backward in terms of education spending with 2.5% of the GDP, while the average in the region is 4%. There is a similar situation in regards to spending on R&D, where Uruguay invests only half of what the region does, in relation to their GDP (see figure 4.2).

Figure 4.4
Quantity of informatics graduates in Uruguay
Per type of university and lineal tendency of total (1990 – 2002)



Source: Elaborated based on data from UdelaR and University of Montevideo quoted in (Mejía and Rieiro, 2004:129).

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[22] The total work force in Uruguay for that year is 1,249,000 so ICT labour represents 0.57%. Source weekly *Búsqueda,* Montevideo, 16th September 2004.

[23] The data of unemployment on the software sector is from (Lescano and Stolovich, 2004:28), and about general unemployment is from INE: www.ine.gub.uy , accessed on 23 September 2004.

Civil society

Having a ‘long’ tradition of network connections and internet use, NGOs began using this medium in the early 90’s, connecting an NGO Network *Chasque* with the academic Central University Computer Service (SECIU) of the UdelaR. This state facility plus some tax exemptions for NGOs as consumers, but also as service providers, help the organised civil society to be comparatively updated in ICT. A recent survey identifies a high level of internet and computer use, with more than 70% possessing dedicated e-mail addresses, 60% with internet connection, but only 25% owning their own web page (Finquelievich et al., 2004: 181).

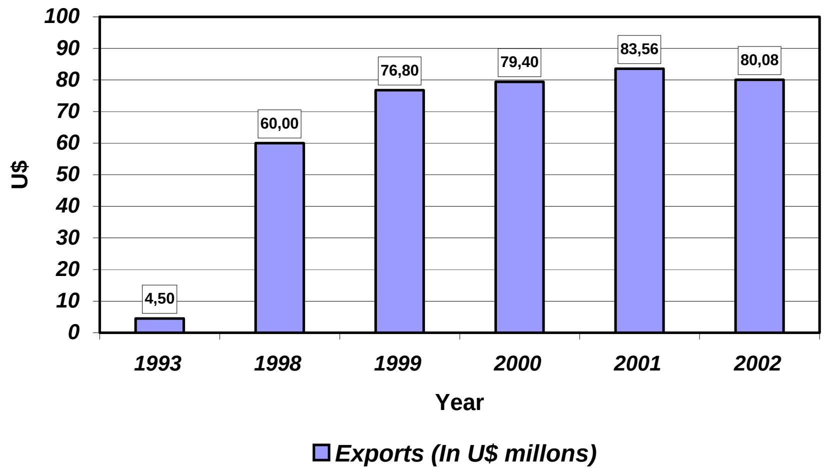
The software sector

The software sector sales in 2002 were $298 million, representing 2.4% of the GDP of that year (Lescano and Stolovich, 2004: 22). The local companies account for 67.6% of the market, while the remaining 32.4% goes to foreign companies due mainly to their high participation in the hardware sector. As consequence of the economic crisis sales in the local market went down 28.4%, an impact clearly presented in figure 4.3. The crisis was particularly strong in the financial sector, accounting for 20% of the demand of ICT services in the country (Lescano and Stolovich, 2004: 34).

Exports of products and services totalled $80 million in 2002, which represented 4.3% of the total exports for that year (FOB value in current dollars). After growing significantly at the end of the 90’s, exports seemed to be stabilizing, and have eventually reached its ceiling within the last three years (figure 4.5). From a global perspective, this amount constitutes only 0.012% of the world software market. However, it should be noted that in absolute terms, Uruguay software exports are higher than Argentina or Chile.

The import of software in 2002 was $11 million, more than 90% from the USA. Even though most of the hardware and complementary infrastructure of the ICT sector is imported without any significant exports, there is an overall annual surplus in the commercial balance of the ICT sector of almost $70 million (Lescano and Stolovich, 2004: 14-15).

Figure 4.5
Evolution of exports from the Uruguayan software sector
(Selected years, in U$ Millions)



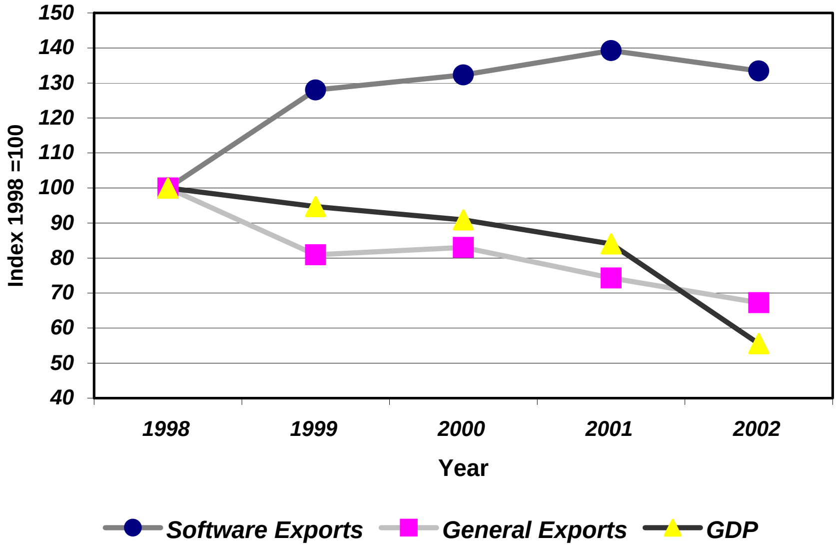
Source: CUTI Survey, published in (Lescano and Stolovich, 2004: 4)

More than 50 companies export software but half of the total amount is concentrated among the 12 biggest ones. Around 70% of the exports are generated by software developer enterprises[24]. The highest proportion of its revenues comes from consultancy in foreign countries (42.7%) rather than royalties of licensing software products (27.1%). When we add the other 14-20% of exports coming from consultancy and specific developments from companies that do not develop their own software, we see that the professional services constitute between 50-65% of the whole software exports (Lescano and Stolovich, 2004).

Uruguay exports software to a wide spectrum of countries all over the world, a total of 45 in 2002, but when weighed by amount, there's a strong regional concentration. Even though Argentina reduced its relative weight after its economic crisis in late 2001, it accounts for 21% of the total software exports. After its record a high peak of 65% in 2001, currently 52.8 % of exports go to South American countries. Two other main destinations are North America (18.7%), with a strong participation of Mexico (9.8%), and Europe representing 15.7% of total exports (Lescano and Stolovich, 2004).

