Bolivian Innovation Policies: Building an Inclusive Innovation System

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Abstract

This study explores the policy paths the Bolivian government has followed in the last three decades to organize science, technology, and innovation. We present strategies proposed by the government to make its National Innovation System more dynamic and socially inclusive. We analyse the process and strategies followed under the light of the Triple Helix (government-industry-university) model of innovation.

Keywords: Innovation system; Triple Helix; inclusive innovation; developing countries; Bolivia.

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INTRODUCTION

Bolivia, as many other countries in Latin America, is creating policies and institutions and building networks to strengthen the dynamics of its National Innovation System (NIS). This more systemic view of the innovation processes explicitly recognizes the potentially complex interdependencies and possibilities for multiple kinds of interactions between the various ele-

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ments of the innovation process (Edquist et al., 1999). The Bolivian government uses this systemic approach at the policy level to unify strategies and gather national institutions to address social priorities such as poverty and inequality reduction, food safety, and interactive local production of knowledge as well as to increase industrial competitiveness.

We start this study by briefly introducing the concept of NIS and its relevance for developing countries focusing on Latin America. Then we present a narrative description of the main policies and institutional context promoted to organize science, technology, and innovation in Bolivia since the end of the dictatorship period. Finally, we analyse the *"National Plan of Science, Technology and Innovation"* under the light of the Triple Helix model of innovation, used as a tool to discuss the characteristics of the model adopted in Bolivia.

1. NATIONAL INNOVATION SYSTEMS (NIS)

1.1 Concept framework

The concept of National Innovation System (NIS) enhances the role of innovation and interactive learning in economic growth and development within national borders. Lundvall et al., (2009) define the national innovation system as an open, evolving, and complex system that encompasses relationships within and between organizations, institutions, and socio-economic structures, which determine the rate and direction of innovation and competence-building emanating from processes of science-based and experience-based learning.

Based on the successful experiences in developed countries, sooner rather than later, the NIS concept was also introduced in developing countries as a conceptual framework to create new policies and strategies to organize science and technology as well as the production and diffusion of knowledge for development responding to urgent social needs. Developing countries are less developed in terms of institutional composition, sophistication of scientific and technological activities, and linkages between organizational units (Kayal, 2008), thus strategies that could work in some countries could

do not work as well in another. Thereby - according with the innovation system approach - innovation is considered to be deeply dependent on the local specificities of social, political, and economic relations, being therefore directly affected by both history and the particular institutional context of countries or regions where it occurs (Scerri et al., 2013).

We use in this study the Triple Helix approach developed by Henry Etzkowitz as a starting perspective to understand and discuss interactions between the main institutions in the Bolivian innovation system development process. Arocena et al. (2000), cited by Etzkowitz et al., (2003), point out that the Triple Helix explains the formation and consolidation of learning societies, deeply rooted in knowledge production and dissemination and a well-articulated relationship between university, industry and government. The model helps explain why the three spheres keep relatively independent and distinct status, shows where interactions take place, and explains why a dynamic triple helix process can be formed with gradations between independence and interdependence and conflict and confluence of interest (Etzkowitz, 2008).

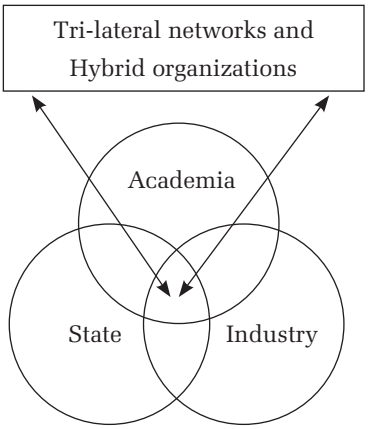

Figure 1: The Triple Helix Model of University-Industry-Government Relations Etzkowitz et al., (2000)

This model can be used at different levels (macro-meso-micro) within a nation as an operative framework to strengthen innovation policies and mechanisms proposed according to the local context and priorities. Triple

Helix strategies are especially important to less-developed countries and in particular to Latin American countries with scarce R&D activities undertaken by firms, and mostly concentrated at universities and research institutes (de Mello et al., 2008).

