Governance of Public Research Institutes in Latin America and the Caribbean

by Juan Carlos Del Bello

1. Re-Invention of Public Research Institutes

STI policies in the LAC Region have not taken enough consideration of the structural transformation of the Public Research Institutes (PRIs). The hypothesis is that STI public policy must include the “re-invention” of PRIs in order to build a knowledge-based society and economy, and for that purpose, the axis of such transformation is governance, an expression that sums up “government and management” activities. Specifically, the following issues related to PRIs’ governance are analyzed: (i) new mission; (ii) non-conventional types of organization; (iii) new governments; (iv) leadership and new forms of management; and (v) state incentives for re-invention, in particular financing.

As PRIs constitute a heterogeneous group of organizations whose STI activities are very different, we attempt to identify governance issues according to the type of PRI.

2. The New Mission of PRIs: The Associability Approach

i. Strategies for Associative Institutional Development

The development of societies is a creation process of social capacity, institutions and markets. In addition, the new international competitive policies take into account the creation of a new public/private institution based on the associability among companies, PRIs and other NIS agents; cooperation to develop pre-competitive research and to produce and diffuse a number of “public goods” that the market will not generate, as well as also reaching scale economies and specialization and development of new forms of systemic competitiveness; and cooperation and associability to produce goods and/or services which generate multiple externalities and complementary synergic effects.

It is within this framework that PRIs must be re-thought and re-invented. They must assume the role of generators of externalities, synergies and ways of complementing, rather than of substitutes of the companies as protagonists of the technological innovation process in the case of sectorial PRIs, or isolated generators of scientific and technological knowledge, in the case of universities. The primary mission of PRIs should be to participate in networks together with other public and private agents. This means re-inventing the strategic vision of each PRI, acknowledging their mission within the new knowledge society. From there, new missions, functions, specific objectives and expected results will emerge. The network and the clustering approaches will also contribute to define the specialization of each network agent and of each PRI.

ii. Reform of Research “Councils”

The re-invention of “Councils” (CONICYT – Spanish acronym for National Science, Technology and Innovation Council) with functions of R&D activity execution, as well as PRIs on health issues, implies designing new associative action programs, and finalization of historic activities because there are other agents that can better perform the merging of R&D centers and institutes. It is essential then that these councils identify good partners

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2 Former Science and Technology Secretary of Argentina.
3 CONICET of Argentina, CONACYT of México and CNPq of Brazil.
for collaborative ventures, participate in international networks to be able to play the “major leagues” and in certain cases adopt incentives that promote re-conversion of researchers into innovative entrepreneurs (spin off). For example, the government research institutes on health matters, can hardly perform without the universities. The same is valid for the “Councils”, whose activities have overlapped with those of the universities.

iii. University Reform

In the case of public universities, internal transformations are basically ideological. Unlike the majority of the PRIs of the Region, universities achieved an enviable institutional autonomy level that was wasted due to the prevailing idea that a close linkage to the “business” world contaminated and harmed the academic performance. Meanwhile, successful university experiences worldwide showed the benefits of the “university extension” development. Understanding by that the links with the surrounding world of production and labor, through technology parks, high technological density business incubators, continuous education and training, in short, the overcoming of the “insularity” approach. Clark, B. (1997) proposes the “entrepreneurial university” concept to typify the more dynamic universities.

iv. Reform of Sectorial PRIs

Reforming the productive-type sectorial PRIs implies answering more complex questions. If their new mission is to focus on small and medium-sized enterprises (SMEs) with low technological capacity, it will entail casting aside bigger scientific and technological challenges, because the associability level of PRIs with companies is decided by the companies’ own technological capacities, and those without internal R&D units, tend to be involved in very simple projects. In turn, when sectorial PRIs are divorced from production needs, the companies avoid connecting.

As Mullin, J. et. al. (2000) point out, the leading idea of a new operating model for these institutions requires understanding and accepting the new competitive environment, where companies participate in PRIs’ performance and development, and together define a shared technological strategy. Goldman and Ergas (1997), based on the results of a study on 167 technological institutions in 8 countries, propose the creation of competitive environments and technological diffusion as their mission to help with the technological catch up.

