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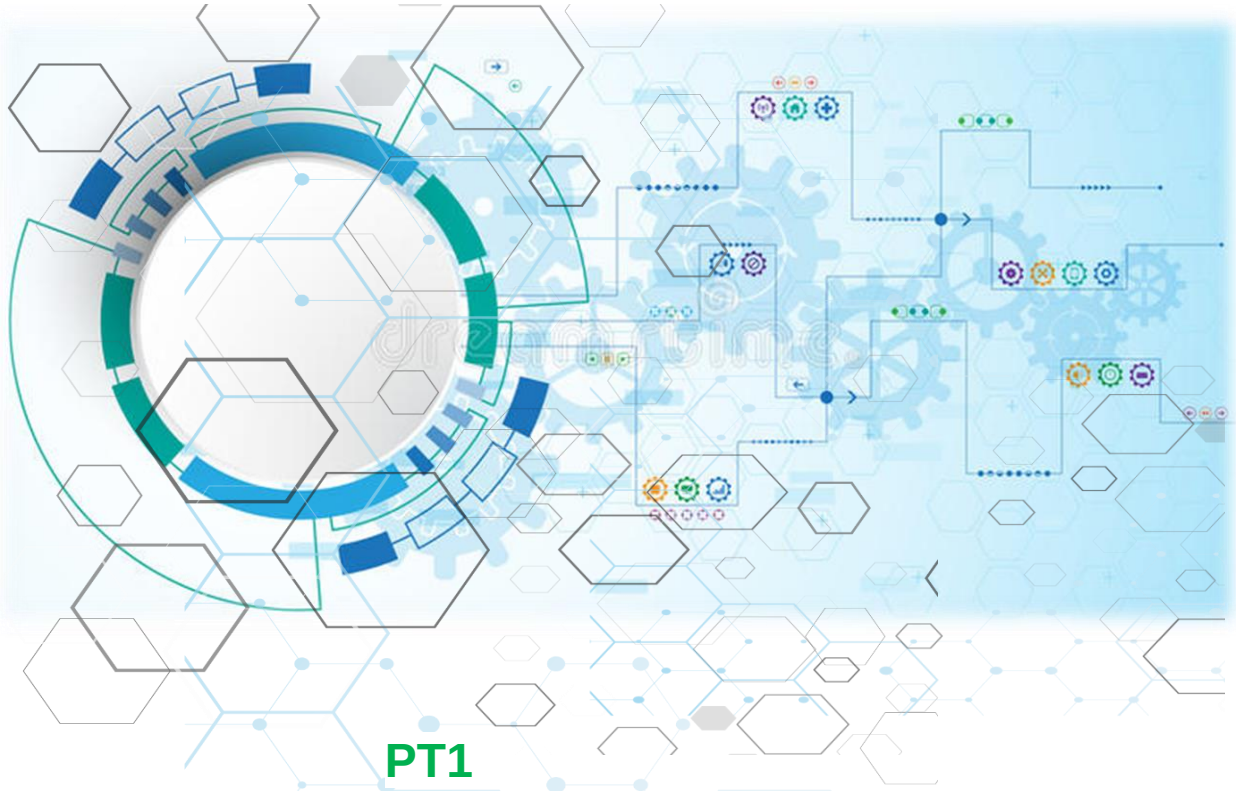
Analysis of Research Policies and Support in
Bolivia & Paraguay

INNOVA "Promoting research Management at Higher Education Institutions in Bolivia and Paraguay"

KA2 – Cooperation for innovation and the exchange of good practices – Capacity building in the field of Higher Education



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1. Introduction

This report corresponds to one of the tangible products of the project on the analysis of research policies in Bolivia and Paraguay. It is a document divided into three levels of analysis: national, institutional, and individual.

For the analysis of policies at the national level, a compilation of bibliographical information was carried out with the help of the project partners on the different research policies in the two countries, and an analysis was prepared considering the following points:

- brief historical analysis of the evolution of research policies in Bolivia and Paraguay (historical background),
- the contribution of research policies (R&D investment in relation to GDP; Competitiveness in research; Patents; Publications and bibliometric indicators; Human resources in research; International cooperation).

The analysis at institutional level was carried out with the information provided by each of the institutions regarding the level of governance and regulatory framework, organisational framework, budget framework, information management framework and cultural framework. The KRA methodology was also used, providing the presentation of a set of key result areas (KRAs) which are positioned as strategic factors (https://strategymanage.com/the-difference-between-a-kra-and-a-kpi/). Within these KRAs, KPIs (key performance indicators) are identified that must be monitored for organisations to achieve their strategic objectives.

The individual analysis was conducted on the extent to which Bolivian and Paraguayan Higher Education Institutions (HEIs) manage, implement, promote and transfer their research actions. As such, following a SWOT methodology, the Consortium designed a comprehensive survey to identify the Strengths, Weaknesses, Opportunities and Threats of the current state of the art in terms of developing effective policy implications for policy makers in the field of research management.

The document will provide a comprehensive picture of the barriers, challenges and support mechanisms that underpin the challenges that researchers and staff of R&D Units face in their activity to produce relevant scientific knowledge.

The structure of this document starts with the introduction, followed by the policy analysis at the national level, the analysis at the institutional level and finally the individual analysis. At the end, a summary of the main conclusions reached is presented.

2. Research Policies Analysis in Bolivia

2.1. Brief historical analysis of the research policies evolution in Bolivia

The development of science and scientific research is supported by the Political Constitution of the State, including resources and policies to implement strategies that incorporate knowledge and the application of new information and communication technologies.

In this context, the Ministry of Education, through the Vice-Ministry of Science and Technology as the executive body responsible for guiding the country's science and technology activities, assumes the constitutional mandate for the construction of a science and technology policy and instruments for its institutionalisation. The Ministry of Rural Development and Lands and the Ministry of Environment and Water are the bodies that promote climate change policies.

The Ministry of Education includes in its organisational structure the Vice-Ministry of Science and Technology, whose mission is to implement and disseminate science, technology and innovation policies, plans and programmes, and to revalue local knowledge and ancestral knowledge.

The regulatory framework established at the national level is based on the Political Constitution of the State (CPE, 2009) and laws on scientific research and climate change. In this regard (table 1):

Table 1: List of documents of the Bolivian regulatory framework1

Document	Analysis
Political Constitution of the State	In articles 91 and 103, establish that higher education has the mission of coordinating and developing scientific, technical and technological research processes to solve the problems of the productive base and its social environment, for the benefit of the general interest. The State guarantees the necessary resources and implements strategies to promote the transfer of science and technology to strengthen the productive base and promote the integral development of society. It also establishes the basis for scientific and technological research activities.
Law No. 2209 - Promotion of Science, Technology and Innovation, 8 June 2001	Its purpose is to establish the guidelines that should orient the development of Science, Technology and Innovation in the country, as well as to establish the institutional and operative mechanisms for its promotion and encouragement. .
Education Law Nº070 "Avelino Siñani - Elizardo Pérez"	Guarantees free education at the different levels of the Plurinational Education System, developing training in scientific, technical, technological and productive research in the different areas of knowledge, based on universal knowledge and know-how, fostering productive, community and environmental

Document	Analysis
	awareness.
Law Nº300 - Framework of Mother Earth and Integral Development for Living Well.	It establishes the vision and foundations of integral development, in harmony and balance with Mother Earth for Living Well. It guarantees the continuity of the regenerative capacity of the components and life systems of Mother Earth, recovering and strengthening local knowledge and ancestral knowledge, in the framework of the complementarity of rights, obligations and duties, as well as the objectives of integral development as a means to achieve Living Well, the bases for planning, public management and investments and the strategic institutional framework for supplementing it. The Plurinational State of Bolivia strengthens the care of Mother Earth through the Ministry of Environment and Water. .
Law No. 164 of 8 August 2011, General Telecommunications, Information Technology, 24 October 2012	It establishes the general telecommunications and information and communication technologies regime, the postal service and the regulation system, in pursuit of living well, guaranteeing the protection of the environment and the individual and collective human right to communication, with respect for the economic, social, legal, political and cultural plurality of all Bolivians, the indigenous native peasant nations and peoples, and the intercultural and Afro-Bolivian communities of the Plurinational State of Bolivia. The Plurinational State of Bolivia promotes regulations and policies on the use of technologies through the Vice-Ministry of Telecommunications, which reports to the Ministry of Public Works.
Law creating the Bolivian Amazon Scientific Research Institute for Sustainable Development (ININCIABO-DS), 7 October 2014..	Its aim is to generate strategic knowledge for decision-making on policies, programmes and projects for the sustainable development of the Bolivian Amazonia.

Based on the regulatory framework, over the last 20 years, various plans, programs, and projects have been built promoting support for research, such as: Patriotic Agenda 2025 (Ministry of Autonomy, 2013), General Economic and Social Development Plan (PDGES) (Ministry of Autonomy, 2013),Economic and Social Development Plan 2021 – 2025 (Ministry of Development Planning, 2021), Institutional Strategic Plan 2016-2020 –Ministry of Education – Plurinational State of Bolivia (Ministry of Education, 2017), Plan of the agricultural and rural sector with integral development (PSARDI) to live well 2016-2020 (Ministry of Rural Development and Lands, 2017) and National Plan of Science, Technology and Innovation of the Bolivian University System 2017-2026 (CEUB, 2017).

The Patriotic Agenda 2025 is the agenda that determines and prioritizes public policies that benefit the integral development of the State, considering the plurality of its peoples, the

diversification of food and management of its own systems with sovereignty and scientific, technological security and productive economic reactivation, industrialization of natural resources, strengthening of research in different areas and support for the training of human resources through post-graduate programmes for the strengthening of strategic State enterprises.

The Patriotic Agenda constitutes the General Economic and Social Development Plan (PDGES) (Ministry of Autonomy, 2013), to which the other medium-term plans must be articulated in accordance with the 13 Pillars that it establishes, among which is the pillar IV: ***Scientific and Technological Sovereignty with Own Identity*** and the pillar IX: ***Environmental Sovereignty with Integral Development, Respecting the Rights of Mother Earth***, related to the field of research. Pillar IV: ***Scientific and Technological Sovereignty with Its Own Identity*** establishes that Bolivia has to be an innovative and creative country, with its own technology, developing innovation, knowledge and technology in strategic, productive and service areas, complementing traditional knowledge, richness in local techniques and technologies and social and professional creativity with modern science. It is essential to continue developing technologies in the areas of food processing, lithium, gas and hydrocarbons, technology for agriculture, manufacturing, transformation of minerals and metals, production of high-tech goods, and biotechnology or technology of life, renewable energy (hydroelectric, wind, biomass use, among others), within the framework of respect for Mother Earth.

Pillar IX Environmental Sovereignty with Integral Development, Respecting the Rights of Mother Earth affirms that all activities of exploration, exploitation, transformation, industrialization, transport and commercialization of renewable and non-renewable natural resources are carried out within the framework of respect and complementarity with the rights of Mother Earth, knowing and respecting the limits of regeneration of its components. To do so, a series of measures are adopted in all priority areas (conservation, protected areas, territorial management, public, private and community actions).

The Economic and Social Development Plan 2021 – 2025 (Ministry of Development Planning, 2021), "Rebuilding the Economy to Live Well, towards Industrialization with Import Substitution", as a medium-term planning instrument, is articulated to the strategic horizon established in the 13 pillars of the Patriotic Agenda, and highlights the Productive Community Social Economic Model (MESCP) (Ministry of Economy and Public Finance, 2014), which is based on the use and maximization of surpluses generated by strategic sectors, establishes income redistribution policies and restores the leading role of the State in the economy, all of the above to reach the civilizational horizon of Living Well (PDES 2021-2025).

Every Strategic Framework contemplates in its formulation process Public Policies or Action Programs aimed at influencing the achievement of institutional or sectoral objectives. Below are the institutional and sectoral Strategic Plans that contemplate Research and Climate Change Policies.

In the Institutional Strategic Plan 2016-2020 of the Ministry of Education of the Plurinational State of Bolivia (Ministry of Education, 2017), the elements of Strategy No. 2: Towards quality education in the Productive Socio-Community Educational Model (Ministry of Education, 2014) are found. Through this strategy, 18 corresponding policies are established, subject to the proposal of "Providing quality education, consolidating the implementation of the Productive Socio-Community Educational Model (MESCP)." The plan allows drawing guidelines for the strengthening of the economic and social development of the country, considering the critical juncture of the socio-sanitary situation that has affected Bolivia and the world in economic and social terms, generating and exacerbating situations of risk and poverty, in addition to generating a digital gap in the academic fields due to the implementation of virtuality and even more to the food crisis.