1.2 NIS in Latin America

Alcorta et al., (1998) locate the origins of national research coordinating organizations in Latin American countries in the 1950s, with the creation of the first national councils for science and technology (the National Institute for Scientific Research - Mexico, 1950; the Brazilian National Research Council - Brazil, 1951; and the National Council for Science and Technology – Argentina, 1958). During the 1960s and 1970s, a significant number of Latin American countries established some form of systemic policy thinking to develop science and technology (S&T) organizational structures. The mere creation of such institutions, however, did not make them operational or dynamic, and in some of the countries (Bolivia, Paraguay, and Nicaragua) S&T plans as well as the so-called S&T funds existed on paper only (Velho, 2004).

In 1964, a wave of military coups (that began with the Brazilian coup) started in Latin American's governments, and lasted until the first half of the 1980s. The relationship in this period between the state and the industrial sector was important, but it was not focused on innovation (Arocena et al., 2000). Influential thinkers in Latin America argued that the way in which the research councils were operated was "marginalising" local science from local needs. They associated this with the character of the industrialization model adopted – defined by its reliance on technology transfer – which did not require local R&D activities but only the accumulation of specific capabilities to operate technology developed elsewhere (Velho, 2004).

The end of the dictatorship period was followed by a democratic transition - so called *neo-liberalism* - proposing macroeconomic policy and economic reforms highly influenced by the Washington Consensus. This model prioritizes the opening up of domestic economies to foreign competition, the deregulation of a vast array of markets, and the privatization of public-sector firms (Katz, 2001). All of these measures, but primarily the latter, were implemented with wide opposition from social movements. Yoguel et al.,

(2007) describe three main characteristics of S&T policies of that time: first, a general perception that public goods were dispensable because knowledge could be incorporated through the purchase of capital goods; second, the selection of prioritized industrial sectors was rejected, because it was the market that should lead the selection; and third, there were no policies that promoted networks, except by isolated experiences through horizontal polices.

Eventually, political and economic breakdowns in Venezuela after 1998 and in Argentina after 2001 and widespread social protests in Ecuador and Bolivia in the early years of the twentieth century culminated in the election of governments committed to the introduction of counter-cyclical policies, programmes of national (and sometimes regional) economic investment, and the extension of social policy coverage (Grugel et al., 2012). These events opened the scenario up to a new attempt to build a more democratic and socially oriented economic model in Latin America called post-neoliberalism (find more in *"Contemporary Latin America: development and democracy beyond the Washington Consensus"* by Panizza, 2009). Grugel et al., (2012) assert that post-neoliberalism is not so much an attempt to return to state capitalism as it is an attempt to refashion the identity of the state, redefine the nature of collective responsibilities, build state capacity, and rethink who national development is for. In this context, a renewed set of strategies for development has emerged in Latin America. Post-neoliberal governments look at NIS as a tool to orient science, technology, and productive structures to achieve sustainable national development. Under these conditions, the concept of inclusive innovation has been enhanced at the time that governments strengthen national innovation systems involving social actors in the decision-making process.

2. BOLIVIAN INNOVATION POLICIES

2.1 Background

The Bolivian GDP increased 6.8% and 5.4% in 2013 and 2014 respectively following a positive tendency in the last decade. The rate of growth in 2013 was the highest in the last thirty-eight years (Central Bank of Bolivia, 2013). The main economic activities that contributed to this growth were:

crude oil and natural gas exploitation, financial services, charges for bank services, and internal revenue (INE, 2014). This performance follows the positive tendency in the Latin American region in the last years and exposes the high dependence on natural resources exploitation.