[24] The 2002 CUTI survey divides the ICT enterprises in four categories: 1. Software developers which account for 69.3% of exports; 2. Consultancy and services 28.4%; 3. Internet and Data Transmission 0.5%; and 4. Hardware and Commercialisation 1.8% (Lescano and Stolovich, 2004: 5).

Figure 4.6
Evolution of software exports,
compared with total exports and GDP in Uruguay (1998- 2002, Index 1998 = 100)



Note: Calculus of the index made by the author. Elaborated based on data from: Uruguayan Central Bank (BCU)published on weekly Búsqueda, Montevideo, 16thSeptember 2004 for GDP and Exports; and from CUTI Survey, published in (Lescano and Stolovich, 2004: 4) for Software Exports.

In summary, the ICT infrastructure of the country as well as the education level of the human resources of ICT is of above regional quality. In regards to the software sector, it is important to highlight three characteristics to be considered when analysing the type of role that the state plays or could play in the future. First, the internal structure of the sector described, heavily concentrated on professional services, which clearly shows the human resource intensive characteristic of the export products. Secondly, the export dynamism shown in figure 4.6 reveals that since the recession started in 1998, while general exports went down thirty percent, software exports moved in similar proportion in an inverse direction. Third, the geographical concentration of exports in the regional market (MERCOSUR) and the rest of Latin America talks about the difficulty of access, in terms of commercial barriers and operational costs, to more developed markets. Keeping these elements in mind, we proceed to a general overview of the policies related to the sector.

4.2 State policies and initiatives

Comparatively to the region, the Public Sector Reform process in Uruguay of the last decades can be described as slow and gradual. The qualification of this gradualism can vary according to the political and institutional position of the observer and to what point in time the evaluation is being conducted. During the mid 90's, the International Finance Institutions (IFIs), like the World Bank (WB) or the International Monetary Fund (IMF), heavily criticised the Uruguayan reform process. However, nowadays even though some critics about lack of depth persist, the same institutions highlight a positive "democratic and institutional way of processing the reforms that did not 'by pass' the Parliament", which was able to implement certain market reform while reasonably cushioning the social costs (Ramos, 2004: 93).

The relevant participation of the Uruguayan state in many economic sectors has created a long lasting debate about state market borders. For some, this 'demiurge' role has to do with the absence of capacity of the private sector to generate certain infrastructure and investment in a relatively reduced market. On the other hand, many claim that the weakness of the private sector is a consequence of such state interventions that do not leave space for private capital to emerge, while others argue against the constraints of an extremely regulated market.

Even during its fastest growing period (1992-97), the country hardly achieved 3.5% to 4.0% GDP growth rates, far from the best years of Argentina (7%) and Chile (8%). The struggle for growth has been one of the most important challenges for development strategy formulations and policy implementation in Uruguay for at least the last 15 years. Between 1985 and 2000, successive government administrations promoted different strategic sectors, like agro-industries, forestry, financial and logistics services and tourism, with different levels of effectiveness. Even though it was not included explicitly among those "strategic" sectors, ICTs have been growing, in terms of product, employment, and exports, at the highest rates for the last decade.

At first glance, there seems to be no-coherent or articulated state strategies to promote the ICT sector. As portrayed through the interview analyses, many ICT specialists argue that precisely for this virtual absence of the state, the success of the sector can be explained. Before going into this debate in chapter 4.3, let's go through the policies and initiatives that are directly or indirectly related to the ICT sector.

State Owned Enterprises

There are two SOEs in Uruguay that are relevant actors for ICTs as creators of infrastructure and consumers of product and services, the National Administration of Telecommunications (ANTEL), and the Electricity Generation and Transmission

Company (UTE). Together they represent 9.6% of the ICT local market, and 7.7% of the total ICT work force (Lescano and Stolovich, 2004: 25).

UTE owns the monopoly of transmission and distribution of electricity, providing a recognised high quality service, a basic condition for the operation of ICTs.[25] Even though this SOE is not in the scope of the paper, it is relevant to note two elements. First, the aforementioned role of consumer of ICT products and services, and secondly, this SOE, as part of its modernization and re-engineering process during the 90's created a consultancy unit call *Conex.* The company sells and exports consultancy services with a strong component of ICTs. At the local level, it competes with private actors, particularly for the provision of services to other SOEs and institutions.

ANTEL still has the monopoly of main local and long distance phone communications despite some attempts to privatise it under the structural adjustment waves in the beginning of the 90's.[26] In 1999, when international communications and data transmission services were liberalized, many multinational companies were launched in the country. However, only three years later, mainly due to the prolonged recession, most of them abandoned the market.[27] So, even in the areas where there is a competence regime: mobile phones, international calls and data transmission, ANTEL is still the biggest provider.

During the last two decades, ANTEL has developed a 100% digital telecommunication network that covers the whole country. Between 1995 and 2000 it invested heavily in infrastructure to fully satisfy the increasing demand. Fibre optics and satellite communications provide an efficient backbone for phone and data transmission inside the country and connecting to the rest of the world. Since 2000, the company started several initiatives for promoting connectivity under the framework of what was called the *Plan Mercurio*. The plan facilitated the acquisition of computers, providing relatively low prices for commercial and household internet connections, and other specific ICTs initiatives. Particularly the Programme of

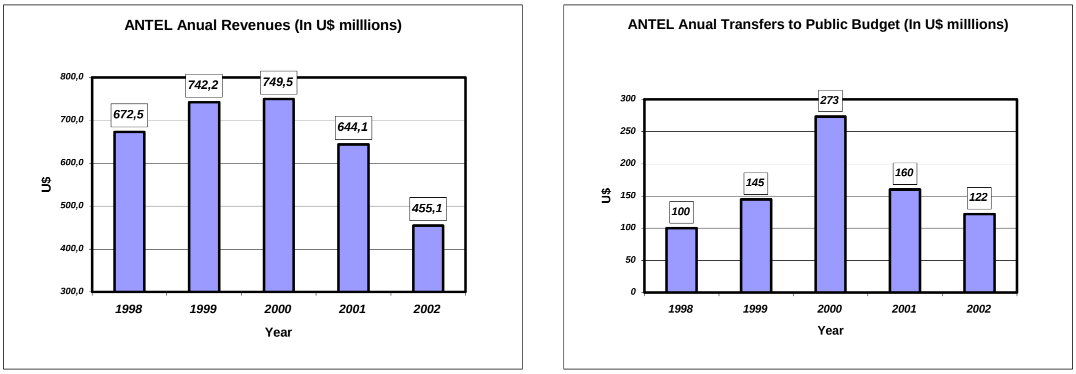
[25] The generation of electricity is legally open to competence, but until now, UTE is the exclusive generator.