The Plan of the agricultural and rural sector with integral development (PSARDI) to live well 2016-2020 (Ministry of Rural Development and Lands, 2017) constitutes a sectoral response to the Patriotic Agenda of the Bicentennial 2025 and the conclusions of the Agricultural Summit "Sowing Bolivia". It includes the main contributions made by producers, peasants, colonizers, indigenous, natives, professionals, territorial organizations, and sectoral and trade union organizations, just to mention some of them, in their capacity as fundamental actors of rural and national agricultural development. The PSARDI is an instrument of participatory planning, the product of a broad process of consultation with Civil Society throughout the country and therefore establishes an agenda of commitments between the National Government and the actors linked to agricultural and rural development. The joint and shared responsibility for the conduct and implementation of the strategic vision of the PSARDI, has all the Ministries that make up the Plurinational State of Bolivia under the coordination of the Ministry of Rural Development and Lands (MDRyT) as head of sector. In this sense, the PSARDI is an essential part of the country's Economic and Social Development Plan (PDES) and marks the productive reorientation of the agricultural and rural sector. (www.ruralytierras.gob.bo, 2017)

In the Plan of the Agricultural and Rural Sector with Integral Development (PSARDI) to Live Well 2016-2020, it should be identified the Policy 2: Technological Development and Agricultural, Fisheries and Forestry Innovation. The principles of this Policy focus on giving continuity and consolidating the work of the National Institute of Agricultural and Forestry

Innovation (INIAF), improving technical and administrative processes, complementing these efforts with the constitution and strengthening of the institutionalism for agricultural and forestry research.

The Bolivian University System (SUB) through the Executive Committee of the Bolivian University - CEUB, establishes in a systemic way the sectoral regulatory framework, of mandatory compliance by the public universities and of special regime that conform it. The National Plan of Science and Technology of the Executive Committee of the Bolivian University – CEUB is the basic strategic framework for all the Universities of the Bolivian University System to elaborate their own Institutional Strategic Plans. Planning in the University System complies with the basis established in the Economic and Social Development Plan and the National Education Sector Plan.

The Institutional Strategic Plans comply cross-evaluations between universities, which result in a compatibility report and subsequent approval of the strategic plans in each university of the Bolivian University System.

In this planning instrument, three policies are established in Strategic Area 2: Research Management, Science, Technology and Innovation:

POLICY 1.

Optimize the planning, structure, process, and funding of research to increase the scientific and technological potential of the university.

POLICY 2.

Optimize the generation, transfer, and dissemination of new knowledge for the development of the Plurinational State of Bolivia

POLICY 3.

Disseminate the results of research, technological development, and innovation processes for the use of society.

Every process of prospective construction implies, from a participatory perspective, the involvement of the actors in question who will be the ones who apply, evaluate and then make the adjustments according to the expected results in each development instrument. From this perspective, the policies and strategies that are presented in this section, although they have complied with the formulation methodology, have not been developed in a participatory manner with the actors involved, or at least with some of them, who are directly related to the management of the research and specifically with the theme of Climate Change.

It can also be observed that, in the Bolivian University System, the planning processes are summoned to the representatives of the universities, which results in the appropriation of these

and in the incorporation in their own policies and development plans that respond to national guidelines, which reflects a systemic work that has an impact on homogeneous effects, at least in the methodology proposed; this is the case of the current Institutional Strategic Plans 2019-2025.

2.2. The contribution of research policies in Bolivia

2.2.1. Investment in R&D respects GDP.

In Latin America and the Caribbean, the average investment in R&D is 0.87% of GDP, only Brazil is above this average with 1.21%; Bolivia does not exceed 0.2% of its GDP in R&D investment (figure 1) (Ministry of Education of Bolivia, 2013).

Regarding R&D expenditure in selected Latin American countries, in the last nine years there was a growth above 50% in countries such as Chile, Colombia, El Salvador, Trinidad and Tobago and Uruguay, at levels higher than the average of Latin America and the Caribbean. (LAC). Comparatively, only Brazil comes close to the level of spending of Canada and Spain. In the region, Bolivia reports 0.16% of investment in R&D in relation to the GDP, equivalent to 27.42 million dollars, exceeding only three countries in the region: Guatemala, El Salvador and Trinidad and Tobago. This shows the complexity of sustaining quality research centres or institutes, that contribute significantly to the state of science and technology, reducing their innovation capacities to rank 124th out of 142 countries in the world, according to the Global Competitiveness Index (WEF, 2019).

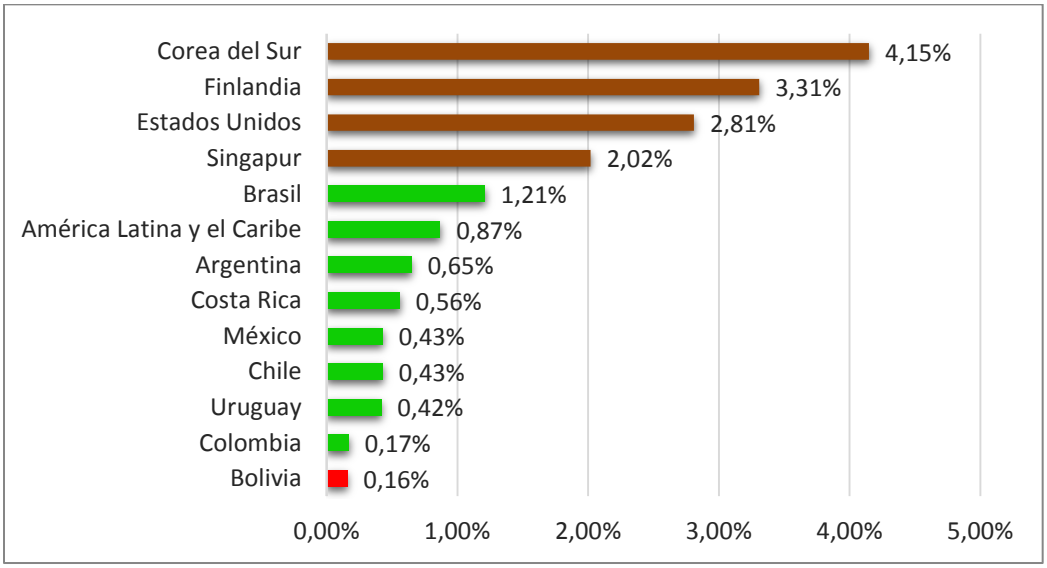

Figure 1: Investment in R&D in countries of the region, compared to developed economies, according to 2013 data (in % GDP)

Source: World Bank, 2016. National Science and Technology Plan (PNCyT, 2017-2026).

2.2.2. Competitiveness in research

In the competitiveness ranking, Bolivia appears in 117th place out of a total of 140 countries, revealing in comparative terms, a low competitiveness. However, there is an improvement in the positioning in the ranking between 2014 and 2015.

2.2.3. Patent indicator

In 2017, Bolivia registered 63 patents granted, of which only 3 correspond to people living in the country, surpassing only Paraguay. In relation to the application of patents versus the granting of patents, Bolivia presents 18%, below the average value of Latin America and the Caribbean (LAC) (34%). This could be an indicator of low scientific and innovative production and little attention to the protection of scientific and intellectual property.

2.2.4. Publications and bibliometric indicators

In South America, the economic expansion of the last two decades and increased investment in research and development have led to an increase in publications resulting from research. However, the impact of this research is low since a third of the publications are not indexed in international databases, such as *Elsevier's Scopus*, or *Thomson Reuters' Web of Science*, acknowledging the low scientific recognition of the research produced.

For its part, Bolivia configures an R&D ecosystem with insufficient and deficient human capital, since it has one of the lowest amounts of researchers (only 0.35 per 1000 inhabitants) among which 17% are doctoral graduates (RYCT, 2019). In addition, scientists concentrate on the higher education sector, since 88% of the research community works for a university (UNESCO, 2018). This dynamic has left the nation in last place in LAC publication intensity index (only 19 publications per million inhabitants), highly dependent on the external initiative for scientific publication (94% of the production of articles is co-authored with foreign researchers) (UNESCO, 2018) and with a low capacity to obtain the grant of patents (only 7 patents granted to residents since 2010) (OMPI, 2019).

2.2.5. Human resources in research

Compared to the Ibero-American average (1.72), Bolivia and Colombia occupy the last places in the number of researchers per thousand people of the economically active population: 0.35 and 0.3 respectively; although the populations of both countries differ by a ratio of one to five.

Bolivia has a low number of researchers per thousand inhabitants. Most of the researchers with a doctorate degree belong to the areas of Natural Sciences, Social Sciences (51%), while at the Master's level professionals are concentrated in Engineering and Technology and Social Sciences, with 48%. The fact that investment in higher education in relation to GDP in Bolivia (2.53% of GDP) is higher than the average value of Latin America (1.38%) and the OECD average value (1.5%) shows that an effort is made in higher academic training, but without impact on quality research.

Considering that research, in the academic field, is carried out mainly at the level of master's and doctoral degrees, it is understood that the strategy may go through promoting more teaching with applied research in master's and doctoral degrees, trying to produce more research with the projects and models of evaluation of classes and theses and dissertations.

3. Research Policies Analysis in Paraguay

3.1. Brief historical analysis of the research policies evolution in Paraguay

Paraguay's first scientific and technological development plan began in 1972, with the publication by the National Institute of Technology and Standardization of the first study on human and financial resources allocated to scientific-technological activities in Paraguay (INTN, 1972 in UNESCO, 2018). The second survey was conducted only a decade later (INTN, 1982 at UNESCO, 2018). Little by little, the INTN became increasingly involved in the strategic aspects of science, technology and innovation activities.

Research policy in Paraguay is closely related to the establishment of democracy in the country. With the overthrow of the current dictatorship, the Science and Technology Commission was created in the Chamber of Deputies, which became an important support for the future creation of the National Council of Science and Technology (CONACYT). It was this same Commission that supported and organized, together with the Organization of American States, in 1990, the "Technology Forum for the Development of Paraguay", through which new priorities were identified at the organizational, educational, stay and scientific and technological development levels, the result of discussions between entrepreneurs, researchers, government and legislators.

In the drafting of the new National Constitution in 1992, fundamental changes were incorporated in the structure and functioning of the National State, which also led to profound transformations in the field of education and, in turn, in the field of research. Democracy allowed for a closer relationship with education, which in turn led to the founding of the National Council of Science and Technology (CONACYT) in 1997, as the government body for the country's science, technology and innovation policies. It is this government agency responsible for the national science and technology system to stimulate and promote scientific and technological research; the generation, dissemination and transfer of knowledge; invention, innovation, scientific and technological education; metrology, standardization and quality of products and services, development of national technologies and management of science and technology (UNESCO, 2018).

In 2012, Law 4798 was ratified, which creates the National Directorate of Intellectual Property (DINAPI) in Paraguay, as a legal entity of public law, with an autarchic character and its own patrimony, as an organ of execution of the national intellectual property policy. This body

proposes the National Intellectual Property Plan, which is implemented through six strategic axes: (i) strengthening of the National Intellectual Property System, (ii) social awareness of intellectual property as an instrument of development, (iii) use of intellectual property as an instrument of competitiveness, (iv) access to knowledge and technology transfer, (v) promotion of intellectual property strategies in areas of interest for national development, and (vi) optimization of the level of compliance with intellectual property laws (UNESCO, 2018).

3.2. The contribution of research policies in Paraguay

3.2.1. Investment in R&D respects GDP.

Funding to support R&D is usually from a variety of sources, including businesses, national and international governments, academic institutions, foreign patrons and other non-profit organizations. The mix of funding sources varies according to the characteristics of each country.

In the study carried out by UNESCO, it is stated that the internal social rate of return on R&D activities becomes visible when a certain fraction of GDP (between 1.5% and 2%) is invested and a minimum critical mass of researchers is allocated (EJC – Full-time equivalent) per million inhabitants (approximately 1,000 to 1,200 researchers EJC per million inhabitants). When national research and innovation systems do not reach the minimum proportions mentioned, it is almost impossible to measure the influence of scientific research, technological development and productive innovation activities on the economy of a given society.

In Paraguay, these values are not yet reached. According to the same study, despite an increase in the percentage of GDP allocated to R&D activities, specifically between 2015 and 2016, these values are still considered low.

Regarding the evolution of gross national expenditure on research and experimental development, expressed as a percentage of GDP, in Paraguay during the period 2001-2016, it is observed that, after a period of declining spending as a percentage of GDP and a turning point in 2008, domestic investment in R&D begins to rise again.

Regarding the percentage distribution of R&D expenses by type of research and main area of knowledge, it is observed that most of the expenses are made in applied research and mainly in agricultural sciences.

3.2.2. Competitiveness in research

Regarding research competitiveness, data are presented only on laboratory equipment dedicated to scientific and technological research. Since 2016, annually, CONACYT applies a survey aimed at universities and other organizations dedicated to research, with the objective of: (i) creating an information bank that constitutes an inventory of laboratory equipment dedicated to R&D; (ii) identify the needs of the different national laboratories; (iii) strengthen the existing scientific and technological infrastructure; (iv) design policy instruments for the renovation, extension and rationalisation of infrastructure; and (v) reduce the gap with other countries in the region.

Through this study, the existence of quality laboratory equipment was verified (233 in total), distributed in 105 public and private research units, but concentrated mostly in Asunción (about 78%).