3. Institutional Reengineering or New Institutions?

Reengineer current PRIs or create new ones? There is not a single answer. In the ‘80s, in order to stimulate innovation in SMEs the US encouraged the development of Industrial Extension Centers. Another experiment was the creation of Engineering Research Centers established in 1985. In Australia, Cooperative Research Centers (CRCs) are promoted, and are integrated by universities, public institutes and the private sector.  

Some countries of the Region developed new institutions. In Peru, the experience of Technological Innovation Centers (CITEs) that assume the cooperative modality and co-governance between the State and the private sector, was tried quite successfully. 5 Aimed at the same objective, the Sectorial Technological Centers driven by COLCIENCIAS in Colombia, derived from Competitiveness Sectorial Agreements, broadening the positive results previously obtained in the agricultural sector by the centers in coffee, cane and

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4 Creation of CRCs is subject to a public contest process where interested parties design a Project that is evaluated by the State.
Technological Consortia are being promoted in Chile as an associative model between universities and companies. Argentina promotes Technological Integrated Projects (clustering) of convergence between private agents and State institutions. Brazil is probably the country where “clustering” has advanced the most in some States, for example in the northeast.

International experience also shows re-structuring and re-engineering processes of old institutions. In the case of the university sector, there has been a broad re-engineering of institutions (Warwick in the UK, Chalmers in Sweden, Twente in Holland), and the creation of new innovative universities (Champagne in France). In Argentina, in Buenos Aires metropolitan and conurbation area, the option was to create new universities with different profiles than the traditional ones. In the cases of re-engineering as well as in the creation of universities, the reform processes are based on substantial changes in the vision and mission of the public university. In short, the scenario shows reformed old institutions and new institutions.

4. **New Types of Organization Based on an Autonomous Approach.**

   i. **Limitations of Non-university PRIs’ as Decentralized Institutions**

   Non-university PRIs historically adopted the figure of decentralized institutions, ruled by the same practices of the central administration: rigid HHRR systems not fit for STI bodies; State funding regulated and controlled by the Finance Ministries with low or none autonomy to make institutional decisions on the spot; impossibility to build technology-based companies coming from research teams or from association with private companies; limitations to accept additional resources coming from the private sector and impossibility to sell assets and make use of the products. To solve these limitations PRIs adopted a “by-pass” type of strategy creating other organizations, in order to manage the links with the private sector and external resources. Even if this was an improvement, it can not compare with the possibility of having autonomy levels that can even include the creation of commercial societies.

   ii. **Universities do not Make the Best out of their Autonomy**

   The situation has been different in the case of public universities. In fact, in several countries (Argentina, Colombia, Chile) the reforms promoted a bigger institutional autonomy and economic and financial autarchy. The HHRR and salary policy of the universities in many countries today, is of exclusive responsibility of each one of these higher education institutions and not any longer of the Ministries of Finance. In addition, they have changed from disaggregated and detailed budgets to a global subvention with control mechanisms and ex post auditing. State universities have had more freedom in this

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7 In Japan, the Agency of Industrial Science and Technology (AIST) of the Ministry of Economy, Industry and International Trade (MITI) has promoted new Industrial Science and Technology Institutes (ISTI), as non-governmental organizations with independent administration within the framework of a decentralization and cluster development policy. But at the same time, also under that figure (ISTI), 15 AIST institutes were reorganized and have become 22 excellence research centers and as many other institutes. In Taiwan, the Industrial Technology Research Institute (ITRI) was restructured: the government of the institution, the way of financing and the project portfolio selection process were changed. China is reforming more than 5,000 institutes with a shock policy that coerces the organizations to reform (*Chinese Darwinian*). In India, the National Chemical Laboratory was reformed. In Germany, the successful Fraunhofer’s model is based on a continuous restructure process. In Canada, the National Research Council (NRC) and its institutes have also undergone important reforms.
sense, even to create business. The universities have not taken enough advantage of their autonomy because of the internal political conflicts that arise when the private sector is involved.