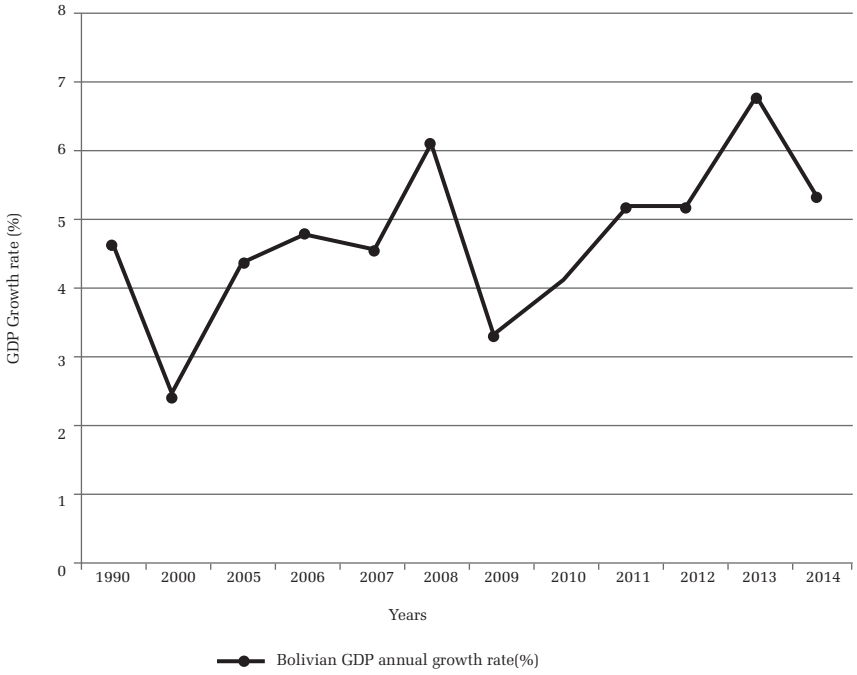

Figure 2: Bolivian GDP annual growth rate (%) 1990-201 (World Bank, 2015).

During the last thirty years, the Bolivian government has created institutions and established councils at the national and regional levels as an attempt to organize S&T. After the dictatorship period ended in 1982, Bolivia found itself in an instable transition to democracy. At the beginning, Bolivia experienced an apparent economic prosperity because of international loans and good international prices for Bolivian exports, such as tin and oil. Nevertheless, that situation was followed by one of the largest foreign debts crisis in Bolivian history, along with hyperinflation that destroyed the purchasing power of the population.

During the 1990s, like many countries in Latin America, Bolivia followed several economic reforms including an extensive privatization of the state enterprises and reduced spending in social services. Arriarán, (2007) considers that the transition to democracy in Bolivia seemed to be characterized by a kind of divorce between the economic and the political. The economy was, in fact, stabilized (stopping hyperinflation). However, it was done based on a model that paradoxically widened social gaps and neglected distributional and equity aspects.

In 2000, the Bolivian Agricultural Technology System (SIBTA) was created under the Ministry of Agriculture as a funding and technology diffusion mechanism to support the agricultural sector. The SIBTA supported agricultural research and extension, creating four regional semiautonomous foundations (FDTAs): *highlands, valleys, tropical, semiarid lowlands (Chaco)*. The evaluation of Hartwich et al., (2007) of this experience suggested that to foster efficient agricultural innovation processes in a decentralized funding scheme such as the SIBTA's approach, the government needs to actively establish priorities, assure that others participate, guarantee transparency and accountability, maintain responsiveness to the demands of users, focus on impact, delegate administrative responsibilities to local agencies that are closer to the farmers, strengthen linkages among the various innovating agents, and provide a strategic vision.

The Ministry of Planning of Development created other systemic initiatives in 2001 with the Bolivian System of Productivity and Competitiveness (SBPC). This initiative introduced a new understanding of the industrial sectors as regional productive chains and proposed mechanisms to organize institutions such as universities, industry, and public bodies around this perspective. At the regional level, Departmental Committees for Competitiveness (CDC) were created in 2004 as operative tools for the system. They were supported by international cooperation, promoting agreements with regional institutions such as universities and suggesting regional strategies based on studies of local productive chains. There were 18 productive chains studied, generating important information but mostly proposing strategies difficult to replicate in the unstable Bolivian context. Eventually, the CDCs became more decentralized from the SBPC, focusing on supporting the medium-large private industries at the regional level. The general

reflections of Hartwich et al., (2007) about the Bolivian systemic approaches during the neoliberalism period state that governance in innovation systems is less about executing research and administering extension services and more about guiding diverse actors involved in complex innovation processes through the rules and incentives that foster the creation, application, and diffusion of knowledge and technologies.