Of the 233 equipment inventoried, 47% is used in the field of medical and health sciences; 45% in the field of natural sciences; 33% in the field of agricultural sciences; 28% in the field of engineering and technology; 6% in the field of social sciences and 1% in the field of human sciences.

3.2.3. Patent indicator

The analysis of the number of patents is one of the fundamental pieces for the analysis and evaluation of technological innovation in a country or region. Globally, it is observed that most patents are applied by countries belonging to the Asia and North American region. According to data presented by UNESCO (2018), the distribution is as follows: 63% in Asia; 20.5% in North America; 11.3% in Europe; 2% in Latin America and the Caribbean; 1.1% in Oceania and 0.5% in Africa. Paraguay is a country with few patent applications: In recent years, it has only managed to get between 1 and 4 patents granted per year (UNESCO, 2018).

In this regard, it is important to note that there is a perceived need to regulate or clarify procedures in Paraguayan universities, with respect to the management of patents. Due to the absence of regulations regarding patents, products, software and other types of work, fruits of academic research, generally remain unpatented, despite the fact that there is legislation and procedures for the registration of patents at the national level.

3.2.4. Publications and bibliometric indicators

Bibliometric indicators have been used to measure or evaluate the results of academic research at the individual, group, institutional and national levels.

The Web of Science (WoS) database, which includes the Science Citation Index Expanded (SCI-EXP), the Social Sciences Citation Index (SSCI) and the Arts & Humanities Citation Index (A&HCI), and SCOPUS, managed by Elsevier (UNESCO, 2018), have been considered the most relevant sources of information on the productivity of scientific knowledge.

In the case of Latin America, and specifically of researchers from Paraguay, publications are mostly made in local and regional journals, indexed in databases such as Latindex, referring to publications from Latin America and the Caribbean (UNESCO, 2018). According to the publication of Latindex (2022), Paraguay appears, along with Bolivia, among the countries that register the least publication in the online journal modality (Figure 2), as well as other types of publications.

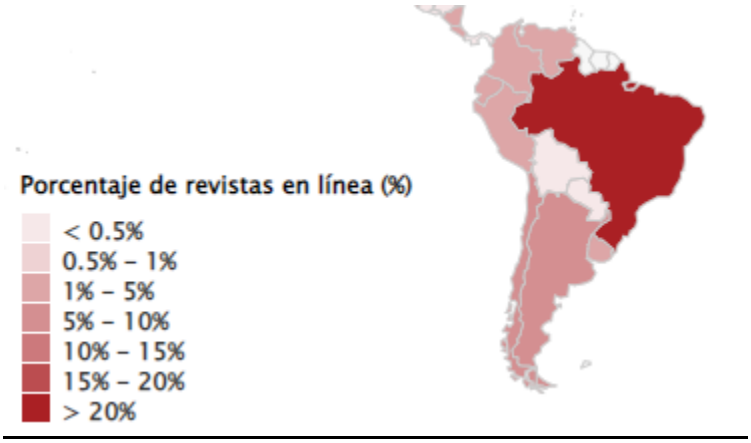

Figure 2: Registration of publications in online journals by country

Note. Taken from Latindex (2022)

However, according to UNESCO (2018), in recent years there has been an increase in publications by Paraguayan researchers in the most relevant databases (WoS and SCOPUS). In 2010, there were only 57 articles with at least one author resident in Paraguay in WoS and 77 in SCOPUS, this figure increased to 179 in WoS and 195 in SCOPUS in 2017. In that same year, according to SCOPUS data, Paraguay ranked 133rd in world production of articles and 17th in Latin America and the Caribbean, only behind Bolivia.

3.2.5. Human resources in research

The existence of trained and specialized human resources is essential to produce more and better scientific knowledge, as well as to increase the value of scientific production, technology and innovation (STI).

Existing data indicate that in 2008, there were around 800 researchers in Paraguay, a figure that doubled in 2012, as a result of STI policy instruments that began to be operated through CONACYT.

Although Paraguay is below other countries with respect to research and scientific production, in recent years it has experienced important advances, such as the implementation of the National Program of Postgraduate Scholarships Abroad "Don Carlos Antonio López" (BECAL) and the actions deployed by CONACYT, such as the PRONII program, of economic incentives for researchers, according to categories or levels.

As for BECAL, as it appears on its institutional web, its objective is: "... contribute to the increase in the levels of generation and application of knowledge in the areas of science and technology (CyT) and learning in education through the improvement of the supply of Advanced Human Capital (CHA) in these areas" (BECAL, 21 August 2018). On the other hand, regarding updated data until 2021, there is a significant number of professionals who benefited by this scholarship program (Figure 3).

Convocatorias hasta la fecha	Totalidad de Seleccionados	Becas otorgadas (con contrato)	Becarios Retornados
78	2.507	2.143	1.191

Figure 3: List of calls and scholarships awarded by BECAL, until December 2021

Note. Information extracted from the BECAL page (2021)

Regarding the incentive program for researchers (PRONII, of CONACYT), according to the institution's database, updated until 2020, in Paraguay there are 566 researchers categorized in this program, distributed in various areas of knowledge, in the different levels or categories (Candidate researcher, Level I, Level II, Level III and Emeritus), a greater concentration was observed at the levels of Candidate researcher and Level I. Although not all researchers in Paraguay are registered or categorized in the PRONII program, these data reveal that in the country, there is still a large gap between the number of researchers per inhabitants that is established in the UNESCO study (1,000 or 1,200 researchers per million inhabitants).

This PRONII program has been implemented since 2011 and aims to "promote the career of researchers in Paraguay, through their categorization, evaluation of their scientific and technological production, as well as through the granting of economic incentives" (CONACYT, 2022, para. 1).

Another important aspect that can impact human resources for research is Law 4995 on Higher Education, ratified in 2013. This Law establishes the figure of research professors in institutions of higher education or the career of the researcher, as well as a minimum staff of professors with master's and doctoral degrees that institutions must have. Although progress is needed in this area, especially in regulation and implementation, higher education institutions must gradually adapt to legal requirements.

4. Institutional Analysis

This analysis was carried out according to the information provided by each of the member institutions of the INNOVA Consortium, regarding the level of governance and regulatory, organizational, budget, information management and thematic frameworks and scientific relevance.

4.1. Governance and Regulatory Framework

All universities have strategic plans and/or regulations, which identify policies and objectives related to research.

The UPSA, in its Strategic Plan "PLAN HORIZONTE UPSA 2034", integrates policies and goals defined with the purpose of reaffirming its institutional positioning by strengthening teaching, incorporating competencies for research and interaction in the faculty, strengthening the university-business link, promoting the participation of the private sectors, governmental, community and voluntary research projects, the application of Information and Communication Technologies (ICT) in teaching, and the dynamization of interuniversity and international research and extension projects. A normative instrument is the Research Regulation, which establishes rules and guidelines for the presentation, approval, administration, and evaluation of the research programs that are generated at the University, with the purpose of promoting teaching activity in research projects and promoting the creation of research centres at the faculty level.

The USFX identifies research as a fundamental element within its institutional work and its development projections, as expressed in its Mission and Vision in its Strategic Plan 2019-2025. The new focus of innovative-entrepreneurial University is a challenge that involves instilling among its students, teachers, and administrators a culture of innovation and entrepreneurship. In the new approach, research and interaction play a strategic role, as missions' functions of the University. It has a Research, Development, and Innovation Regulation, which establishes the regulatory and organizational framework for the management of the processes of scientific research, development and innovation that take place at the University. It includes the Vice-Rectorate, Directorate of Research, Science and Technology; Social Interaction Centres; Optional Research and Development (CISID); Centre for Graduate Studies and Research (CEPI) and research institutes.

The UAGRM by mandate of its Organic Statute, approved in 2018, establishes that scientific and technological research is fundamental, mandatory and transversal, constituting an indivisible part of the teaching-learning processes, in coordination with social interaction and extension, and with the postgraduate, so that the whole must be reflected in the academic structure, curricular objectives, plans, programs and evaluation system of the UAGRM. Research must be pertinently oriented to the knowledge and clarification of the Bolivian reality and to the search for concrete solutions to the problems of management, development, and regional, national and international production, linked to economic, technical, cultural and social problems.

The UCB has a centralized management system, made up of the Vice-Rectorate for Research, the National Research Coordination, and the Regional Research Coordinators. Its regulatory framework consists of a national statistical plan and regional plans, research regulations, researcher regulations, regional research council regulations, and regulations for funding management.

In the universities of Paraguay, research management assumes a mixed model.

The UNE has a strategic policy body for decision-making in this area (CONCITUNE). The management of the research is developed through the different academic units, in accordance with their attributions provided for by the institutional regulations. The Institutional Strategic Plan establishes the research policy for the entire University and each academic unit formulates its own plan, according to the discipline and the area in which it is developed.

At UNA, research management is decentralized in the Faculties (14) and Research Centres dependent on the University. The regulatory framework of the university is mainly made up of the Statute, Policy and Strategic Plan of the UNA 2021-2025. There is also an annual fund that comes from State resources for the development of research projects in the faculties of the UNA, distributed annually proportionally. The administration of these resources is centralized in the Rectorate, managed through the General Directorate of Scientific and Technological Research.

At the UC, research policies are outlined by the Academic and Research Vice-Rectorate, through the General Directorate of Postgraduate and Research as the most operational instance. Policies around research are defined every five years in the institution's strategic plan, where the weaknesses and strengths of research are mentioned and the lines to promote it are defined. From the General Directorate of Postgraduate and Research, the Postgraduate and Research Directorates that are in the different headquarters, faculties and pedagogical units are derived. Thus, several specialized research and development centres operate in the UC with a

more autonomous character. In this sense, the research and development centres with a technological focus, and in social sciences stand out (Catholic University "Nuestra Señora de la Asunción", s.f.a.).

4.2. Organizational Framework

Structures, commissions and units responsible for the management of the research are analyzed as the organizational framework, as well as their functions within the institution. The universities are organized as follows (Table 2).

Table 2: Table of research management instances within universities

UNIVERSITIES	RESEARCH MANAGEMENT STRUCTURES
UPSA	The research regulations identify mechanisms to encourage research activities and the improvement of teaching programs at the undergraduate and graduate levels; boost the University-Business-Society relationship, development, and innovation; promote research projects in the private, governmental, community and social sectors; as well as strengthening inter-university relations and participation in international cooperation projects. The research management bodies are the Research Directorate and the Research Centres, responsible for coordinating and promoting research and providing support services in their respective scientific fields.
USFX	Scientific research at the University is carried out through the following instances: Research, science, and technology directorate Facultative Centres for Social Interaction, Research and Development (CISID) Centre for Graduate Studies and Research (CEPI) Facultative research institutes Specialized university research centres or institutes Student scientific societies
UAGRM	Research management units Institutes and Research Centres Laboratories Observatories Museums Veterinary Hospital Experimental Farms Scientific Research Societies
UCB	Research management Units: National research coordination Regional research coordination Publications Committee The Headquarters Coordinator works with the research units: institutes, centres, and with research groups and student scientific societies. The establishment of an Ethics Committee is going to be created soon.

UNIVERSITIES	RESEARCH MANAGEMENT STRUCTURES
UNE	The Council of Science, Technology, and Innovation (CONCITUNE) - advises the rector in the stimulation and promotion of scientific and technological research, the generation and dissemination and transfer of knowledge, invention, innovation, scientific and technological education, the development of technologies and the corresponding management.
UNA	In UNA, the structure defined for the management of research is concentrated in the General Directorate of Research, Scientific and Technological, dependent on the Rectorate, composed of the following dependencies: Centre for Technology Transfer and Research Results Multidisciplinary Centre for Technological Research National Atomic Energy Commission Business Incubator Management with their respective areas and dependencies Coordination of management of scientific research and innovation
UC	At the UC, the research management bodies are as follows: Academic and Research Vice-Rectorate (central institutional level) Directorate-General for Postgraduate and Research (central institutional level) Vice-Directorates or Academic Directorates (headquarters level, pedagogical units) Postgraduate and Research Directorates (headquarters level, pedagogical units) Research and development centres, in some locations, in accordance with the areas of knowledge in which they work.

Note. Own elaboration based on information provided by universities

4.3. Budget Framework

Table 3 presents the results of the analysis of the budget framework, per university.