iii. **PRIs as Private Organizations**

There are few exceptions to the typical non-university PRIs’ organization as decentralized bodies. Maybe the oldest ones are the agrarian research institutes established as non-profit private organizations in Colombia (“CENI”). For example, the CENICAN was founded in 1977 by initiative of the “Asociación de Cultivadores de Caña de Azúcar” (Sugar Cane Growers’ Association), funded by a fixed percentage of the Fondo Azucarero (Sugar Fund). In 1991, CENIPALMA was created also under that legal figure and formed by the “Federación Nacional de Cultivadores de Palma de Aceite” (National Federation of Oil Palm Growers). Also CENICAFE and others are registered, all of them with an ad hoc funding originated by the State’s funds for the development of the activity. Fundación Chile is a private non-profit institution created by the government and the ITT Corporation. More recently, the company BHP Billiton, Minera Escondida, was incorporated as co-founding member. On the other hand, Chile’s mining PRI (CIMM) organized the CIMM Tecnologías y Servicios S.A. (Technologies and Services S.A.) and in Argentina a byproduct of the National Commission for Atomic Energy (CNEA) was the INVAP Sociedad del Estado, a classic company for the development, production and marketing of technologies. Another example is the Sadosky Foundation in Argentina, specialized in information and communication technologies, that was jointly promoted by the private sector and the State, and which had to overcome the traditional approach that an organization financed by the State cannot be established as a private organization.

iv. **Alternatives for New, More Autonomous Institutional Models**

It is hard to find a legal figure that surpasses the present one in the case of State universities: constitutional “autonomy” rank with a broad scope. Nevertheless, there are examples of re-conversion of State universities into non-profit private organizations, like the Chalmers University in Sweden, that opted for ceasing being a State institution to become a foundation.

Probably PRIs in the health sector and the “Councils”, could adopt the university model, while sectorial PRIs could adopt the model of non-profit private institutions able to develop business enterprises like the CENI in Colombia, the Fundación Chile and the Sadosky Foundation. In Uruguay, the INIA (agrarian) and Laboratorio Tecnológico del Uruguay (LATU-Technological Laboratory of Uruguay) adopted the “non-State public legal model.”

There is no recipe for the ideal legal model, as it depends on local factors and the type of PRI involved. However, whatever the legal form is, it must ensure (i) the greatest possible institutional autonomy (ii) the capacity to constitute spin offs and business enterprises, and (iii) full decision rights on patrimony, on the generation and use of resources, and on the management of scientific and technological staff.

The counterpart to autonomy is evaluation. Autonomy goes hand in hand with the adoption of accountability practices by the institutions and of external evaluation by the State, that includes control of the strategic management through an efficient follow up and performance evaluation system, for which the strategic plans must clearly show

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8 The legal figure of “non State public organization” also exists in Argentine law and it has been applied only to professional associations.
achievement and impact indicators. In the region, external evaluation is being imposed in the university sector, but it has not yet been introduced into the rest of the PRIs.

5. Governance of New PRIs

i. Inclusion of Stakeholders in the Governance of PRIs

The PRIs have been governed, since their creation, by scientists in the case of the “Councils” and health research institutes; by boards of professors in the case of universities; and by technologists and technicians in sectorial PRIs. Stakeholders’ participation has been very limited.

It can be said that in a knowledge society based on associability and cooperation, with diffuse borderlines between basic scientific knowledge and the new technologies, the “Councils” cannot be solely in the hands of scientists. Technologists and innovative entrepreneurs cannot be absent from the governance bodies.9

Universities are too important for the economy and knowledge society to be left solely in the hands of professors and students, as it happens in most Latin American countries. Recent world scale reforms in the university government system have implied the incorporation of external actors into the government, thus ending with the university self-government tradition understood as synonymous with university autonomy. Besides, the “from-down-up” authorities election mechanisms are substituted by “from-up-down” ones.10 Up to a point, the University of Chile and the Sao Paulo State universities have broken the rigidity of corporate-type government systems prevailing in the rest of the region, reserved for professors and students exclusively.11 In sectorial PRIs, stakeholders include sectorial ministries (health, industry, energy, agriculture) and also innovative companies. For all of the above, the international experience indicates the relevance and importance of having effective stakeholders’ participation in PRIs’ government including private agents and sectorial State authorities.

Grier D.H. (1996), on a study of 69 research and development organizations, proposes that the majority of members of the board of directors of the Councils must be stakeholders, including relevant sectorial associations if the centre is of sectorial character, or regional government if the center is of territorial type. Likewise, unlike the corporate representations, he proposes that the CEO should nominate persons to integrate the board of directors and submits them for stakeholder approval.