[26] In 1992, a law known as *"SOEs Law"* was approved. It allowed the total or partial privatisation of ANTEL and UTE. After a pro-referendum campaign in mid 1992, part of the law was put under plebiscite. The result was an overwhelming rejection of the reform law by 72% of the votes.

[27] Among other companies: Telefónica Data (Spain); Diveo, Velocom, PsiNet. In mid 2003, only Techtel (Argentina/México) and Movicom-Bell South (USA) remain in the market.

Education Connectivity (PCE) aimed to provide wide band connections to public education centres; and the creation of Centres of Access to the Information Society (CASI) where citizens had free access to internet.[28]

Figure 4. 7
Evolution of ANTEL Revenues and transfers to public budget



Source: Elaborated by author from data of ANTEL: Memoria y Balance Anual (ANTEL 2003: 13).

As figure 4.7 shows, the five years of economic recession affected ANTEL heavily. From a peak of U$749m in 2000, the total revenues went into a tailspin down to U$455m in 2002 (-39.3%), which significantly reduced its transfers to the public budget -55%.[29] Apart from the impact of the crisis, at the end of 2002, ANTEL's president resigned due to disagreements with the central government guidelines in the telecommunications policy. According to specialists, this caused a shift in the investment policies of companies that affected the infrastructure. For example, the *Plan Mercurio* was suspended at the beginning of 2003.

Laws and regulations

In terms of the regulatory framework, some important laws, approved in recent years, should be noted. In 1999, the software sector was declared as "National Interest" by the decree No. 84 providing it with several fiscal benefits such as VAT tax devolution over exports. Even more significant, is the decree No. 387/2000 which exempts the software sector from the Income Tax for Industry and Commerce

[28] There are 25 CASI pilot centres in the country. Source: www.antel.com.uy/antel_social/ social_ casi.htm, Accessed on 23rd August 2004.
[29] Author calculations based on official accounting information of the SOE (ANTEL, 2003). Even controlling the currency devaluation effect, there was a decrease of 29.4% in current Uruguayan pesos.

Enterprises (IRIC) up to 31 December 2004. Since mid 2003, the Uruguayan Chamber of Information Technologies (CUTI) has been lobbying for the extension of the exemption, arguing similar levels of tax reduction in the region, particularly Argentina, Brazil, and Colombia.[30] As we will see in the interview analyses, this exemption is considered as a central issue by the actors of the private sector.

The same law, (No. 17.296), which opened the competence in international telecommunications, internet access and data transmission, also created the Communication Regulatory Unit (URSEC). This regulatory agency and competence watchdog is in charge of the communication market and has to deal with the traditional monopoly operator ANTEL and the new private actors.

A law approved at the end of 2002, No. 17.616, updated an old law of authors' rights, to include among other things specific references to computer programmes[31]. The level of software piracy in the country is comparatively high, with a rate of 60% in 2002, provoking losses of the local industry, over $4 million according to the anti piracy organization *Legal Software Uruguay (SUL*).[32] The International Intellectual Property Alliance put Uruguay in the *"priority watch"* list (CID, 2003: 304).

Finally, another important component of the legal framework to be considered is the creation of Free Trade Zones. One of them, *ZonaAmerica*, is focused on providing facilities to high technology industries. Taking advantage of the 'market friendly environment', some of the biggest Uruguayan software companies open offices there to carry on their export activities. Furthermore, in mid 2002, TaTa Consultancy Services (TCS), the software division of the giant Indian industrial conglomerate, launched its base there for its Latin American operations. According to CUTI estimations, 15.7% of total ICT exports are generated in this free trade zone (Lescano and Stolovich, 2004: 26).

[30] On its official WEB site, the CUTI announces a virtual approval of an extension of the tax reduction, at least for six more months, by the government of President Batlle; http://www.cuti.org.uy/portal , accessed on 17 June 2004.

[31] The law was formally promulgated on 10 January 2003. It modifies the previous law Nr. 9739 from year 1937. It should also be mentioned that the law No.17.164 from 2 September 1999, refers to protection of patents and includes ICT related products.

[32] Data published in *El Observador*, 12 June, 2003.

Special programmes

The creation of the National Committee for the Information Society (CNSI) was one of the most promoted initiatives when the new government administration took office in March 2000.[33] The CNSI was created to provide policy recommendations on ICTs and articulate private interests and public initiatives. It was constituted by the President himself, and representatives of public and private universities, ANTEL, the URSEC, and the CUTI. It was organised into five areas: i. informatics alphabetisation; ii. E-government; iii. modernizations of the public administration; iv. telecommunication and internet market improvement; and v. strength and competitiveness of the software sector.

As executive unit of the CNSI, "Uruguay Net" was created.[34] But soon after activities started, its director, a young well reputed engineer left the programme for a post in the IADB. Replacing him was a lawyer without a relevant curriculum on the area. As we will see in the interview analyses, this change caused an important loss of credibility for the CNSI among the key actors of the sector. The meetings were few, and in the beginning of 2003, the CNSI was, despite not being formally dissolved, not operative at all.

In mid 2003, academics and entrepreneurs conceived a new initiative to regenerate the institutional space that the CNSI was leaving. With this purpose, the Academic-Industrial Centre for the Information Technologies (CAITI) was created. The intention was to operate a coordination centre between academics, entrepreneurs and the government in a more bottom-up profile, rather than the CNSI's clearly top-down profile, from the presidency to the market actors. The CAITI has specific tasks, such as creating a testing centre for locally generated software products.

On the other hand, some programmes oriented to support the ICT sector were created. The most important one, in terms of budget, is the Programme of Technology Development (PDT), with a total budget of $45 million, financed mostly by the Inter American Bank (IADB), but with a relevant amount of local funds. This Programme co-finances the development of new software and high tech products. The programme had presented severe problems of execution because of transfer delays and shortcuts of funds from the central government.

[33] The CNSI was created by the Executive decree 225/00 in August 2000.
[34] See www.uruguayenred.gub.uy.