Table 3: The budgetary management of research in universities

UNIVERSITIES	BUDGET MANAGEMENT
UPSA	UPSA research is financed with its own funds obtained through partnerships: UPSA Foundation Agreement - National Academy of Sciences of Bolivia for activities of promotion, financing, and dissemination of scientific research in Santa Cruz (2010), in the areas of sciences and culture with funding for up to $1,500. for each project and execution periods not exceeding 12 months. The Teacher Development Plan establishes as a strategic objective the education and training of research teachers, as well as the financing and dissemination of their research. In this context, since 2019, the UPSA has enabled teachers to participate in a doctoral program in prestigious European universities through the Carolina Foundation Scholarship, as well as the realization of workshops and short-term training programs in aspects of academic writing, search for scientific information, among others. In the last two years, UPSA has financed, with its own resources, 15 research projects presented by its professors with an average of $1,000. per project.
USFX	THE USFX has two sources of funding annually: FANCESA dividends, with a budget of Bs 25,000.00 ($3580); and HDI resources, with Bs. 1,500,000.00 ($215,500) It also has research grants for students annually. Between 2016 and 2020, almost 450 scholarships have been awarded.
UAGRM	The UAGRM presents the budget, in terms of equipment of research units and research projects. The data presented correspond to the period from 2016 to 2020: 2016: 17.970.698 Bs 2017: 2.892.880 Bs 2018: 1.764.051 Bs 2019: 11.395.983 Bs 2020: 4.435.471 Bs
UCB	Active research institutes are the research units with allocated budget. In the 2021 management, the following amounts were allocated: - Institute of Socio-Economic Research $8,500 - Behavioral Science Research Institute $7,963 These same units usually obtain other resources directly, either by applications to calls or consultancies. The UCB headquarters La Paz, issues an internal call with its own resources for the research units. The amount allocated to this call is variable. By 2021, $50,000 was allocated for this initiative, through each headquarters research coordination.
UNE	The UNE, as a public body, is subject to the financial administration of the State, so the budget available for research depends to a large extent on these resources. The public budget in Paraguay does not include specific allocations for the management of research, so it is up to the internal bodies of the UNE to manage these resources. The resources allocated for research,

UNIVERSITIES	BUDGET MANAGEMENT
	for the most part, correspond to salaries of the personnel who exercise functions in this area.
UNA	The UNA is a public institution and its funds come from the State budget available for research, and it relies heavily on these resources. The public budget in Paraguay does not include specific allocations for the management of research, most of which corresponds to salaries of personnel performing functions in this area.
UC	At the Catholic University of Paraguay, each faculty or unit annually plans a budget that it will allocate to research, which is usually paid for with its own funds, that is, funds from the income generated by the various fees paid by students. The average assigned to research over a period of three years is 1,825,423,580 Guaranies (one thousand eight hundred and twenty-five million, four hundred and twenty-three thousand five hundred and eighty guaranies). In addition, competitive projects are managed or try to apply external funds, such as those offered by CONACYT, through the General Directorate of Postgraduate and Research, an unit dependent on the Academic and Research Vice-Rectorate (Catholic University "Nuestra Señora de la Asunción", s.f.b)

4.4. Information management framework

In the framework of information management, the systemic tools of management, monitoring and storage of data and information on research used by the different institutions are presented. Information management tools differ between institutions. (Table 4).

Table 4: Management of research information

UNIVERSITIES	RESEARCH-BASED INFORMATION MANAGEMENT
UPSA	The University does not have a system of management, monitoring and storage of data and information on research that is developed on a regular basis. Currently, the systematization of publications is an activity that is carried out only to face accreditation processes. It is also important for the University to create virtual repositories of its research in progress (working papers) before they are published in academic journals. These are pending tasks that are being addressed within the framework of their participation in the INNOVA project.
USFX	The USFX has various means of dissemination: book publishing, social networks, presentation of results at national and international conferences, scientific informative bulletins on the University's website, specialized university journals on the Web page (http://revistas.usfx.bo/index.php/rcti/issue/archive), etc.
UAGRM	The UAGRM has a website where it publishes its scientific production. Additionally, the University Directorate of Scientific Research and Technological Innovation has a database on research units, researchers names, research projects, scientific publications, technology transfer and intellectual property. (https://www.uagrm.edu.bo/unidades-administrativas/dicit)
UCB	To monitor the data, the Strategic Plan system is used, where research, management and academic data are loaded. Dissemination is carried out through the university's website, the university's social networks, national and international refereed scientific journals, university's refereed scientific journals, posters generated by research centres and research institutes, journals of research centres and scientific societies.
UNE	The UNE develops and implements knowledge management systems. These include: Activity Manager: gestor.une.edu.py Institutional repositories repositorio.une.edu.py http://servicios.fpune.edu.py:88/jspui/ Scientific dissemination magazines: http://servicios.fpune.edu.py:83/fpunescientific/index.php/fpunescientific Journal Portal: revistas.une.edu.py It also has an office for access to public information, a communication consultancy and each faculty also has communication management units.
UNA	At UNA, the Faculties upload data related to science and technology activities into CONACYT's system of indicators at the national level

UNIVERSITIES	RESEARCH-BASED INFORMATION MANAGEMENT
	(https://act.conacyt.gov.py/), designed to estimate the total number of science and technology activities in institutions that carry out research activities in science and technology at the national level. In addition, the UNA web portal (https://www.una.py/investigacion) publishes data on: Research areas Full-time research professors Conferences of young researchers Links to dependent research centres and institutes Centre for Technology Transfer and Research Results Multidisciplinary Centre for Technological Research National Atomic Energy Commission Business Incubator Management with their respective areas and dependencies Health Sciences Research Institute Portal of the 16 Scientific Journals of the UNA: https://revistascientificas.una.py/ Likewise, each faculty has in its institutional portal the research section that includes the news of the events carried out, this information is also disseminated in the social networks of the institution.
UC	UC implements periodic reports (monthly, quarterly) as a strategy for monitoring research activities. These reports, depending on the types of research projects, are submitted at the central level, to the General Directorate of Postgraduate and Research, as is the case of research projects funded by CONACYT. Also, at the level of faculties and pedagogical units, the delivery of reports on the execution of research projects to the general directors or deans is implemented. Regarding the dissemination of research results, various media are used, such as website, social networks, print media: magazines, books, among others. The University has a central website (https://www.universidadcatolica.edu.py/), where each headquarters or faculties can publish information through the Department of Communication. In turn, each headquarters has its own web page, where disseminates information. In this sense, the Hohenau Pedagogical Unit stands out, which on its website has a repository that includes the following subcategories: publications, congresses, conferences, final degree projects, summaries of final degree projects and galleries (https://uphohenau-extension.edu.py/repositorio/publicaciones/). In addition, the various research and development centres that operate at the University, mostly have web pages (see website of the Centre for Appropriate Technology [CTA] https://cta.uc.edu.py/). However, there is a lack of greater visualization or dissemination of research results, in the various headquarters.

4.5. Thematic Framework and Scientific Relevance

This section briefly describes the scientific disciplines in which each institution stands out for scientific production and relevance, as well as its relations with civil society, environmental communities and the private sector (Table 5).

Table 5: Scientific disciplines in which universities stand out

UNIVERSITIES	MAIN SCIENTIFIC DISCIPLINES RELEVANCES
UPSA	The UPSA was created within the Chamber of Industry, Commerce, Services and Tourism (CAINCO) of Santa Cruz, the largest and most important business union in Bolivia. Since its foundation, UPSA has stood out essentially in the training and generation of knowledge in the business field and also with research in the technological, environmental, social, arts, architecture and business law areas. The UPSA is also a benchmark in the field of public policies through the generation of knowledge as a result of its research, particularly in areas of environmental and waste policies, business arbitration processes, and others.
USFX	USFX excels in the following areas of knowledge: Area of technological and agricultural sciences: it stands out for the range in number of careers and specialties with the highest number of research related to industry and environmental impact. Area of social and legal sciences: stands out for research in direct relation to society. Economic Sciences area: focused on the productive development of the region and job creation. Area of health sciences: dedicated in great magnitude to public health. The purpose of the relationship with civil society is to establish general lines of cooperation and collaboration that contribute to the fulfilment of institutional objectives, through the planning and development of social interaction and extension activities, which are necessary for the implementation and execution of specific activities, execution of programs and projects.
UAGRM	The areas in which the UAGRM stands out are: Legal, Social and Humanistic Sciences Area: works with civil, urban and rural organizations, involved in issues of gender violence between girls, boys, adolescents and young people; as well as with organizations of indigenous peoples, Ayoreos, Chiquitanos, Guaraníes and Guarayos. Participatory, collaborative multidisciplinary and inter-institutional research. Research in the area of Neurosciences and Neuropedagogy. Community Psychology in Rural areas and Urban Communities. Health Sciences Area: Inter-optional programs on issues of environmental impact and health. Agricultural and Livestock Sciences Area: National Centre for Genetic Improvement, approved by Supreme Decree No. 1582. Program of beans, soybeans, purple corn, tropicalized quinoa, fruit growing. Beekeeping studies. In the forest area and environment, the Program of conservation of genetics of seeds of timber trees.

UNIVERSITIES	MAIN SCIENTIFIC DISCIPLINES RELEVANCES
	Technological Sciences Area: development of food from natural products, with intellectual property registration and obtaining patents. Area of Economic, Administrative and Financial Sciences: Publication of two indexed journals: Economics and Oikos Polis, both published quarterly and semiannually respectively, with collaborators of international renown.
UCB	The university is distinguished for carrying out economic and social research through its research institutes. In recent years, the research contribution of the research centres of the Mechatronics Engineering and Environmental Engineering careers has also been important. The closest work with communities is mainly done through the VLIR UOS program. There are no meaningful relationships with the private sector.
UNE	The UNE develops activities in the following areas: agronomic sciences, economic sciences, humanities, legal sciences, technological sciences and health sciences. An Office of Municipal Affairs has been implemented with the aim of detecting the needs in the municipalities of Alto Paraná and where the UNE has headquarters, to elaborate proposals for joint work that articulate efforts and resources for local development. In addition, the UNE Extension Network has been developing activities that articulate the institution with the territory. As an experience of good practice, we can cite the Demominga project, whose objective is to describe the epidemiological characteristics of lifestyles and social determinants associated with chronic non-communicable diseases in the population of the Norma Luisa Fraction of the municipality of Minga Guazú, Alto Paraná Department, Paraguay. The relationship with the environment takes place through the Institutional Communication Unit and the University Extension Department. The faculties have scientific initiation programs, in addition to formal programs related to research methodology. As for postgraduate programs, the University has mechanisms for incorporating students into research projects.
UNA	The UNA stands out for its scientific production in the area of health. It has a teaching hospital, which is part of the National Health System, and Faculties / Degree and Specialization Careers in 23 most demanded medical specialties, which provide services to the community through activities in the teaching-learning process, linkage with the environment (university extension) and specialized services. In addition, research is carried out to respond to the needs identified in the communities at the Institute of Health Sciences, under the UNA. Regarding the relations of the UNA with civil society and the private sector, there are initiatives implemented and others in the design stages, highlighting the agreements in the socio-productive areas. There is a Centre for The Transfer of Technologies and Research Results (CETTRI), on the San Lorenzo campus, under the General Directorate of Scientific and Technological Research (DGICT), the unit responsible for the articulation between the public and private sectors. The purpose of the Centre is to integrate the UNA with the public and private business environment, safeguarding intellectual property and promoting the economic and social profitability of the research, innovation and technology transfer activity generated by the academy.

UNIVERSITIES	MAIN SCIENTIFIC DISCIPLINES RELEVANCES
	Among the functions of the Centre, the following are: to identify technologies developed in the faculties of the UNA with high potential for application in the economic and social fields; manage sources of financing for technological projects; carry out the processes of negotiation and preparation of technology transfer contracts; and implement the institutional policies for the protection of intellectual property and technology transfer developed in the institution. The Multidisciplinary Centre for Technological Research whose purpose is to carry out scientific and technological research work in the area of its competence and provide specialized services, in accordance with current legal and technical regulations; as well as offering training and higher education courses. The National Atomic Energy Commission whose purpose is to promote the peaceful use of nuclear technology, the training of specialized resources, the provision of services in its area of competence and research in the field. The Directorate of Business Incubator with its respective areas and dependencies seeks to promote networking between the governmental, non-governmental, business, educational and scientific sectors for the development and consolidation of a national incubation system and contribute to the improvement of the quality of life of the population and sustainable national development, through support for the creation and consolidation of companies. Since 2007, the UNA Young Researchers' Conference has been held and to date more than 2,000 young researchers have participated demonstrating initiative and great professional capacity, who over the years have obtained more than 50 international awards for the research presented. This has consolidated the Conference as the main space for scientific initiation in Paraguay. The thematic areas in which the research is developed include: Natural sciences Medical and Health Sciences Agricultural and Veterinary Sciences Engineering and Technology Social sciences Arts and Humanities
UC	The UC stands out in the field of research in applied technological sciences, areas associated with the environment and climate, and human sciences: education and anthropology. Several research and development centres that operate at the University are related to the technological area: Centre for Appropriate Technology (CTA), Digital Electronics Laboratory (LED), Centre for Research and Technological Development (CIDT), Scientific and Technological Park, Engineering Centre for Research, Development and Technological Innovation (CIDIT), Centre for Research, Sciences, Technology and Advanced Innovation (CICTIA). As for the social and human sciences, the following centres stand out: Centre for Anthropological Studies of the Catholic University (CEADUC), Centre for Bioethics of the Catholic University (CEBUC), Tomás Moro Institute and Centre for Public Policies (CPP). Likewise, the institution is part of the Support Network for Educational Management (AGE Network), which allows it to undertake research jointly with other Ibero-American institutions in the field of

UNIVERSITIES	MAIN SCIENTIFIC DISCIPLINES RELEVANCES
	education sciences, with a focus on educational management. With a focus on land and the environment, there is the Centre for Study and Research on Rural Law and Agrarian Reform (CEIDRA) and the Soil Laboratory.