2.2 Plans, reforms and support structures 2006 – 2014

A new government was elected in December of 2005 with a strong indigenous rhetoric and brought significant social stability by increasing the political participation and power of the traditionally excluded indigenous groups and other social movements. The recovery of the social and indigenous esteem was an early effect of these measures involving an important participation of social and indigenous movements in consultation and governance processes. The new government enjoyed a wide majority in the parliament, which allowed it to push forward larger reform processes with the main goal of creating a new political state constitution (CPE), which was approved in 2008 by the Congress of the Nation.

With the new CPE, Bolivia adopted a new *plural* economic model, so-called "national-productive" model (García, 2008). This model recognizes several forms of economic organizations - community, state, private, and social cooperative - and is mainly focused on an active participation of the government in economy, the industrialization of natural resources, a focus on social needs, and the redistribution of wealth.

The government started the reforms with the nationalization of key industries, reaching 19 firms by 2014: (e.g.: YPFB *(hydrocarbons)*, 2006; Huanuni *(mining)*, 2006; ENTEL *(telecommunication)*, 2007; Vinto *(smelter)*, 2007; Air BP *(jet fuel)*, 2009; Corani *(electricity)*, 2010). Another early measure implemented was to reduce the president's salary, which implies by law that no other public servant can earn more than the president. According to the Ministry of Economy and Finance, the president's salary was 18,800 BOB per month by 2014, or about 2,845 USD$. This austerity measure limits the possibility of economically incentivizing the research community (at public universities) that increase their current activities (researching and teaching) by participating in future initiatives that encourage collaboration with productive actors and the government.

In 2006, the Ministry of Planning and Development presented the *"National Plan for Development 2006-2011" (PND),* later approved by a supreme decree in 2007. This plan was important for the new political reforms, because it was used as reference for following actions at the national and regional levels. The plan proposed policies, strategies, programs for development, and gave a high priority to increasing capacities in science, technology, and innovation to support the productive sector. It also defined strategic areas for productive development with a systemic and socially inclusive approach through the creation of the Bolivian Innovation System (SBI). The plan oriented Bolivian governmental institutions to face the challenges of gathering and organizing all the actors of the system in order to find technology-based solutions, while recognizing and including ancient indigenous (non-academic) knowledge in the process of innovation as well.

The responsibility of the SBI lies in the Vice-Ministry of Science and Technology (VCyT), created in 2006 under the Ministry of Planning and Development. In 2007, the VCyT presented a proposal to establish the SBI, which schematizes institutional complexity and relations between the actors, and identifies 15 geographical sub-regions based on productive and cultural similarities to increase the scope of the actions (Carvajal et al., 2007). In 2009, the VCyT was moved to the Ministry of Education, but remained in charge of promoting the SBI. The VCyT prepared a new planning draft in 2009, and after an extended participatory consulting process, published an official version in 2013. This plan is focused on long-term strategies for the period 2014-2025. It seeks the development of human and institutional capacities under the rhetoric of sovereignty in science and technology with the perspective of social inclusivity. We will discuss the strategies presented in the plan in more detail in the following section. Meanwhile, we mention other initiatives carried by other ministries according to the framework of the Bolivian Innovation System presented in the PND, but independently from the VCyT's proposal.