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9 The majority of the LAC “Councils” do not have non-scientific stakeholders’ representatives in the government bodies. The business sector participates in the Brazilian CNPq, but in a very minor way. The CNPq has a collegiate government organ formed by the institution’s President and Vice-President, the presidents of FINEP and CAPES (organization specialized in post-grade quality evaluation and study grants’ financing), the Executive Secretary of the Ministry of Science and Technology, and representatives of the S&T, business communities and the CNPq staff. The 1996/97 CONICET reform in Argentina included the modification of the government body that included scientists and stakeholders’ representation (universities, provinces, agriculture and industry) in a 50-50 relationship.

10 Holland and the Scandinavian countries lead the reform process of the European universities’ government systems, adopting the figure of Directive Boards designated by the Parliaments, in a way similar to the U.S. tradition of boards of trustees, who in turn designate the Principal, who designates the Deans or Department Directors. Besides, the Directive Boards are composed by prestigious academicians, but also innovative companies and bank’s CEOs. In the governing board of the University of Copenhagen, by example, with 9 members, one is a CEO of a big pharmaceutical company and another is a banker.

11 The high participation of students in the government of LAC universities has no comparison in other regions of the world.
ii. **Non-Symbolic Stakeholder Participation**

State or stakeholder majority in PRIs’ government? There is no definite answer. In Chile, the creation of non-profit private law corporations with a minor State participation has been suggested (Mullin, J. *et. al.*, 2000). Even though the proposal emphasizes the case of Fundación Chile as a precedent, it should be noted that in that case the State and the private sector are almost equally represented in its board of directors.\(^\text{12}\) Tapia, H. (2007) declares himself in disagreement as he questions the privatization proposals of the Mexican PRIs, even though he does not question the participation of the private sector in government. In Argentina, the INVAP, specialized in nuclear and space technology, is a State-owned commercial enterprise that has achieved important accomplishments both in the technological and commercial aspects; it is owned by the provincial State of Río Negro, but the Comisión Nacional de Energía Atómica (National Commission of Atomic Energy) is half of its Directorate membership. Anyway, the important thing is that both Fundación Chile and the INVAP, with different legal figures and majority State control, operate with business logic.

There is a link between successful results and stakeholders’ participation in the governance of the institutions, not because of their majority or minority position in the board, but because of their non-symbolic character.

6. **Importance of Leadership**

It is not enough to change the governance system and adopt an autonomous and decentralized organization model. A good selection of the CEO is also essential. I use the expression CEO to clearly highlight the function of the top responsible executive of the organization. It is common practice in the private sector to scout for business executives through specialized consulting firms. This good practice is not followed by the State’s institutions. The CEO can come from the private sector or from the scientific/technological world; what matters is his/her aptitudes and attributes to lead the organization. And one of them is his/her ability to lead.

In his analysis of Entrepreneurial Universities, Burton Clark mentions the success case of the University of Warwick. During the ‘80s, this university created the Warwick Manufacturing Group (WMG) under the leadership of a charismatic professor: Kumar Bhattacharyya. In 1995 *The Economist* defined Bhattacharyya as “the professor of product development”\(^\text{13}\).

A regional example was the figure of Jorge Sábato in the Comisión Nacional de Energía Atómica (CNEA) whose contribution to the Latin American science and technology thinking (the Sábato triangle) came basically from his own practical experience in the CNEA. The history of good institutions is also that of their leaderships. In modern terminology, PRIs require good CEOs.

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\(^{12}\) *Fundación Chile’s* board is formed by its President, 6 State representatives, 4 ITT representatives, 2 from BHP Billiton, 1 honorary councilor and 2 follower councilors (*Sociedad Nacional de Agricultura and Instituto de Ingenieros de Chile*).

\(^{13}\) The Warwick Science Park is the second in size of the United Kingdom’s scientific parks, 2000 managers have participated in WMG’s training and the organization has generated 65 new companies with 1.300 employees.
7. New Management Styles

In addition to the required legal status and the significant participation of stakeholders in the government of PRIs, the management of these organizations should be ruled by the trends and regulations of the academic world (in Councils and universities) or the market. In any case, it is necessary that the management criteria include best practices and techniques of the sector. Certainly, these capacities reside today primarily in the private sector and the PRIs will have to adapt them.