Another relevant initiative is the *Programme for the Support of Software Sector* (PASS). The programme's objective is to improve the international competitiveness of small software enterprises through three main instruments: i. training in financial aspects, marketing, quality of production processes and others; ii. technical assistance in quality management and marketing, iii. generation and provision of information, and networking to facilitate exports. The PASS is carried out by the CUTI, and financed mainly by the Multilateral Investment Fund of the IADB (55%) and local counterparts (45%).[35] Since mid 2002, more than half of the members of the CUTI, 107 out of 180 enterprises, have participated in different activities of the PASS (Stolovich, 2003: 26).

E-Government

As part of the aforementioned *Plan Mercurio* , comprehensive initiatives of e-government were created by a national government portal.[36] This is a gateway to almost all public institutions and ministries, and allows the citizens access to different public information and services. As example, it can be noted that the portal of the System of State Acquisitions (SICE), apart from providing information of auctions and prices, promotes electronic relations between enterprises and the state, which foster the ICT incorporation into them.[37] At the local level, the Municipality of Montevideo, accounting for almost 50% of the country population, has developed in the last decade an important quantity of services that can be done through internet. This e-government is complemented by the law Nr. 17243, which in Arts. 24 and 25, sets the creation of the electronic file, and set the legal acceptance of the '*electronic sign'*(ALADI, 2003).

Education

With the education Reform process carried out between 1995-2000, significant investments on ICT infrastructure and connectivity at primary and secondary education levels were developed. This put the country over the regional levels in indicators such as quantity of education centres connected to internet, computers per

[35] The total budget of the PASS is U$ 1.6 million. Source CUTI official web-site: www.cuti.org.uy accessed on 17 June 2004.
[36] See www.uruguay.gub.uy .
[37] See www.comprasestatales.gub.uy

pupil and the existence of computer education as a curricular subject at secondary level.

In tertiary education, the public spending has been dropping during the last two government periods, and the country is clearly below regional average. However, the UdelaR is an extremely important actor in the ICT sector. Being the only national university, it is financed exclusively by public funds, with no fees or recovery costs for students at the graduate level. The UdelaR accounts for 85% of the total of tertiary students, and approximately 95% of the R&D activities in the country.[38] It started informatics careers as early as the late 60's, and has generated around 55% of the total work force of technology and computer engineers during the last decade (see figure 4.4).

A university initiative, the Programme for the Development of Basic Sciences (PEDECIBA), which also includes Informatics, was particularly relevant during the second half of the 80's to help bring back many ICT experts that left the country during the military dictatorship period (1973-1984). In the 90's, the PEDECIBA financed MA and PhD postgraduates in informatics for the INCO professors. Since 2000, this programme has been struggling to survive because of central government spending cuts.

Financing

In 2004, a capital investment fund was launched in the Uruguayan ICT market. Even though this is mainly a private initiative, the risk capital fund called Uruguay International Venture Capital (UIVC), also has the participation of the IADB and the National Corporation for Development (CND), a government agency. The purpose of the UICV is to invest in small and medium enterprises (SMEs) of the Uruguayan IT sector, particularly those export oriented.[39]

In summary, except from the education and telecommunication policies, it is not possible to identify a coherent articulation of the policies and initiatives that were specifically conceived to promote the ICT sector. Needless to say, the coordination between them which is almost inexistence. The effective implementation of many of

[38] Data from Uruguayan Ministry of Education, *Statistical Yearbook* 2002.

[39] Apart from the IADB and the CND, the main promoter in the UICV is a private actor, *Prosperitas Capital Partners*. The capital fund is planning to invest in 12 to 15 SMEs in the next five years, with an average of U$500.0000 per project.

the policies has been, in the best cases, partial. The above mentioned PDT had been receiving only half of the expected funds, the CNSI virtually disappeared before half of the government period was completed, and the *"Plan Mercurio"* was partially implemented and then suspended. In this context, the following chapter analyses the opinions of the key actors about the discussed indicators and policies, presenting their perspectives on what the state role should be in the ICT sector.

4.3 The ICT main actors opinions

The third component of the analysis, that helps us to make the link between ICT indicators and policies, is the perspectives of the key actors. In this regard, with the analytical framework and the data presented, we will critically analyse their opinions in the two dimensions set in the research objective. First, what role the state had been and actually does play in the ICT sector and what it should play. Secondly, their perspectives about the state-market relations in the sector, to try to explain the degree of autonomy that the state has to design and implement its policies.

Table 4.1
Interviews to ICT actors in Uruguay

Position and area among the ICT sector	Qty. of interviews	Identification numbers
Chief Executives of top software, hardware and consulting ICT companies	5[a]	1, 5, 5b, 10 and 12
Chief Executives of Private Telco. Companies	2[b]	2 and 4
Chief Executive of State Owned Telco. Company	1	6
Prestigious ICT Academics from Public University	3	3, 3b and 7
Prestigious ICT Academics from Private Universities	2[c]	9 and 9b
Experts on ICT in Uruguay	1	8
Chief Executive of Regulatory Agency on Telco.	1	11
Total	**15**[d]	

Notes:
a. Three are national software companies which are among the top five exporters; two are international and among the largest and most well known global companies.
b. The two private telecommunication companies are the only ones which have their own infrastructure and provide both data transmission and international phone communication.
c. From the three private universities that provide training on informatics the largest two were interviewed.
d. Four more interviews that appeared in the press, two CEOs of software companies and two recognised specialists, were incorporated in the analysis totalling the opinion of 19 key actors.

As was explained in the methodology section of the introduction chapter, the information provided by the interviewees is treated confidentially. The table 4.1 presents the detail of the type of actors and area of work matched with the identification numbers to properly weigh up their opinions when they are quoted along the text. Apart from the 15 direct interviews, during the press review some others were identified that cover the topics of the research and thus also incorporated into the analyses. In those cases they are identified with the proper reference.

State role on ICT promotion

The different actors consulted recognise the centrality of the ICTs as a key factor to foster development. One specialist claims “In the current information society there is a strong change in the way wealth is generated […] knowledge has become the main production factor, which generates an intensive demand of qualified workers” (Int. 8).The Uruguayan long run difficulty to define and implement an integral development strategy is, in the majority opinion, is also inhibiting the definition of one for the ICT sector. So, despite not being something new, the actors agree that the tech sector has certain particularities that make necessary a specific approach. Those elements can be traced through their opinions presented in the following pages.

A ‘positive absence’ of policies?