In 2008, the National Institute for Agricultural and Forestry Innovation (INIAF) was created under the Ministry of Rural Development and Lands (MDRyT). It was formed following the PND guidelines as a component of the Bolivian Innovation System (SBI). It is a decentralized institution with the aim of establishing guidelines, implementing policies, and generating

technologies for agricultural and forestry innovation. This institution replaced the functions of the former SIBTA. The INIAF supports farmers and seed suppliers to increase the productivity on prioritized sectors (wheat, potatoes, corn, rice, vegetables, livestock and forage, quinoa, forests and sugarcane). The INIAF seeks to increase the scope and impact of the former experiences by using participatory and inclusive mechanisms to build consulting platforms at four levels: national, regional, local, and by product. These platforms involve researchers, local producers, institutions (private, public and mixed), and agents from the government at all levels.

On the other hand, the Ministry of Productive Development and Plural Economy (MDPyEP) implemented three strategies to strengthen the productive sector according to the PND guidelines. In 2008, the MDPyEP created three decentralized development agencies – *ProBolivia, Insumos Bolivia,* and *Promueve Bolivia* - with the aim of changing the productive matrix and supporting competitiveness in the manufacturing sector. At the same time, a new norm was approved that allows these agencies to execute public-public and public-private financial transfers. In this way, in 2012 these agencies started promoting contests as a strategy to motivate public-private as well as academic and non-academic partnership for innovation projects in prioritized sectors (food, leather, wood, metal-mechanic, textile, and handicrafts). A second strategy was the creation of "productive complexes" (regional clusters) supported by the regional governments based on the capacity of the local productive chains. The productive clusters will be technically strengthened by productive centres for innovation (CIP) in collaboration with public universities and regional governments. The third strategy to change the productive matrix was the creation of state enterprises in strategic national priority areas (in addition to those ones nationalized). By now, five new state enterprises have been built (LacteosBol *(dairy products),* 2007; PapelBol *(paper)*, 2007; CartonBol *(cardboard)*, 2010; EceBol *(cement)*, 2008; and Eba *(almond)*, 2009), but there are many others pending. In order to manage this process, the Development Service for State Enterprises (SEDEM) was created. These state enterprises seek to ensure the supply of basic products for the population and the industry, but a lot of controversy was generated around unfair competition from the state with the local-private industries. Anyhow, it is part of the strategy adopted by the government to mobilize

resources and strengthen the national economy. Most of these strategies are in the very first phases of implementation. Follow-up studies will complete analysis and will determine their impact on the society.

In 2012, the Ministry of the Presidency started a wide consulting process to create a long-term roadmap for national development so-called *"The Patriotic Agenda: Bolivia towards 2025."* This document was presented in 2014 with the aim of continuing the reform process started with the National Plan for Development (PND). The Patriotic Agenda was built based on 13 core guidelines, identifying science and technology explicitly in the 4th guideline as *"sovereignty over identity and development of science and technology."* In that section, innovation is located in the core of the proposal and is considered a result of a process of systemic convergence that involves the academic sector, the government, the productive sector, and the native-indigenous sector (both as knowledge-generators and users of science and technology) as main actors.

2.3 General Comments

The Bolivian government promotes several initiatives around the systemic vision of innovation for development, looking for a closer partnership between the academic, the productive, and the governmental sectors to reduce poverty.

We have considered the initiatives presented by the VCyT as a core element in the system, which is in charge of organizing institutions for innovation to give a conceptual framework and promoting policies to make it more dynamic. However, we argue that the dimension of the current Bolivian Innovation System exceeds the scope of the System of Innovation under the VCyT, which responds mainly to the Ministry of Education's concerns, but is complemented mainly by the initiatives of the Ministry of Agriculture and the Ministry of Productive Development. We expect in the short-term the Patriotic Agenda and its executing organisms to coordinate (at the highest level) all the systemic initiatives to promote innovation for sustainable social development.