Modern management implies strategic planning, the definition of results and impact indicators for performance evaluation, monitoring exercises and periodical review of the programs, rules of transparency in decision making, explicit criteria for priority and resources assignment, internal incentive mechanisms for staff and associability with stakeholders and the creation of working networks with other PRIs and performance-based evaluation.14

The PRIs’ governance systems require good management. Traditionally, PRIs have been governed by numerous collegiate bodies that monopolize not only big decisions but the management of the organization itself. The consequence is high bureaucratization and great rigidity for institutional development. This tends to be modified through collegiate bodies with strategic definition and control functions (like a company’s Board of Directors) and one-person organs with executive functions (like Executive President or General Manager).

8. Performance Oriented State Financing

In addition to giving PRIs the greatest possible autonomy, governments must also provide them with sufficient and well-oriented funding. It is not about leaving the PRIs on their own with self-financing recipes. This kind of reform may have had relative success in some advanced countries because of the density of the social and economic fabric and in particular because the technological capacities of their production apparatus made the raising of funds in a recurrent way possible through research contracts, technical assistance, training and technical services (metrology, quality certification, etc.). In societies with weak socioeconomic networks, self-financing policies entail a specialization in low scientific technological intensity activities to serve stakeholders with lesser technical capacities.

Even though State financing is significant, subventions not complying with accountability criteria must by definitely eliminated.15

Governments, as major shareholders of PRIs, must ensure their basic funding through block-grants (not disaggregated) coming from multi annual performance with rewards (“carrots”) and punishments (“sticks”) linked to the degree of accomplishment of the objectives and the attainment of expected outputs. This global allocation of resources ensures a high flexibility from the institution that manages the resources. Global allocation should not be reduced pari passu to the increase of resources coming from the commercialization of scientific and technological services, but should aim at finding additional resources, and thus be rewarded by the government. A case worth looking into

14 On institutional management good practices see Rush, et. al. (1995) and on performance-based evaluation, it is worth mentioning the South African experience.
15 Goldman y Ergas (1997) identified the inadequacy of the State support to PRIs in all of the countries they studied.
is that of New Zealand, a country whose size very much resembles the region’s economies; where the State rewards obtaining funds from third parties.16

Another modality of the performance contract is the financing of a specific program submitted by the institution, as it happens in Chile.

Complementary to block-grants, another financing modality is to make PRIs look for financing resources participating in competitive funds, where the allocation criteria are based on quality and relevance. As it has been proven in many countries, the mechanisms that foster competition increase the chances of technical success. For sectorial CTRs, COLCIENCIAS in Colombia grants subventions of “seed capital” to cover initial costs and offers financing by contract-through-contest funds for its development. In Finland, the State contributes a 43% of the total R&D funds (1995) through contest grants.

In the case of industrial and productive PRIs, commercial exploitation of know-how and industrial property rights, as well as technical assistance and provision of technical services, constitute legitimate financing sources. The Centro de Investigación Minera y Metalúrgica (Center of Mining and Metallurgic Research -CIMM) in Chile finances itself a 90% through contracts with its customers.

9. Final Thoughts

The conclusions of the first meeting (1999) of technological industrial organizations of different countries and continents of the southern hemisphere (Australia, Brazil, Chile, Malaysia, Argentina, New Zealand, South Africa, Uruguay and Paraguay) should be taken into account. These are: (i) it is necessary to give the business sector and other stakeholders’ leaders increased representation in institutional governments; (ii) human capital is the main asset of the organizations; (iii) more emphasis must be put on taking care of demand and on income coming from contracts with users; and (iv) regardless of the increase of income by contracts, States have the primary responsibility of allotting stable and long term resources in order to avoid an orientation towards short term self-financing that distorts long term strategies.

Certainly, not all PRIs are clearly oriented towards productive sectors, mainly industrial ones, but they must clearly identify what they are going to specialize in, so as to be clear on who they are going to associate with, and if the type of activities will be of low, medium or high scientific technological intensity.

Undoubtedly, the PRIs of the LAC Region face the challenge of their “re-invention” for which it is imperative to transform their “governance”.

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16 In New Zealand the State awards an economic prize according to the additional funds obtained by the PRIs (see Simpson, B. and Craig, J., 1997). In Munich, Germany, if a university decides to create a company, the State contributes 50% of the initial investment.
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