4.6. Indicators of scientific production (KRA)

A set of key performance indicators (KPIs) was selected, based on the key results area (KRA) methodology, which identify the key areas that should be evaluated and monitored for a correct analysis of the research management policies of the universities present in the consortium. The analysis of these indicators refers to the last 5 years.

As Brown and Cheffers (1991) state, to determine the good performance of a given activity, it is necessary to identify the key result areas (KRA), which determine the priorities of the competencies or conditions to be evaluated.

In this sense, five key areas were identified (research, teaching, management, human resources, and infrastructures) and a set of KPIs was proposed in each of them. On this basis, a comparative analysis of the current situation of the institutions involved in this study was carried out.

KRA 1 – Research

For KRA 1, 10 key performance indicators (KPIs) were evaluated, referring to the state of research at the level of scientific publications, books and book chapters, patents, grants and collaborations with the private sector.

At a general level, most scientific publications are national in scope and all institutions contribute to this indicator (Figure 4), highlighting UNA with a much higher value than other institutions. The UCB, the USFX and the UNE have also a higher contribution that the other institutions in this type of publications.

As for scientific publications at the international level, the UNA stands out once again. Regarding publications in scientific congresses, the USFX presents the largest number, followed by the UPSA and the UC.

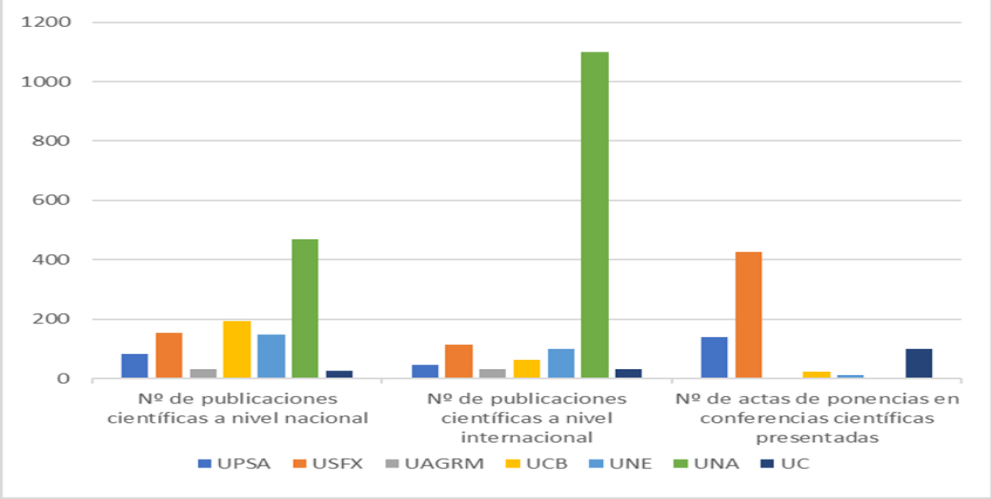

Figure 4: Scientific publications

Note. Own elaboration based on information provided by the institutions

In relation to books and book chapters published (Figure 5), it is noted that UNA also in highlighted from other institutions. On the other hand, the UC, the UPSA and the UAGRM are the institutions that publish less in this area.

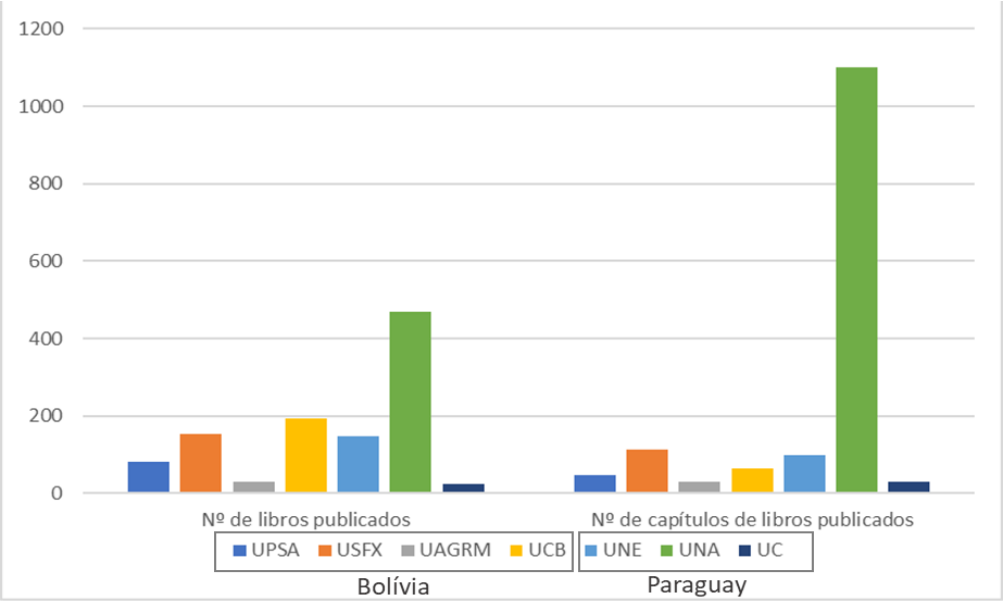

Figure 5: Chapters of published books

Note. Own elaboration based on information provided by the institutions

Figure 6 shows data on grants and collaboration with the private sector.

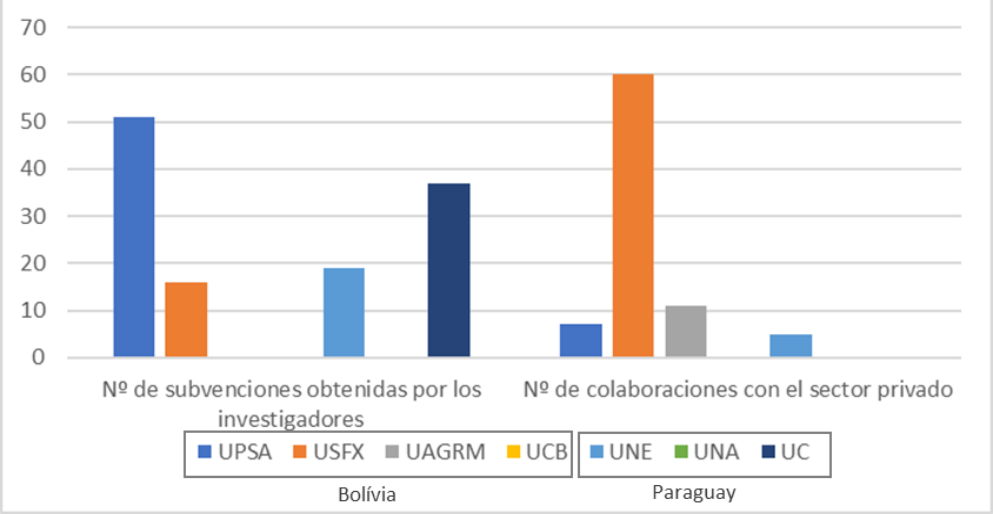

Figure 6: Grants and collaborations

Note. Own elaboration based on information provided by the institutions

Only UPSA, USFX, UNE and UC provided information about this subject. It can be noted that the UPSA is the institution that reported the highest number of scholarships obtained by researchers, followed by the UC.

In terms of collaborations with the private sector, USFX stands out with 60 collaborations. Some of the institutions do not have this information.

Regarding patents, and taking into account this consortium, the UNE and the UAGRM are the institutions that register most patents (Figure 7).

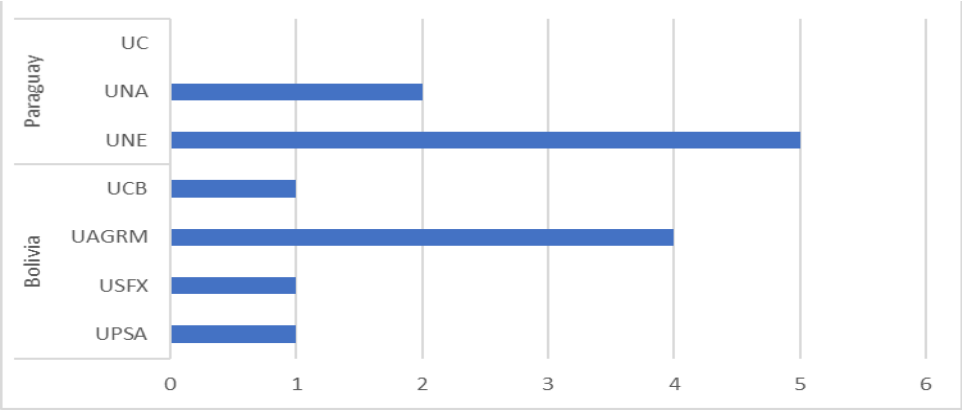

Figure 7: Number of patents

Note. Own elaboration based on information provided by the institutions

KRA 2 - Teaching

Regarding KRA 2 - Teaching, 7 key performance indicators (KPIs) were evaluated, as shown in the following figure (Figure 8).

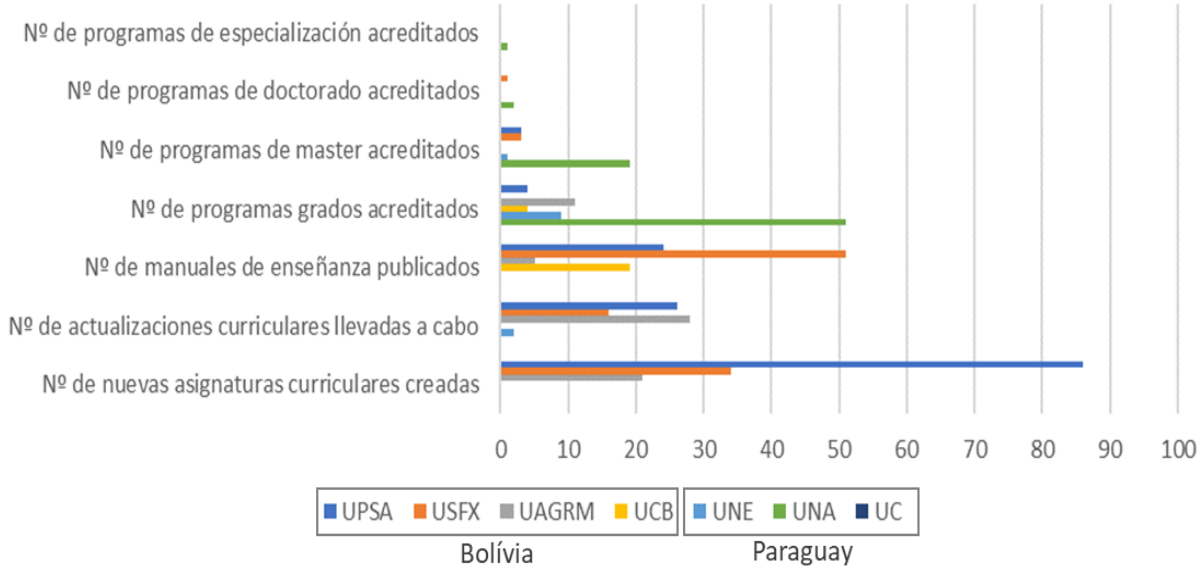

Figure 8: Teaching

Note. Own elaboration based on information provided by the institutions

The amounts presented are very different between the institutions. However, there is a general commitment in this field, in terms of the number of new curricular subjects created, the updates made, the number of published manuals, and even the number of accredited degree programs. On the contrary, in general terms, there is a limited number of accredited master's, doctoral and specialization programs, being led by the UNA, the institution with the largest number of accredited postgraduate programs.

KRA 3 – Management

In KRA 3 - Management, 4 key performance indicators (KPIs) were evaluated: research dissemination campaigns, research management, protocols and strategic plans. Next, the analysis of each of the indicators (Figure 9).