3. NATIONAL PLAN FOR SCIENCE, TECHNOLOGY AND INNOVATION (PNCTI)

3.1 Main components of the PNCTI

In 2013, the VCyT presented a National Plan for Science, Technology, and Innovation (PNCTI). It was the result of a graduated consulting process that involved 940 representatives of the three main sectors identified in the system (667 academic, 141 social-productive, and 132 government). In this plan, the VCyT defines the Bolivian System for Science, Technology, and Innovation (STI) as follows:

> *"The set of interrelated and complementary actors, using science, technology, and innovation in a coordinated and constructive form that generates integral solutions for productive, social, and environmental problems, with a focus on participatory equitable and sustainable development."* (VCyT, 2013)

The plan is organized in two phases of implementation; the first one (2014-2019) looks to strengthen the system, and the second one (2020-2025) looks to consolidate the system according to the challenges proposed in the *"Patriotic Agenda: Bolivia through 2025."*

The PNCTI presents eight prioritized sectors to be fortified: health; agricultural development; industrial and manufacturing transformation; local and ancient non-academic knowledge; natural resources, environment and biodiversity; energy; and mining.

The Bolivian System of STI is presented in terms of the interactions (demand-pulled) between three main sectors: the knowledge-generating sector, the science and technology demanding sector, and the government sector. The VCyT presents a Triple Helix approach formed by bilateral relations among the government, the knowledge-generating sector, and the sector that demands science, technology, and innovation. These sectors are defined in the PNCTI as follow:

- *The governmental sector* involves all the entities with the capacity to generate, regulate, promote and implement policies related to science and the technological development of the nation. The main

representatives of this sector are the Ministry of Education, the Vice-Ministry of Science and Technology (VCyT), and institutions yet to be created to support the system according with the plan.

- *The knowledge-generating sector* involves universities, public and private research centres, and the local and ancient non-academic knowledge developed by indigenous groups. The role of this sector includes activities of human training skills for research, technology development, technology transfer, and professional management of the productive sector.

- *The sector that demands science, technology, and innovation* is represented by the socio-productive sector that encompasses the society (in general), agricultural producers, indigenous groups, and the industrial sector (public, private, small, medium, and large enterprises).

In this model, social actors and indigenous groups are explicitly included and recognized as knowledge producers as well as users of science, technology, and innovation. This approach responds to the claim of inclusion of the traditionally excluded segments of the population as dynamic actors in innovation processes and development strategies.

The challenge for the Bolivian government in a demand-pulled model of innovation is that this model needs a dynamic demanding sector able to mobilize and organize internal resources into a long-term productive vision that involves sectorial leaderships that would be able to facilitate collaboration with other institutions in the system and look for common goals rather than institutional claims. The Bolivian economy is still highly dependent on natural resources, and most of the population works in a low added value sectors. This context could influence the performance of a demand-pulled model of innovation. Sometimes in non-dynamic sectors, financial programs of cooperation are exploited for the traditionally best-positioned companies and organizations, which as a result contributes to maintaining inequalities. In fact, Benavente (2005) and Yoguel et al. (2007) present evidence from Chile and Argentina respectively pointing out that the experiences of horizontal financial agencies showed a tendency to concentrate supporting resources for the productive sector in a reduced number of firms, probably

those most dynamic in their sectors, but not contribute to reducing inequality as expected.

3.2 PNCTI first phase of implementation (2014-2019)

This phase of the PNCTI is focused on the passage of a new Law of Science, Technology, and Innovation and its regulation. It will create a decentralized unit to execute the PNCTI and another to manage the financials of the social-productive and academic sectors (both under the VCyT).

The starting actions performed in the last years by the VCyT as a foundation for the system were:

- Establishment of 12 scientific and technological research networks in prioritized fields, gathering more than 400 scientists. These networks offer scenarios to discuss socio-productive needs and to apply for resources by proposing projects based on trans-disciplinary collaboration.
- Facilitation of free access to 19 international databases linking national scientist to over 3000 Scientific Journals.
- Presentation of 2 editions (2009 and 2011) of surveys about the Bolivian science and technology potential. These reports put an end to a decade without similar studies performed at the national level.
- Yearly promotion of *"scientific olympics"* (national contest) as part of a program for the popularization of science. This contest has the purpose of increasing scientific and technological capabilities for high-school students through competitions in mathematics, chemistry, biology, informatics, and robotics. In more than four years, more than a half million students from all over the country have participated in the olympics.
- Organization of tailor-made workshops for public, private, and academic partners in order to spread the concept of innovation systems, understand the role of key stakeholders, and use this concept as a policy tool in the Bolivian context.