The overwhelming majority of the interviewed, from all areas, argue that in Uruguay there has not been direct promotion policies for the ICT sector, at least this is their first answer when specifically interrogated. A few examples are:

> There are no policies, in this country there is not a single promotion measure (Int.4).
>
> I think that there are no policies to promote the ICT sector, perhaps they should be, but the fact is that there are none (Int. 5).
>
> There is no national vision in this area, no definition of where we want to go (Int. 2).

Even the ones who recognise certain promotion initiatives, they visualise them not as being part of a coherent strategy: “The state has never communicated what its strategic vision is on the ICT sector, there is certain support, but they are isolated initiatives, not something coordinated” (Int. 1).

It is interesting to note that not all the actors consider the absence of promotion policies as something particularly negative. Many of them, mostly entrepreneurs but also many academics and specialists, in fact argue that this has been something positive for the strengthening of the sector:

> The ‘luck’ that the software sector had is that the state didn’t realise the importance of the sector and so it did not tried to help […]a perverse thing is that often the state is more an anchor than a promoter because it becomes bureaucratic and politicised (Int.8).

> Ironically, precisely with the absence of promotion policies the state has been one of the promoters of the exports of the ICT industry (Int. 7).

As the two quotes at the opening page of this chapter show, the positive perspective about the eventual absence of policies is far from being a homogenous opinion, even among actors inside the private sector. The CEO of a software company claims, “I don’t think the success of the ICT sector is because the state was not involved, they are absolutely complementary, the state strengthens the private enterprises” (Int. 10). Others accept a potential role of the state, but they do not consider it as the defining factor: “If the state would have had policies, many things probably would have happened faster or would be better, but it is not the ‘sine qua non’ of the development of the ICT sector […] it grew up open to the outside world, their market is the world, not the state” (Int. 8).

Many accept a potential relevant state role, but put into question the state capacity to generate promotion policies. Not only from the entrepreneurs perspective, who have appreciations such as, “I don’t want protection, however promotion is welcome. But, why is this sector not being promoted? Perhaps because the state doesn’t know how to promote it” (Int. 4); but also from academics who consider that, “there is a lack of policies but also, and more importantly, a lack of capacity to generate them” (Int.3). As was discussed in chapter 2, when considering possible state role, it’s clear the importance of analysing its capacity to design and effectively implement the policy.

When trying to identify the causes of state weakness, the old weberian dichotomy of bureaucrats and politicians arises, “There are capable people inside the state to implement the policies, the problem is the political system. The ones who filter the effective implementation of policies are the political directors of SOE and ministries” (Int. 11).

The necessity of an institutional framework

Most of the actors consulted, either from public or private sectors agree on the necessity of an effective institutional framework. They recognise its impact on the mid and long run performance of the ICT sector, aligned with the institutionalist approach discussed in chapter 2. Nevertheless, the type and amount of intervention desired varies heavily. Even inside the entrepreneur sector, opinions vary from a more central state role such as, “The role that the state should play is to create a clear and stable institutional framework, currently there’s no coordination and articulation of the initiatives” (Int. 8) to a more liberal or ‘pro-business’ state attitude, “We believe in a role of the state as a facilitator, rather than an intervening actor or a regulator” (Int. 12).

Without exemption, the actors stress the necessity, that no matter what type of role the state plays, in order to be effective that institutional framework has be clear and stable. Also, many believe that certain basic definitions should be made avoiding the political shifts that the electoral cycle generates.

> In general there is a problem of management capacity in the public policies, that has to do with the set of rules and the characteristics of the political system (Int. 11).

> For sure the state is a key actor in defining where the ICT sector can go, […] the state should intervene and must do it with coherence (Int. 10).

The same ‘pro-business state role’ entrepreneurs recognise the unique role of the state in certain tasks: “The design, implementation and execution of an integral development strategy require an articulation of policies that probably each individual actor cannot see with the necessary global perspective” (Int. 12).

It is interesting to note how the same entrepreneurs whose first reaction to the question of the state role was not to intervene at all, or that it has not been doing anything positive, gave quite wide spectrum of requirements in specific areas about what they expect from state once they were consulted. According to the responses, certain areas can be identified where the key informants visualize the state role as being determinant.

a. Human Resources

Many of the managers of the biggest companies claim that in case of a faster growth of the ICT sector, the country could face a shortage of qualified labour. In a press interview at the end of 2003 the CEO of Tata Consultancy Services (TCS) explained: “Last year 270 people graduated in informatics, our company alone required 150”.[40] In august 2004 the same company decided to hire professionals from other areas and train them in informatics at their own training centre, aiming to hired 500 new employees in the following two years.[41]

That fear of an over demand is also shared by most of the academics who reckon the low number of engineers or computer analysts who receive degrees each year (see figure 4.4). For academics of the private sector the reduced number has to do mainly with cultural matters of young Uruguayan students who do not have a natural propensity to maths, science and engineering disciplines, and that the secondary education system is not successful in generating a better proximity to those fields: “…the ones who have vocation are destroyed by the difficulties of the college courses of engineer related options” (Int. 9). Comparative statistics presented in figure 4.2 supports that view.

Complementary to this view, even if they agree on the absence of a natural vocation in the local students, academics from the UdelaR argue that there are also significant endogenous reasons related to the difficulties of the education system that achieve high levels of quality but have severe problems with quantity:

> Part of the problem is the method of how engineers are produced, the method is based on the ‘genocide’ of a generation. The first year you kill one half, the second year another half, as well as in the third, the ones who survive are for sure of high calibre. This is an effective method to produce high quality professionals but a destructive method to achieve quantity! (Int. 7).

Despite the fact of reduced quantity, all the actors interviewed agree that the exceptional level of the Uruguayan informatics professionals is one of the key elements to explain the relative success of the sector. This has to do, according to them, with a comparatively premature start of computer related careers in the UdelaR in the late 60’s. What is more, some of the entrepreneurs consider the education policy not only to be of good quality, but as the only existing policy on the ICT sector:

> We take advantage of the only existing policy of having an early and very good informatics education, the UdelaR launched its first computer career in 1967and at that moment only four or five countries had it. […] Who can educate people for something that will happen in ten years? Only the state can do that (Int. 5)

[40] Official figures indicate a total of 253 graduates on informatics for year 2002. Interview with Gabriel Rozman CEO of TCS Ibero-America, published in *El Observador*, Montevideo, 28th December 2003.
[41] Data provided by the CEO of TCS Ibero-America Gabriel Rozman in an interview on Radio *El Espectador*, Montevideo on the 29th of September 2004. www.espectador.com.