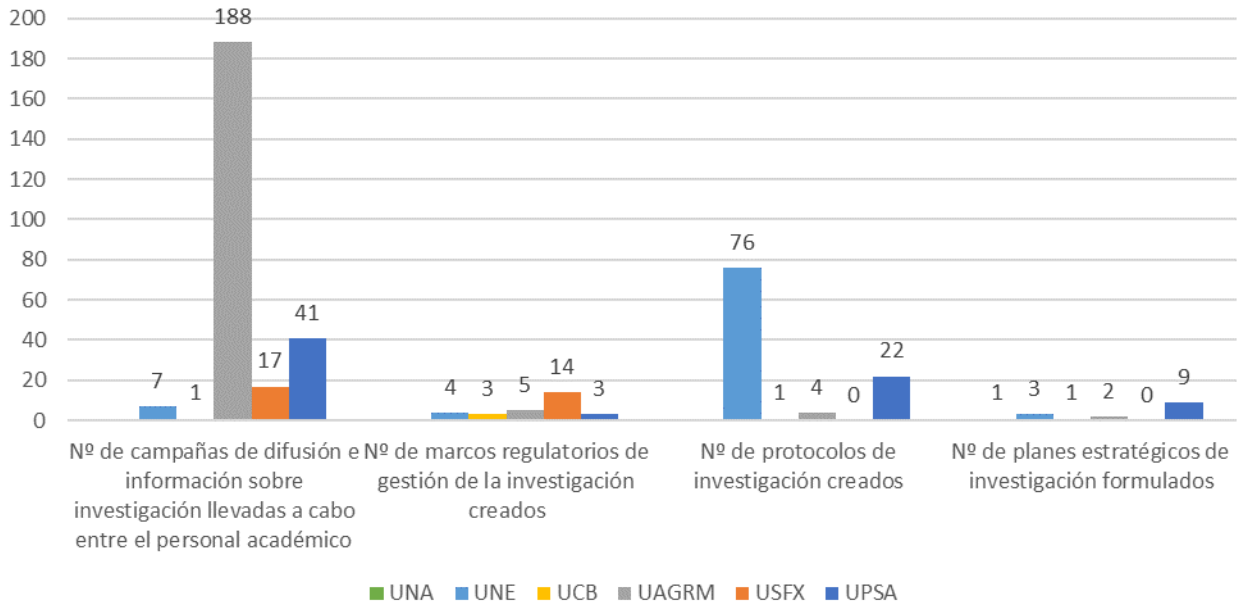

Figure 9: Management

Note. Own elaboration based on information provided by the institutions

In relation to dissemination and information activities on research, it is found that the UAGRM is the one that invests the most. This is perhaps one of the indicators on which more work should be done, to improve and optimize the communication and dissemination of research actions.

With respect to the other indicators, the following stand out: the USFX with 14 regulations, the UNE with the largest number of protocols created and the UPSA with 9 strategic plans.

This shows that it is very necessary to develop, in these two countries, strategies to improve research management and standardize processes and optimize research within institutions.

KRA 4 - Human Resources

For KRA 4 - Human Resources (Figure 10), the evaluation focused on six key performance indicators (KPIs). Among these, three aim to know the situation of teaching staff in relation to their level of training: doctoral degree, postgraduate studies or undergraduate studies. The other three are related to the issue of teacher training in research and its mobility (national and international).

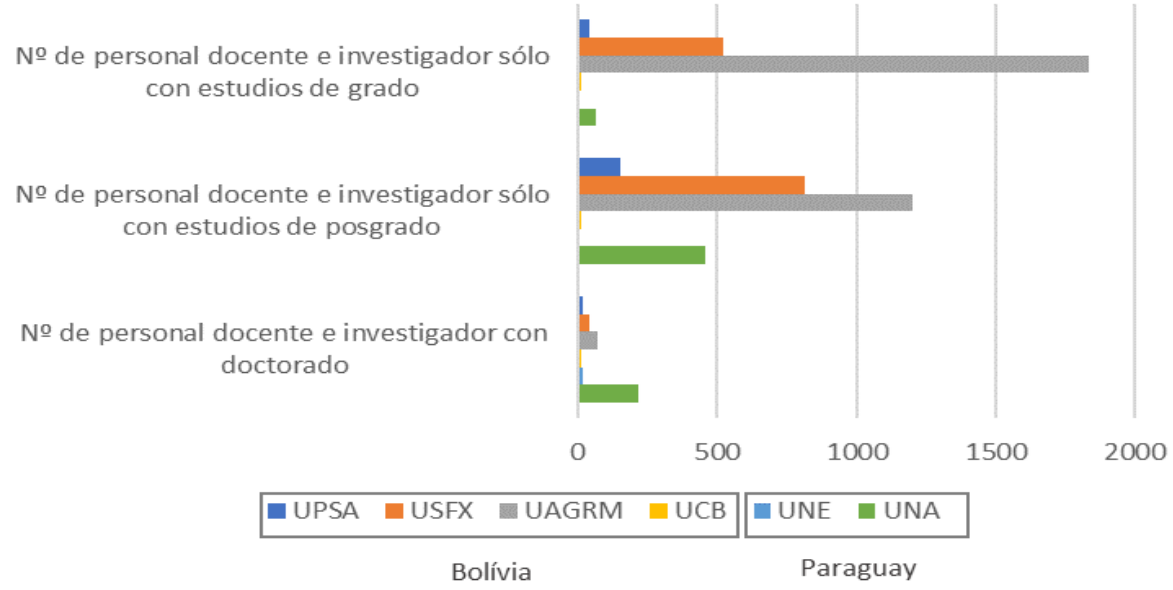

Figure 10: N° of teaching and research staff with postgraduate degrees

Note. Own elaboration based on information provided by the institutions

As for the teaching staff, it is possible to refer that:

- Most of the teaching and research staff of the UAGRM have undergraduate or postgraduate studies, with few professors with doctorates.
- At USFX and UPSA there is a greater number of teachers with postgraduate studies than with undergraduate studies, but the number of professors with a doctoral degree is still very low.
- At UCB and UNE, most teachers already have a doctorate, but there are still some who only have undergraduate and postgraduate studies.
- At UNA, most teachers have postgraduate studies, and a significant number have doctorates.

The following figure (11) shows the indicators of teacher training in research and their mobility (national and international).

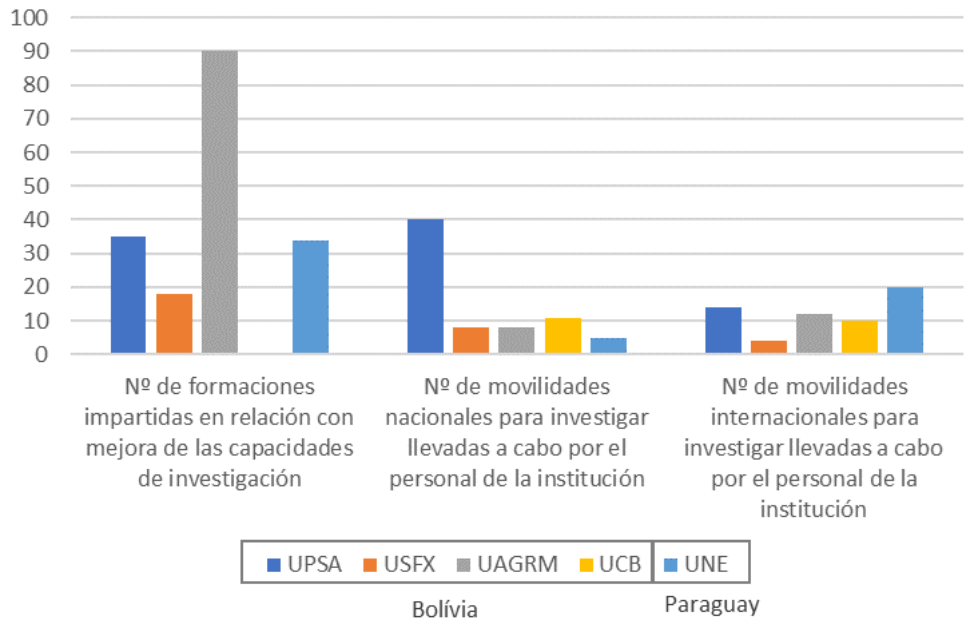

Figure 11: Training and mobility

Note. Own elaboration based on information provided by the institutions

In terms of training, the UAGRM is the one that has invested the most in this indicator, followed by the UPSA and the UNE. On the other hand, with regard to mobility, the UPSA and the UNE stand out, at the national and international levels respectively.

KRA 5 – Infrastructure

Finally, the last KRA refers to the infrastructures that each university has, to support the development of research (Figure 12).

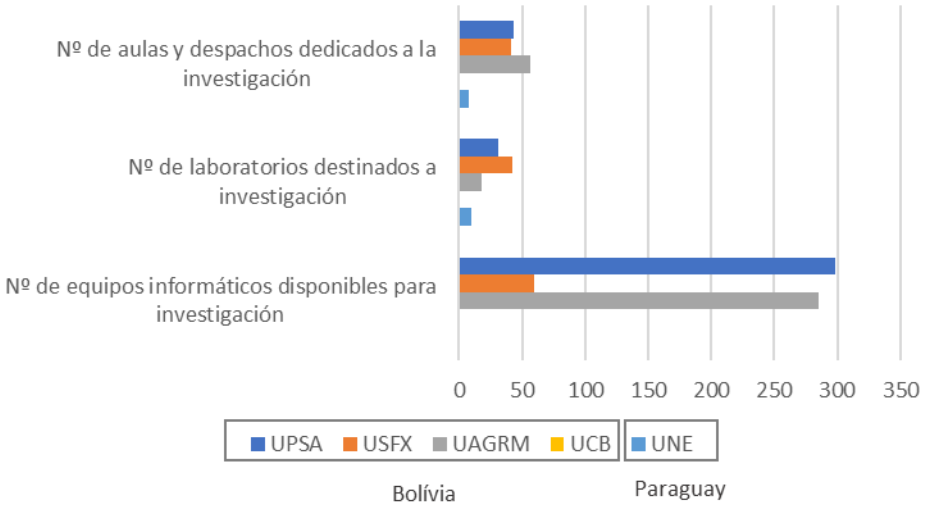

Figure 12: Research Infrastructure

Note. Own elaboration based on information provided by the institutions

In relation to infrastructures, and from the analysis of data, most institutions are well equipped, both in terms of computer equipment and laboratories available for research. However, it is noted that some of the institutions did not present data on these indicators.

5. Individual Analysis

5.1. Methodology

The methodology of the current study begins by considering the nature of the SWOT analysis. SWOT analysis is a strategic tool to analyze the behavior of studies based on strengths, weaknesses, opportunities and threats.

Swot analysis has been carried out in the Excel application with the simple frequency analysis approach on a percentage scale. Table 7 includes a series of questions related to the strength (f) and weakness (d) part of the SWOT analysis. Table 8 includes a series of questions related to opportunities and threats.

The main target groups were staff from the Research and Development (R&D) units, academic researchers and managers from the higher and middle levels of higher education and policy makers. The analytical compilation of the ideas of this study of research policies at the level of Higher Education broken down by country and partner institutions, allowed to contextualize the information and provide structural links to enhance future project activities in the countries involved.

The total number of observations (respondents) reaches 462 and corresponds to institutions in Bolivia (four universities and the Ministry of Education) and Paraguay (three universities and the Ministry of Education and Sciences).

- Private University of Santa Cruz de la Sierra- UPSA (Bolivia)
- National University of the East – UNE (Paraguay)
- National University of Asunción-UNA (Paraguay)
- Bolivian Catholic University -UCB (Bolivia) “San Pablo”
- Catholic University "Our Lady of the Assumption" Unit – UC (Paraguay)
- Gabriel Rene Moreno Autonomous University – UAGRM (Bolivia)
- Universidad Mayor, Real y Pontifica de San Francisco Xavier de Chuquisaca – USFX (Bolivia)
- MEC - Ministry of Education and Sciences (Paraguay)
- MINEDU - Ministry of Education of the Plurinational State of Bolivia (Bolivia)

5.1.1 Data analysis

Likert scale data is analyzed using descriptive statistics. The SWOT analysis of seven universities and two ministries of education in Bolivia and Paraguay is estimated based on the evaluation classified on a scale of 1 to 5: 1 - totally disagree, 2 - disagree, 3 - neutral, neither agree nor disagree 4 - agree, 5 - totally agree. To simplify the interpretation of the results, two negative categories (1+2 = disagreement) and two positive categories (4+5 = agreement) were subsequently grouped, while category 3 remained unchanged. Respondents' frequency and percentage of each evaluation subject to the questions (weaknesses, strengths, threats, opportunities) have been adequately estimated and represented in the tables.

5.1.2. Data characteristics

Design of an online questionnaire based on a SWOT methodology to collect current policy frameworks on research management in Bolivia and Paraguay. Dissemination of the survey to target groups at different levels in the HEIs of the partner country: staff of the R&D units, academic researchers, managers of higher and middle levels, and ministry officials of higher education according to the following detail (Table 6).