This phase seeks to consolidate these initiatives and allocate resources

to make them sustainable in the time. 75% of the Bolivian capacities (infrastructure and human resources) in science and technology lie in public universities (VCyT, 2011). This tendency is repeated in most Latin American countries. In this context, the VCyT identifies universities as key institutions for initial mobilizing activities. In addition to the started actions mentioned above, the VCyT proposes the implementation of a *National Program for Developing Human Talent* in strategic scientific and technological areas - food, biodiversity, mining, and energy - as well as looking for the support of existing research infrastructures at universities in collaboration with the socio-productive sector. The first phase also stipulates initial activities through the creation of several mechanisms to facilitate linkages between the actors and implement support programs. Nevertheless, the implementation of most of them will be clarified in detail in following planning documents to be elaborated for the second phase (2020-2025). Meanwhile, the PNCTI presents a scheme of the bilateral relations in the system including these organizations and institutions to be created:

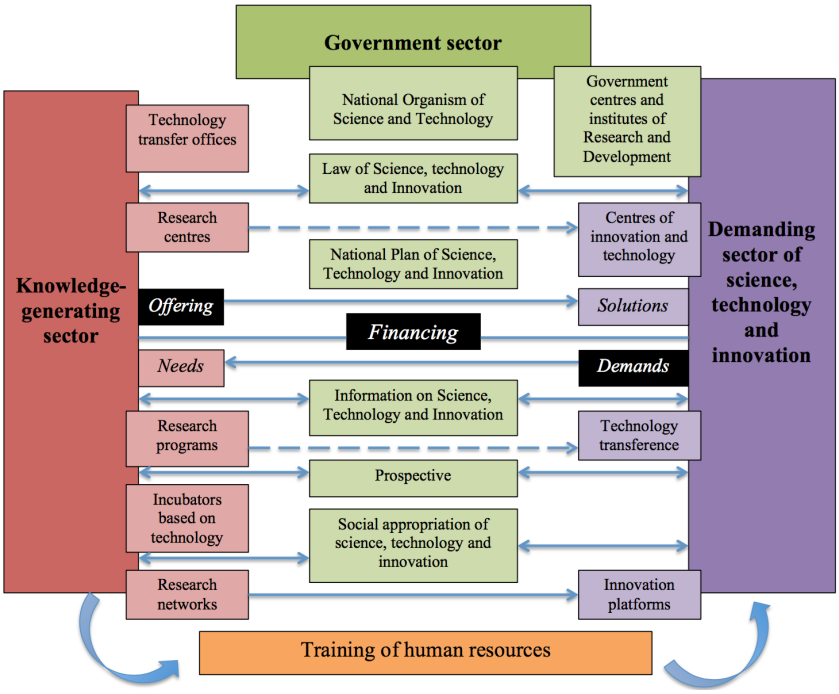

Figure 3: Sectors and interactions in the Bolivian System of Science, Technology, and Innovation (VCyT, 2013).

The second phase (2020-2025) of the plan suggests a consolidation of the functions of the mechanisms to be started during the first phase, directing them towards objectives to be presented in the "*Patriotic Agenda: Bolivia towards 2025*." In this phase, there is expected to be an increased scope of activities of the Unit of Execution and for the Financing Program, promoting the implementation of new mechanisms (organisms to transfer research results, scientific parks, incubators, and so on). At the same time, the training programs are initially supposed to focus on master degree programs that could be continued by PhD programs to enrich the critical mass of researchers. Then it comes to the challenge of creating strategies for incorporation of new professionals, not only in the academic sector, but also in the productive sector. Finally, the phase includes plans to transform the monitoring system of science and technology into an observatory of science and technology that also includes prospects studies in different sectors.