> We have an advantage from the beginning to perform well in ICTs, because good quality tertiary education, this has been a good strategy, but we have to try not to lose it (Int. 8)

The quality of education that professionals receive in the public university is considered as a comparative advantage by the entrepreneurs consulted. The CEOs of a national software company that at the same time represents locally one of the biggest global software giants claim, “I think that the INCO of the UdelaR is a lighthouse in the region […] comparatively in the region we are in a very good position in terms of HHRR” (Int. 10).

b. Investment on R&D

In the same way that Castells argues about the central role of the state in the creation of the Internet through the ARPANet project (Castells, 2001: 10-17), most of the actors refer to the key role of the state as initiator of the process by investing in education and R&D. The INCO of the UdelaR was created at the end of the 60’s and since then “The state has been investing a lot in HHRR, specially since 1985, helping students and professors to study abroad for MAs and PhDs, many who are now the teachers at the INCO” (Int. 3b). However, in recent years the public budget for R&D has been decreasing, “Uruguay is quite backwards in investment on R&D. If we look at the region, including Argentina with all its problems, the policies on R&D are much better” (Int. 7). The data presented on chapter 4.2, clearly shows the current disadvantageous position on investment on R&D (see figure 4.3).

Some of the entrepreneurs argue in favour of trying to concentrate the national software production close to what Vernon calls the ‘innovative end’ of the software product cycle which was discussed in the chapter 3. A CEO of a software company explains, “We need a paradigm shift, we have to work at a high level, where a high level of specification is required, and the rest, which is done by cheap labour programming, could be accomplished with automatic tools” (Int. 5). It is clear that such an innovative integrated system requires an adequate articulation of the synergy of the different actors. The CNSI was originally conceived to play a central coordination role, but its life was short as well as unproductive. The CAITI centre appeared to play that role.

An entrepreneur directly involved in the creation of the centre argues about its importance, “This a ‘creature’ born from a death mother, the CNSI […] often the state does not have confidence in the technical capacity of the local ICT sector, so how can you create that confidence? I think that the CAITI, as a testing centre, is a solution" (Int. 10). From the perspective of the academics from the INCO, the potential of the centre as a policy instrument is more than relevant:

> This requires that the state should be united with the industry and the academic sector. We need a prospective study that can show us where we can go, the CAITI is one of the first centres of this type inside the state. It can be a very useful tool when the state wants to elaborate policies (Int. 7)

c. The state as a consumer of ICT services

All over the world public institutions are one of the main consumers of ICT products and services. Particularly in small developing countries, the proportion of the state market is even greater, and local as well as multinational companies see the state as one of its main clients. Apart from the revenues that selling to a big client can generate, software entrepreneurs are sometimes even more interested on generating the know how and experience of implementing big scale ICT projects that can be shown in foreign markets. In Uruguay, due to the relatively restricted privatisation processes, analysed in chapter 4.2, the state apparatus is still quite large.

The CEO of a multinational software company argues: "The point is, in Uruguay the presence of SOEs and other public institutions is very important, much bigger in proportion than in other countries, the huge computer centres are there, so a relevant part of our market is there" (Int. 1). Another interviewee, also from a multinational software company claims: "The relative weight of the state in Uruguay is very important, the main companies are SOEs. The state has a huge ICT infrastructure and thus is a significant portion of the market" (Int. 12). An opinion also shared by academics: "The state has an investment capacity that the private sector doesn't possess in Uruguay" (Int. 9b).

The role of the state as a big consumer is also perceived by the state actors themselves: "In this country, from the biggest ten consumers six are public institutions. Most of the ones who demand for privatisation measures have been living from the state for ages!" (Int. 6).

Several of the interviewees stress the role of the state in setting certain standards and regulatory norms of product and processes to help create a market of sub-products. This requires, according to an academic: "The political intention, high levels of coordination of the ICT policies among the different state areas, and an improvement of the qualifications of the professionals that are in key decision places" (Int. 3). This is another example of how the state can have an impact on the development of the sector either with action or omission.

d. The role of the telecommunication SOE

Without doubt, the telecommunication state company is a particularly central actor in the ICT sector development process. Most of the interviewed considered that the infrastructure on telecommunications is more than adequate in the country but that currently the investment is descending. A specialist argues: "At the beginning of the 90's the infrastructure was, comparatively to the region, very good, however during the last years the investment didn't continue, resulting in a rapid backwards slide" (Int.8). The data presented on the impact of the recession on tech indicators clearly shows the deterioration process (see figures 4.3 and 4.7). Another intervening variable is the shift on the policy mentioned in chapter 4.2, a state bureaucrat considered that:

> Previously ANTEL had a much more modern project with a clear vision of the information society, but with the change of its president during this government period, the way was truncated (Int. 11).

Considering the quality of services, but particularly costs there is a clear and predictable difference on opinions depending in which side, state or market the interviewee is on. The interviewees from the state think that, "The infrastructure is good, all digital and a good network of optic fibre. This is a 'sine qua non' condition for the development of the ICT sector" (Int. 11), but entrepreneurs insist that the communications are expensive and possess not enough band width for data transfer to foreign countries. About this particular point, from ANTEL, the perspective is completely different: "ANTEL is paying for a band width that is not being fully used, there is not enough demand to use it!" (Int. 6).

Referring to international connections, during the second half of the 90's there were many offers from international data transfer operators to make ANTEL part of multinational interconnection initiatives. However, the telecommunication company was quite reluctant to those investments. For some private actors this was negative: "We had the opportunity and we made the wrong decisions" (Int. 2). However, for ANTEL authorities that was a necessary cautious attitude: "Most of the projects went bankrupt. I am not here to take risks, the risk is for the private actors, I am here to manage an enterprise that is a state owned one" (Int. 6).

In relation to state capacity, all the interviewees reckon a high level of technical capacity from ANTEL to design and implement policies with high autonomy to make decisions. The private operators argue that despite the fact that there is a regulatory agency, the technical capacity and thus the effective decision making process is inside the SOE.

> ANTEL has the expertise, it used to be the only player as we were under a monopoly situation, so they concentrate the knowledge and sometimes we are in a disadvantageous position when we negotiate with them. There is a regulatory agency, but it is still not strong enough, the ones who decide are the engineers of ANTEL, and they know about the topic! (Int. 2).