Table 6: Recipients

Target groups		
Ministry Official workers	8	1.73%
Member of the senior management of the university (Rector, Vice-Rector and Deans)	35	7.58%
Mid-level manager at the university (Directors of Research Centres, Career Directors, Directors of Research Institutes, Heads of Department and other similar position)	103	22.29%
Member of R&D units or research centres	76	16.45%
Academic researcher at the university	240	51.95%
Total	462	100%

5.1.3. Strengths and Weaknesses

Table 7 SWOT analysis questions related to strength and weakness

Code	STRENGTHS	Code	WEAKNESSES
f1	The teaching staff is committed to the research process.	**d1**	A limited number of researchers at the university.
f2	It has consolidated teams of research teachers.	**d2**	Policies and lines of research are indefinite and not systematized at the institutional level in the university.
f3	Policies and research lines are defined at the institutional level at the university (or faculty).	**d3**	Little coordination between the areas of knowledge and a weak link of research with postgraduate training.
f4	There is accessibility to bibliographic sources and virtual information systems at the university level and at the national level.	**d4**	Little integration of the research service with the local or departmental environment problems.
f5	It has a team of researchers with a high scientific production capacity and competitive at the national level.	**d5**	Little participation of the population and society in general in research activities.
f6	It has an adequate physical structure and is well-equipped to support research.	**d6**	Scarce and unstable public funding for research.
f7	It has a database where statistical information on the scientific production of the institution is recorded and generated.	**d7**	Limited knowledge of strategies to attract and maintain private financing.
f8	There is management capacity to obtain funding from competitive calls at the national level.	**d8**	Limited capacity (competitiveness) to obtain national and international financing.
f9	There is management capacity to obtain funding in competitive calls at an international level.	**d9**	Limited culture of research leadership and support in the service by the Directorates/Heads of research.
f10	The research area management staff is committed to research policies and goals.	**d10**	Little interest in teaching and student staff in research.
f11	We have permanent participation in local, regional, national and international research projects (international agreements and contracts).	**d11**	Limited methodological support, administrative and operational support to develop proposals and execute research projects.
f12	The researchers of the university are part of research groups at the national level.	**d12**	Little appreciation and recognition of research activity at the institutional level and in the face of progress in the professional career.
f13	There are sufficient scientific-technological resources to promote research.	**d13**	Absence of clear, defined, stable and long-term policies to manage research and scientific production at the University.
f14	Research is supported by national policies.	**d14**	Frequent political changes with changes in priorities and objectives within the University.
f15	There is a strong executive desire to improve research management at the institutional and national levels.	**d15**	Management difficulties in establishing collaboration agreements with governmental and non-governmental organizations.
f16	There is an administrative support service for the researcher	**d16**	Absence of strategies and activities to promote and direct young researchers.
		d17	Lack of annual calls for the promotion of research (research projects, scholarships, pre

Code	STRENGTHS	Code	WEAKNESSES
			and postdoctoral contracts, stays abroad, acquisition of infrastructure, etc.).
		d18	Poor innovative and research culture in the public sector and in the business sector.
		d19	Little training in R + D + I in the university postgraduate degrees.
		d20	System of communication and dissemination of poor results.

5.1.4._ Opportunities and Threats

Table 8: SWOT analysis questions related to Opportunities and Threats8

Code	OPPORTUNITIES	Code	THREATS
o1	Existence of different research networks at the international level (Latin American and European).	**a1**	Non-compliance with national policies that promote research in universities.
o2	Coordination between national universities through the country's University System.	**a2**	Absence of clear regional priorities in research by the Departmental Government.
o3	Agreements with institutions and/or some companies for the realization of practices by students of last years.	**a3**	Little appreciation of research in our country and in the institution itself
o4	Collaborations with companies in specific research and/or advisory projects	**a4**	Absence of strategic and diverse incentives to promote research and innovation by the Government and the Institution.
o5	International calls in force around research in the different areas of knowledge.	**a5**	Little involvement of companies, institutions and social organizations to do research with the university.
o6	Presence and development of technological platforms at the regional level that supports, extend and reinforce research and innovation and its internationalization.	**a6**	Absence of national or regional calls to participate/compete in the development of research.
o7	Annual promotions of young professionals with potential research capacity.	**a7**	Little competitiveness in national or international calls for attracting resources for research.
o8	Motivation and responsiveness of professional groups that have had fewer opportunities and prominence in research.	**a8**	Waste of agreements as external sources of financing.
o9	New technologies and accessible information systems for research.	**a9**	Limited dissemination of research results by National and Institutional Bodies
o10	Existence of links and collaboration agreements with other Latin American and European universities.	**a10**	Continuous changes in Investigation Managers: charges subject to political change.
o11	The active presence of Vice Ministry of Science, Technology and Innovation/ National Council of Science and Technology and national policies and programs around research and decision-making and organizational capacity in the sector.	**a11**	Under political and financial commitment of the Government with the investigation.
o12	Internal and external economic resources are available to support research.	**a12**	Research is not a priority for the government in periods of cuts and crisis.
o13	Technological development and growth in research affect institutional positioning at national, regional and international levels.	**a13**	Insufficient coordination in research between university company and state.
o14	Ability to access competitive funds for scholarships for doctorates for national researchers to train in universities of high international prestige.	**a14**	Insufficient coordination at the institutional level between the different key actors to organize research (different faculties, Rectorates, Administrative Services and researchers).
		a15	Technological, equipment, human

Code	OPPORTUNITIES	Code	THREATS
			resources and research support gap with respect to competing research centers and groups.
		a16	Little support from research funding programs for young researchers and experienced scientists.
		a17	Global financial constraints following the COVID-19 crisis.
		a18	Flight of talents and researchers to other countries due to salary and other regulations.
		a19	Bureaucratic difficulties for the registration of patents and authorship for the results of the University's research.
		a20	Little research culture in the national education system.

5.2. Country analysis: Bolivia

5.2.1. Sample profile of Bolivia

Table 9 presents the sample profile of the participants from Bolivia. The maximum and minimum age of employees is 73 and 25 years respectively. Seniority at the institution ranges from 48 years to less than one year.

Table 9: Sample profile of participants from Bolivia

Gender	**Frequency**	**%**
Man	133	53%
Woman	116	46%
I prefer not to answer	1	1%
Age		
Min	25	
Max	73	
Average	46	
Level of education		
Doctoral	8	3%
Doctorate	60	24%
Master	137	55%
Degree	42	17%
None of the above	3	1%
Profile within the organization		
Ministry Official	4	2%
Mid-level manager at the University (Directors of Research Centres, Career Directors, Directors of Research Institutes, Heads of Department and other similar position)	38	15%
Academic researcher at the University	153	61%
Member of the senior management of the University (Rector, Vice-Rector and Deans)	21	8%
Member of R&D Units or Research Centres	34	14%
Seniority in the institution (years)		
Min	8m.	
Max	48	
Average	13	
Total	**250**	**100%**

5.2.2. SWOT analysis of Bolivia

Regarding the strengths in the case of Bolivia, we can mention that 54% of respondents strongly agree with the accessibility to bibliographic sources and virtual information systems at the university and national level, and 53% maintain that there are policies and lines of research defined at the institutional level at the university (or faculty). The following three indicators are related to staff, such as research directors, teaching staff and the team of researchers: respondents consider that the director of the research area is committed to research policies and objectives (51%), while the teaching staff is committed to the research process (49%), and the team of researchers has a high level of production capacity. Scientific and competitive at the national level (47%). According to the respondents' perspectives, there are still some challenges to address. For example, they are very much in line with increasing the scientific and technological resources available to enhance research, improving research support by national policies and establishing an administrative support service for researchers (Table 10).

Table 10: Result of the analysis of "STRENGTHS"

Code	Factor	D	N	A
f4	**There is accessibility to bibliographic sources and virtual information systems at the university level and at the national level.**	**20%**	**26%**	**54%**
f3	**It has policies and lines of research defined at the institutional level in the university (or in the faculty)**	**17%**	**30%**	**53%**
f10	**The research area management staff is committed to research policies and goals.**	**18%**	**30%**	**51%**
f1	**The teaching staff is committed to the research process.**	**24%**	**27%**	**49%**
f5	**It has a team of researchers with a high level of scientific production capacity and competitive at the national level.**	**24%**	**29%**	**47%**
f15	There is executive will to strengthen research management at the institutional and national levels.	35%	27%	38%
f2	It has consolidated teams of research teachers.	30%	32%	38%
f12	The researchers of the university are part of research groups at the national level.	32%	33%	34%
f11	We have permanent participation in local, regional, national and international research projects.	30%	37%	34%
f8	There is management capacity to obtain funding from competitive calls at national level	36%	32%	32%
f6	It has adequate physical structure and equipped to promote research.	35%	34%	31%
f7	It has a database where statistical information on the scientific production of the institution is recorded and generated	37%	32%	30%
f9	There is management capacity to obtain funding in competitive calls at an international level	39%	32%	29%
f13	There are sufficient scientific-technological resources to promote research.	43%	30%	27%
f16	There is an administrative support service for the researcher	48%	27%	25%
f14	Research is supported by national policies.	55%	28%	17%

Note: D – Disagreement, N – Neutral, A – Agreement

Table 11 shows the results of the analysis of weaknesses. Most respondents recognize the scarcity and instability of public funding (80%) as the greatest weaknesses, as well as the limited number of researchers at the university (72%), the poor innovative and research culture in the public and business sector (69%). In addition, the university has organized few courses and seminars based on R + D + I (Research, Development and Innovation), so that 64% of respondents are not informed about R + D + I projects.

Table 11: Results of the analysis of "WEAKNESSES"

Code	Factor	D	N	A
d6	**Scarce and unstable public funding for research.**	**10%**	**10%**	**80%**
d1	**Limited number of researchers at the university.**	**11%**	**17%**	**72%**
d18	**Poor innovative and research culture in the public sector and in the business sector.**	**10%**	**21%**	**69%**
d7	**Limited knowledge of strategies to attract and maintain private financing**	**12%**	**22%**	**66%**
d19	**Little training in R + D + i in the university postgraduate degrees.**	**13%**	**23%**	**64%**
d5	Little participation of the population and society in general in research activities.	13%	23%	64%
d12	Little appreciation and recognition of research activity at the institutional level	17%	21%	62%
d13	Absence of clear, defined, stable and long-term policies to manage research and scientific production at the University.	20%	20%	61%
d3	Little coordination between the areas of knowledge and weak link of research with postgraduate training.	14%	27%	59%
d11	Limited methodological support, administrative and operational support to develop proposals and execute research projects.	20%	23%	56%
d20	System of communication, dissemination and dissemination of poor results.	14%	30%	56%
d8	Limited capacity (competitiveness) to obtain national and international financing.	14%	31%	56%
d15	Management difficulties in establishing collaboration agreements with governmental and non-governmental organizations.	21%	24%	55%
d9	Limited culture of research leadership and support in service by the Research Directorates.	21%	26%	53%
d16	Absence of strategies and activities to promote and direct young researchers.	23%	27%	50%
d17	Lack of annual calls for the promotion of research (research projects, scholarships, pre and postdoctoral contracts, stays abroad, acquisition of infrastructure, etc.).	23%	26%	50%
d4	Little integration of the research service with the problems of the local or departmental environment.	24%	26%	50%
d10	Little interest of teaching and student staff in research.	23%	27%	50%
d2	Policies and lines of research indefinite and not systematized at the institutional level in the university.	25%	27%	48%
d14	Frequent political changes with changes in priorities and objectives within the University.	33%	24%	42%

Note: D – Disagreement, N – Neutral, A – Agreement

Table 12 presents "Opportunities" results in the case of Bolivia. According to more than 50% of respondents, Bolivia makes great efforts to establish international research networks and collaboration agreements that connect Latin America with Europe. In addition, higher institutions in Bolivia offer several calls for different categories of knowledge and create opportunities for students to obtain an internship in companies with their relevant studies.

Table 12: Results of analysis of "OPPORTUNITIES"

Code	Factor	D	N	A
o1	**Existence of different research networks at international level (Latin American and European).**	**15%**	**24%**	**61%**
o10	**Existence of links and collaboration agreements with other Latin American and European universities.**	**20%**	**30%**	**50%**
o3	**Agreements with institutions and / or some companies for the realization of practices by students of last years.**	**20%**	**35%**	**46%**
o5	**International calls in force around research in the different areas of knowledge.**	**22%**	**39%**	**39%**
o9	**New technologies and accessible information systems for research.**	**26%**	**36%**	**38%**
o14	Ability to access competitive funds for scholarships for doctorates for national researchers to train in universities of high international prestige.	31%	33%	36%
o2	Coordination between national universities through the country's University System.	36%	29%	35%
o4	Collaborations with companies in specific research and/or advisory projects	28%	42%	30%
o7	Annual promotions of young professionals, with potential research capacity.	36%	36%	28%
o6	Presence and development of technological platforms at the regional level that support, extend and reinforce research and innovation and its internationalization.	31%	42%	27%
o13	Technological development and growth in research that affects institutional positioning at national, regional and international levels.	32%	42%	26%
o11	Active presence of a Vice Ministry of Science, Technology and Innovation/ National Council of Science and Technology and with national policies and programs around research and with decision-making and organizational capacity in the sector.	46%	29%	25%
o8	Motivation and responsiveness of professional groups that have had fewer opportunities and prominence in research.	33%	42%	24%
o12	Internal and external economic resources are available to support research.	48%	34%	18%

Note: D – Disagreement, N – Neutral, A – Agreement

Table 13 presents the Threats in the case of Bolivia. More than 70% of respondents say that the main threats in relation to research are that: the government gives little priority to research during periods of economic crisis, which has led to scarce political and financial commitment to research in the national education system. The results also show that government and institutions have faced a lack of strategic and diverse incentives to promote research and

innovation, as well as a low commitment of companies, institutions and social organizations in conducting research with the university.