3.3 General Comments

The PNCTI presented proposes the creation of new institutions and several new experiences of organizations where Bolivia has few or no successful experiences yet (industrial parks, incubators, innovation platforms, and organisms for technology transfer). To achieve the proposed goals, the plan also demands building innovative culture among the involved actors, creating a solid law for S&T and reliable platforms to create trust and networking, as well as breaking institutional barriers for collaboration and ensuring inclusivity. Recent experiences at the public University of San Simon creating the first university Technology Transfer Office have shown that these kind units can support the articulation of regional innovation systems. The public university can work as a relatively neutral and reliable platform for dialogue in order to support innovation processes and reinforce trust after decades of deteriorated relations among the actors.

4. CONCLUDING REMARKS

The Triple Helix model of innovation can be used as an ex-ante con-

cept and as a strategic tool to open up roads for a catch-up process with an ultimate goal of creating a learning society (Etzkowitz et al., 2003). This can be the case in Bolivia, where a Triple Helix approach has been adapted and expanded to be more socially inclusive, recognizing indigenous groups and other social movements as important actors in the production and use of knowledge in terms of STI. At the same time, it is necessary to give one more step in PNCTI breaking linear models of interactions and start to focus on non-linear relations in order to establish new roles in the traditional institutions in the system. This can increase the cohesion between actors to create better synergies emerging also from bottom-up initiatives in the system. Triple Helix processes can enrich the current practices denoting not only the relationships of university, industry, and government, but also internal transformation within each of these spheres (Etzkowitz et al., 2000).

Currently, several governmental bodies promote diverse initiatives focused on fostering innovation culture based on Triple-Helix partnerships to contribute to national development by responding to socio-productive needs. Since 2006, Bolivia has had a relatively stable socio-political environment. This situation allows for the construction and implementation of long-term strategies and reforms to achieve social goals. The VCyT promotion of the Bolivian Innovation System since 2007 has driven the development of a medium-term plan to strength the National System of Science Technology and Innovation (2015-2019). This proposal, complemented by initiatives of other ministries, needs a national coordinator body in order to make an efficient use of the limited resources available. The long-term plan, so-called *"Patriotic Agenda: Bolivia towards 2025"*, will orient efforts of all the governmental bodies promoting innovation for development towards a common goal and a more efficient use of the national resources allocated.

We must be conscious of the fact that demand-based strategies in non-dynamic socio-productive sectors need strong leaderships from the sectors and strategies to create cross-boundary organizations to catalyse processes of networking at national and sub-national levels, ensuring the inclusivity at several levels of the more needed population to reach the social impact. The reflections of Cozzens et al., (2009) based on studies of developing countries explain how innovation and inequality co-evolve with innovation, sometimes reinforcing inequalities and sometimes undermining them.

The success of NIS rests on the degree of integration and matching efficiency between the various drivers and components of the system (Kayal, 2008). The creation of national research networks became an important scenario to recover and open new bridges with the research community to discuss national policies, diffuse research results, and share bottom-up initiatives contributing to the system. Since most of the research and high-level training capacities are concentrated in few public universities, this gives them a key role in the Bolivian Innovation System. This social responsibility for the national development is transforming the traditional missions of universities. They are evolving from providing higher education and scientific knowledge into constantly encountering claims from society and government to transcend institutional spheres in the knowledge production process. This is done by promoting institutional dialogue and involving social actors as sources of knowledge and users.

Finally, no one of these important efforts will be complete if the national government does not consider substantial reforms to market policy to promote and support the local industry (private-public) and entrepreneurs. This issue has been a constant demand in all the dialogue platforms. Bolivia is part of a regional policy learning process looking at the national innovation system concept as an alternative for development and competence building. The Bolivian policies for innovation means one step forward focusing efforts also on the legitimacy of science, technology and innovation by including the indigenous groups and society in general as important actors in the creation of knowledge in collaboration with the traditional institutions mentioned in the Triple Helix model of innovation (university-government-industry). We expect that further studies can determine the impact of these policies in the evolutionary processes. The experiences gained can contribute to the perspective of social inclusive innovation systems, but wider perspective of inclusion is needed to face national challenges of development as proposed in the *"Patriotic Agenda towards 2025."*

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