> The URSEC was created but it's still 'in diapers'. In practice it is absolutely clear that ANTEL manages the market. It should be the URSEC that setting the rules, but it doesn't do it (Int. 4).

These quotes rise a very relevant point that has to do which the decision process inside the state, or where the decisions are effectively being taken. The URSEC perspective is different from the entrepreneurs: "We deal with all the actors as equal enterprises, however, we don't allow the companies, even the state owned ones, to set the policy" (Int. 11). The entrepreneurs vision is in a way confirmed by the interviewee from ANTEL who explained how the SOE has been investing heavily in education and technical training and highlighting the "enormous capacity and preparation of ANTEL engineers who make the decisions in operational matters" (Int. 6). So, in his opinion, if there is a problem of capacity, "the absence of capacity is in the private sector, not in the public one" (Int. 6).

e. State support in the world markets

The absence of a coherent and permanent national strategy for insertion into the global markets is a difficulty constantly referred, particularly by the entrepreneurs and specialists, "The strategy of our country to the world is not clear at all. Six or seven years ago we bet on the MERCOSUR, three years ago we bet on the ALCA, nowadays we don't bet on anything" (Int. 8).

Even the biggest local companies are very small in the global context, so strategies that can aggregate forces such as commercial missions sponsored by the state are mentioned as essential. However, entrepreneurs are sceptical about state capacity to play that role: "We had been invited to some commercial missions accompanying government representatives but they're so badly organised that in many cases we decided not to participate" (Int. 5b). A good example that clearly shows the type of scale difficulties that local companies face is the one of *Interactive Networks*, whose messaging software product was selected by the prestigious *PC Magazine* as the only Latin American finalist in the competition at the Technology trade show *Comdex*. However, its director explains: “We’ve lost major deals just because we couldn’t afford to send someone to New York and spend a week bidding on contracts […] you can only count on friends and family for so long”.[42]

f. Other areas of state involvement

There are other specific areas mentioned by the interviewee where the presence or absence of the state is considered relevant. Despite being areas where there’s no homogenous opinions among the different actors on which should be the state role, are in all cases relevant topics that should be mention.

Promotion Programmes: Most the actors interviewed, including those from the government are very critical with the CNSI “The results were non-existent, in fact it disappeared, and the authorities in charge didn’t have any legitimacy at all among the sector” (Int. 8). Entrepreneurs are not very optimistic on the usefulness of specific promotion programmes. Juan Grompone, a well respected engineer and expert on ICT claims “The ICT enterprises do not need the support of the state or a special programme for its promotion, they only need to be clear of obstacles” (Grompone, 2004).

Legal Framework: Like any other economic sector the entrepreneurs demand clear rules to set their business. In this regard, certain general agreements among the actors can be identified “In a country such as Uruguay with a very small local market, not very attractive for its volume, it is even more important that the rules are very clear.” (Int. 4) “The rule should be clear, maintained along time and well communicated. The investment is not recovered in a short time, so we need a clear and stable legal framework” (Int. 1).

Protection of Property Rights: In general, the role of assuring property rights is not mentioned as one of the main roles of the state, except from a well known multinational software company which claimed, “The levels of piracy in Uruguay are high and we need the state to tackle this” (Int. 12). It is important here to bear in mind

[42] Interview to Pablo Salomon, director of Interactive Networks, published in magazine *Latin Trade*, January 2004.

the internal structure of the software sector. As was mentioned in the description of the sector in chapter 4.1, the majority of the revenues do not come from royalties of software programmes but from consultancy and implementations services that can hardly be objects of piracy.

Country Image: There is quite a broad consensus around the importance of generating a country image related with technology, “To create a ‘country brand’ associated with technology is very important, and this is an issue of public policy” (Int.6). Even the more sceptical actors about state intervention support a central role of the state in this task. Academics found certain inconsistency: “What is the country image that we have, Uruguay Natural or Digital? Sometimes it seems that we have a schizophrenic behaviour” (Int. 9). The works of Alice Amsden, referred in chapter 3, regarding the role of Taiwanese state in ICT promotion go well in hand with that perspective (Amsden, 2004).

Capital Investment: Some of the interviews consider that the state can also have a role as an investor, “For example investing the pension funds, as a demonstrating role, to prove that the ICT sector is a strategic one and must be supported in Uruguay” (Int. 8). Or facilitating the access to cheap credit, a role that many entrepreneurs mention as a very important deficit: “In the world, this industry is capital consuming and here we have to generate our own capital, […] the banks lend money to the traditional industries that have machines or buildings as collateral but not to us, needless to say, capital risk for investment, and this is a serious problem” (Int. 5). A view that is also shared by experts, “There is no system of capital risk here, and that is essential for the dynamism of the information society” (Int. 8).

State-Market relations and the issue of autonomy

The neo-utilitarian vision that as state interventions increase, so does the generation of rents and thus the rent-seeking attitudes of the private sector, is shared by several actors, particularly the entrepreneurs themselves. They assume that they will be more interested in creating close relations with state bureaucrats, than in generating wealth by innovative production. A big local software exporter says, “I don’t think state protection is good, protection automatically means inefficiency…” but later the same entrepreneur reckons “obviously if there is a local market model that allows my business to arise at its first stages, that helps!” (Int. 5).

The lack of a national coherent development strategy in general in Uruguay opens the field to rent seeking attitudes of the different economic sectors. The interviewees coincide that this is a severe problem of the traditional economic structure: “There’s no strategy, so everyone tries to look for certain subsidies or exemptions according to their lobbying capacity” (Int. 1). The interviewees almost unanimously support the idea that the sector has a weak lobbying capacity and non direct access to key state decision levels:

> The profile of people that are in the ICT sector is different from the traditional economic sectors that had a culture of lobbying the government. This is a new sector, they don’t waste time with the state, their market is the world (Int. 2)
>
> These entrepreneurs have little relation with politicians, they don’t go to the state first to solve their problems (Int 3).
>
> In this country the traditional economic groups have lobbying capacity, but this capacity in our sector is almost inexistent (Int.4)

From the perspective of the actors inside the state the image of the lobbying capacity of the sector is not so reduced or weak: “The lobbying of the CUTI is the best of this country, don’t underestimate it! It’s a modern one, and very effective. They had the tax exemptions and they will have the labour deregulation for their sector soon” (Int.6). A specialist argues that, “Without doubt they knock on the doors of the state, and they are successful in their demands” (Int. 8). Even some entrepreneurs recognise that: “The CUTI has its lobbying capacity, in the ‘good sense’, it has it […] is not a little thing to have the income tax exemption” (Int. 1).

In relation with the regulatory agency (URSEC), most of the interviewees agree that, as every new institution, there is still a long way to go to consolidate that institutional space: “The URSEC doesn’t have an easy relation with nobody because it is playing a role that has never existed before” (Int. 8). The capacity of URSEC to design and implement the policies, as well as in terms of autonomy, especially from the SOEs, is still weak.

The interviewee from the regulatory unit recognises that the technical capacity is necessary but not enough: “The effectiveness of the URSEC will depend on the technical capacity of its personnel but also on the political support, to achieve autonomy you also need political support” (Int. 11). We can see that the combination of technical capacity in a context of embedded autonomy, as was discussed in chapter 2, is identified as essential by the actors involved. The incipient cooperation experiences at the CAITI most of the actors recognise that can constitute an institutional space for an adequate interaction of state and market actors, because until now “There’s nobody inside the state with a minimum level of credibility to deal with the private sector. This is a key issue” (Int. 8).

5 CONCLUSIONS

> There is a growth dilemma now in the Uruguayan ICT sector. The dilemma is or even we growth or we go backwards, in this sector stability is not possible (Academic from the INCO, UdelaR).[43]

5.1 Concluding remarks

This paper analyse the state role in promoting the ICT sector in developing countries through the Uruguayan case. Its findings help to better understand the specific country experience as well as provide useful elements for other countries pursuing development strategies strongly supported on ICTs. All around the world the ICT sector is generating important amounts of resources what will be an increasing phenomenon in the nearer future. In this regard, the type of policies that states are able to design and implement to foster the development of the sector have a relevance that exceed the sector itself.

The literature reviewed suggest that to the problems of inefficiency and ineffectiveness in policy design and implementation that traditionally affected developing countries, when referring to the ICT sector, even new problems are added. As a continuously changing and extremely globalise sector it requires high level of dynamism and professional expertise from every actor involved. Developing countries sates are not precisely in a high position at the ranking of fast actors and the capacity of bureaucratic apparatuses to attract and maintain highly skilled professionals is, in the best cases, limited. Furthermore, the institutional framework of ICT sector, necessary to generate an environment that assure state autonomy and private sector efficiency is, in general terms, still weak. The empirical evidence presented and the critical analysis of the opinions of the key actors involved confirmed these elements for the Uruguayan case.

Uruguayan ICTs sector have been performing comparatively well during the analysed period. The sector initially developed independently from the state in an

[43] Interview Nr. 3.

outward oriented strategy, growing constantly and expanding exports even under a recession context, with just a few direct promotion policies. However, that doesn't mean a virtual absence of the sate. The role of Uruguayan state has been a combination of '*demiurge*' role with strong and relatively efficient SOE's and a '*husbandry*' role setting measures like tax exemption to promote an already existent private sector. Certain policies and state initiatives created the conditions that made this phenomenon possible: an efficient public ICT infrastructure, specially telecommunication and electricity network, created and managed by SOEs; the early creation of high quality informatics tertiary education and a regulatory framework that includes significant tax exemptions.

The particular role of the telecommunication SOE with a long lasting accumulation of technical capacity and the generation of high quality infrastructure proved to be a more than relevant precondition. Moreover, the human resources generation as well as the R&D investment at the public university are also key explaining variables of the whole process. The empirical evidence presented about the downward in national ICT indicators due to the economic crisis of mid 2002 and the referred public policy shifts provides a clear evidence of the consequences of reductions on public investment.

Currently, the degree of autonomy of institutions and SOEs to take decisions on ICTs policy seem to be acceptable. However, the lack of state capacity to design and implement policies appears to be a significant problem. The absence of adequate specific institutions, repeatedly referred by the actors and empirically confirmed along the research, can be a severe difficulty. If the sector becomes one of the country main exporters, and thus a bigger generator of resources, the state–market relation it is expected to change. That will influence further state intervention. The better the institutions generated can be, the more probable that the state can visualize the ICT sector as a genuine opportunity for national development rather than a simple fount to extract resources.

As the literature review presented suggests, also confirmed by the actors opinions, as closer to the innovative end the ICTs products are, the higher the added value and thus the better the impact over the general development of the country. This proximity to the innovative end requires an active and efficient state role on ICT promotion. In the Uruguayan case, this role has to do with increasing investment on education and R&D, strengthening the telecommunications infrastructure, defining a coherent policy for the public sector as an ICTs products and services consumer, promoting capital risk investment, and facilitating private actors access to foreign markets by the construction of a high tech ‘country brand’ and by pursuing more favourable commercial agreements.

In conclusion, some lessons can be learned from the Uruguayan case useful to other small developing countries. The strategic vision necessary for long run investment with uncertain results, at least at it early stages, it can only be carried out by a public entity, such as the generation of infrastructure by SOEs or investment on human resources and R&D by a public university. The state role as an investor and consumer of ICTs products and services in contexts of relatively weak local markets is also a key issue. This role of ‘big consumer’, if strategically used, can be a relevant instrument to help enterprises to achieve scale of production and implementation experience. This, combined with diplomatic support, can significantly improve local companies access to foreign markets and thus increase export levels.

5.2 Future lines of research

Additional research is required in the area of state role on ICT promotion in developing countries. For example, much more knowledge still has to be generated for a better conceptualisation of the state role in order to deal with the particularities of the ICT sector and its transformation potentiality at developing countries.

On the other hand, further questions arise in the Uruguayan case. If, as suggested along the paper, Uruguay is facing its ceiling on ICTs sector growth and it becomes necessary a new state role for a second phase, what are the pre-conditions necessary to make such a change possible? In this regard, in the case that a new development strategy strongly sustained on ICT sector emerge, and the state policy efforts are focus on that in a context of always scarce resources, what consequences that could have over the policies on traditional promoted sectors?

Finally, two significant elements that will affect the Uruguayan ICT sector in the near future should be noted. First, after five consecutive years of economic recession the country started to grow in 2003 and this is not yet registered by the national ICTs indicators. Second, for first time in Uruguayan history, a left wing party won the presidential elections of October 2004. The implications that this will have over the prospects of ICTs and development will entail further analysis and significant research efforts the following years.

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