Table 13: Result of the "THREATS" analysis

Code	Factor	D	N	A
a12	**Research is not a priority for the government in periods of cuts and crisis.**	**9%**	**10%**	**81%**
a11	**Under political and financial commitment of the Government with the investigation.**	**10%**	**11%**	**79%**
a20	**Poor research culture in the national education system**	**10%**	**11%**	**79%**
a4	**Absence of strategic and diverse incentives to promote research and innovation by the Government and the Institution.**	**10%**	**16%**	**75%**
a5	**Little involvement of companies, institutions and social organizations to do research with the university.**	**10%**	**16%**	**74%**
a13	Insufficient coordination in research between university – company – State.	10%	15%	74%
a18	Flight of talents and researchers to other countries due to salary and other regulations.	9%	16%	74%
a17	Global financial constraint following the COVID-19 crisis.	13%	16%	71%
a2	Absence of clear regional priorities in research by the Departmental Government.	10%	20%	70%
a15	Technological, equipment, human resources and research support gap with respect to competing research centers and groups.	12%	18%	70%
a3	Little appreciation of research in our country and in the institution itself	13%	20%	67%
a9	Limited dissemination of research results by National and Institutional Bodies	11%	24%	66%
a16	Little support from research funding programs for young researchers, prioritizing more established and experienced scientists.	14%	21%	65%
a14	Insufficient coordination at the institutional level between the different key actors to organize research (different faculties, Rectorates, Administrative Services and researchers)	16%	24%	59%
a19	Bureaucratic difficulties for the registration of patents and authorship for the results of the University's research.	12%	30%	58%
a7	Little competitiveness in national or international calls for attracting resources for research.	15%	28%	58%
a8	Waste of agreements as external sources of financing.	14%	29%	57%
a1	Non-compliance with national policies that promote research in universities.	13%	30%	57%
a10	Continuous changes in Investigation Managers: charges subject to political change.	16%	29%	56%
a6	Absence of national or regional calls to participate/compete in the development of research.	19%	26%	55%

Note: D – Disagreement, N – Neutral, A – Agreement

5.2.3. SWOT analysis based on the profile within the organization, in Bolivia

This section aims to examine the components of SWOT from the perspective of different types of respondents, including ministry staff, upper and lower-level managers, researchers and those affiliated with research institutions. This will assist in determining whether or not there are any differences or similarities in your evaluation. The four parts of the SWOT analysis were studied based on the organizational profile of the respondents to determine if their evaluations varied according to their position. First, an average of 1 to 5 was calculated on a Likert scale for each element of the Strengths, Weaknesses, Opportunities and Threats in the case of the five profiles analyzed. The annex 7.9 contain the detailed results of Bolivia's analysis. Table 14 only displays the initial highest mean values of the SWOT elements for the five examined profiles.

Table 14: SWOT analysis according to the different profiles of the respondents

Profile of respondents	STRENGTHS		WEAKNESSES		OPPORTUNITIES		THREATS	
Ministry Official workers	Accessibility to bibliographic sources and virtual information systems	3.75	Limited number of researchers at the university	4.75	Existence of different research networks at international level (Latin American and European)	4.50	Insufficient coordination in research between university – company – State	4.50
	The Research Area Management Staff is committed to research policies and goals	3.25	Absence of clear, defined, stable and long-term policies to manage research and scientific production at the University	4.50	Ability to access competitive funds for scholarships for doctorates for national researchers to train in universities of high international prestige	3.50	Little support from research funding programmes for young researchers, prioritising more established and experienced scientists	4.50
	It has policies and lines of research defined at the institutional level in the university	3.00	Knowledge and weak link between research and postgraduate training	4.25	Agreements with institutions and / or some companies for the realization of practices by students of last years	3.25	Absence of clear regional priorities in research by the Departmental Government	4.25
Member of the senior management of the University (Rector, Vice-Rector and Deans)	It has policies and lines of research defined at the institutional level in the university (or in the faculty)	3.71	Scarce and unstable public funding for research	4.09	Existence of different research networks at international level (Latin American and European)	4.09	Flight of talents and researchers to other countries due to salary and other regulations	4.24
	The Research Area Management Staff is committed to research policies and goals	3.67	Limited knowledge of strategies to attract and maintain private financing	4.09	Agreements with institutions and / or some companies for the realization of practices by students of last years	3.81	Absence of clear regional priorities in research by the Departmental Government	4.19
	Accessibility to bibliographic sources and virtual information systems at the university and national levels	3,57	Limited number of researchers at the university	3.95	Existence of links and collaboration agreements with other Latin American and European universities	3.56	Under political and financial commitment of the Government to the investigation	4.19

Profile of respondents	STRENGTHS		WEAKNESSES		OPPORTUNITIES		THREATS	
Mid-level manager at the university	It has policies and lines of research defined at the institutional level in the university	3.50	Scarce and unstable public funding for research	4.05	Existence of different research networks at international level (Latin American and European)	3.65	Flight of talents and researchers to other countries due to salary and other regulations	4.34
	Accessibility to bibliographic sources and virtual information systems	3.5	Limited number of researchers at the university	4.00	Existence of links and collaboration agreements with other Latin American and European universities	3.49	Under political and financial commitment of the Government to the investigation	4.32
	The Research Area Management Staff is committed to research policies and goals	3.42	Little appreciation and recognition of research activity at the institutional level and with a view to progress in the professional career	3.76	Agreements with institutions and / or some companies for the realization of practices by students of last years	3.38	Research is not a priority for the government in periods of cuts and crisis	4.29
Member of R&D units or research centres	It has policies and lines of research defined at the institutional level in the university	3.32	Scarce and unstable public funding for research	4.32	Existence of different research networks at international level (Latin American and European)	3.56	Research is not a priority for the government in periods of cuts and crisis.	4.23
	The Research Area Management Staff is committed to research policies and goals	3.29	Low participation of the population and society in general in research activities	4.12	Agreements with institutions and / or some companies for the realization of practices by students of last years	3.50	Under political and financial commitment of the Government to the investigation	4.09
	accessibility to bibliographic sources and virtual information systems at the university and national levels	3.12	Poor innovative and research culture in the public and business sectors	4.03	Existence of links and collaboration agreements with other Latin American and European universities	3.22	Poor research culture in the national education system	4.09

Profile of respondents	STRENGTHS		WEAKNESSES		OPPORTUNITIES		THREATS	
Academic researcher at the university	Accessibility to bibliographic sources and virtual information systems	3.62	Scarce and unstable public funding for research	4.24	Existence of different research networks at international level (Latin American and European)	3.62	Research is not a priority for the government in periods of cuts and crisis	4.34
	The teaching staff is committed to the research process	3.52	Limited number of researchers at the university	3.96	Existence of links and collaboration agreements with other Latin American and European universities	3.41	Poor research culture in the national education system	4.25
	It has policies and lines of research defined at the institutional level in the university	3.52	Limited knowledge of strategies to attract and maintain private financing	3.93	Agreements with institutions and / or some companies for the realization of practices by students of last years	3.37	Under political and financial commitment of the Government to the investigation	4.15

In the case of Bolivia, accessibility to bibliographic sources and virtual information systems at the university and national levels, and the policies and lines of research defined at the institutional level in the university (or faculty) are defined as strengths by all interviewees. The commitment of research management staff to research policies and objectives is another strong point mentioned by interviewees of all categories except researchers. The researchers highlight as a strong point the commitment of the teaching staff to the research process.

The valuation of the weaknesses Varies according to the respondent's profile. The limited number of researchers at the university seems to be the main weakness, defined by all categories except members of research units. The scarcity and volatility of public research funding is another vulnerability cited by the majority of categories, followed by a lack of understanding of tactics to seek and maintain private funding. Ministry officials emphasize the lack of comprehensive and long-term policies to govern research and scientific production at universities, the inadequate coordination between knowledge domains, and the tenuous link between research and postgraduate education. In turn, members of I+D Units or Research Centres are more critical of the minimal participation of the public and society at large in research activities, as well as the inadequate inventive and research culture in the public and private sectors.

The interviewers' assessment coincides with the opportunities for promotion and improvement of research management. The existence of different international research networks (Latin American and European) and the agreements with institutions and/or some companies for the realization of internships of students of recent years are identified by all respondents as the best opportunities. The existence of links and collaboration agreements with other Latin American and European universities is another opportunity identified by all categories, except Ministry officials. The Ministry's trustees provide an opportunity for the possibility of accessing competitive funds for doctoral scholarships for national researchers to train at universities of high international prestige.

The government's lack of political and financial commitment to research and the fact that research is not a priority for the government in periods of cuts and crises raise the concern of interviewees from senior and mid-level managers, researchers and members of research units. However, ministry officials consider the main threats to be: the lack of clear regional research priorities on the part of the departmental government, insufficient research coordination between the university, the company and the state, and insufficient support from research funding programmes for young researchers, giving priority to the most established and experienced scientists.

5.3. Country analysis: Paraguay

5.3.1. Sample profile of Paraguay

Table 15 provides a profile of the Paraguayan participants. The maximum age of employees is 85, while the lowest age is 23. In addition, the minimum seniority in the institution is two months, and the maximum is three and a half years.

Table 15: Sample profile of participants from Paraguay

Gender	Frequency	%
Man	113	53%
Woman	99	47%
Age		
Min	23	
Max	85	
Average	46	
Level of education		
Doctoral	9	4%
Doctorate	32	15%
Master	133	63%
Degree	36	17%
None of the above	2	1%
Profile within the organization		
Ministry Official workers	4	2%
Mid-level manager at the University (Directors of Research Centres, Career Directors, Directors of Research Institutes, Heads of Department and other similar position)	65	31%
Academic researcher at the University	87	41%
Member of the senior management of the University (Rector, Vice-Rector and Deans)	14	7%
Member of R&D Units or Research Centres	42	20%
Seniority in the institution (years)		
Min	2m.	
Max	44	
Average	13	
Total	**212**	**100%**

5.3.2. SWOT analysis of Paraguay

This subsection presents the full SWOT analysis in the Paraguay case study based on 212 surveys. Table 16 presents the strengths of Paraguay's SWOT analysis. Paraguay shows its **strengths** with more than 50% of the total respondents who agree with the accessibility to bibliographic sources and virtual information systems, existence of effective policies and lines of research at the institutional and national level and, high-level teaching and research staff is highly involved in the management of the research process and in research policies and objectives. In addition, there are qualified researchers to generate a competitive and high-level scientific production at the national level.

Table 16: Results of the analysis of "STRENGTHS"

Code	Factor	D	N	A
f4	**There is accessibility to bibliographic sources and virtual information systems at the university level and at the national level.**	**20%**	**26%**	**54%**
f3	**It has policies and lines of research defined at the institutional level in the university (or in the faculty)**	**17%**	**30%**	**53%**
f10	**The research area management staff is committed to research policies and goals.**	**18%**	**30%**	**51%**
f1	**The teaching staff is committed to the research process.**	**24%**	**27%**	**49%**
f5	**It has a team of researchers with a high level of scientific production capacity and competitive at the national level.**	**24%**	**29%**	**47%**
f15	There is executive will to strengthen research management at the institutional and national levels.	35%	27%	38%
f2	It has consolidated teams of research teachers.	30%	32%	38%
f12	The researchers of the university are part of research groups at the national level.	32%	33%	34%
f11	We have permanent participation in local, regional, national and international research projects. (International conventions and contracts)	30%	37%	34%
f8	There is management capacity to obtain funding from competitive calls at national level	36%	32%	32%
f6	It has adequate physical structure and equipped to promote research.	35%	34%	31%
f7	It has a database where statistical information on the scientific production of the institution is recorded and generated	37%	32%	30%
f9	There is management capacity to obtain funding in competitive calls at an international level	39%	32%	29%
f13	There are sufficient scientific-technological resources to promote research.	43%	30%	27%
f16	There is an administrative support service for the researcher	48%	27%	25%
f14	Research is supported by national policies.	55%	28%	17%

Note: D – Disagreement, N – Neutral, A – Agreement

Table 17 presents **the weaknesses** in the case of Paraguay. Five main weaknesses are identified based on more than 60% of respondents' agreement. There are difficulties in funding research, a limited number of research in universities. Deficient innovative and research culture

in the public sector and in the business sector, limited knowledge of strategies to attract and maintain private financing and little training in R + D + i in the university postgraduate degrees.

Table 17: Results of the analysis of "WEAKNESSES"

Code	Factor	D	N	A
d6	**Scarce and unstable public funding for research.**	**10%**	**10%**	**80%**
d1	**Limited number of researchers at the university.**	**11%**	**17%**	**72%**
d18	**Poor innovative and research culture in the public sector and in the business sector.**	**10%**	**21%**	**69%**
d7	**Limited knowledge of strategies to attract and maintain private financing**	**12%**	**22%**	**66%**
d19	**Little training in R + D + i in the university postgraduate degrees.**	**13%**	**23%**	**64%**
d5	Little participation of the population and society in general in research activities.	13%	23%	64%
d12	Little appreciation and recognition of research activity at the institutional level and with a view to progress in the professional career	17%	21%	62%
d13	Absence of clear, defined, stable and long-term policies to manage research and scientific production at the University.	20%	20%	61%
d3	Little coordination between the areas of knowledge and weak link of research with postgraduate training.	14%	27%	59%
d11	Limited methodological support, administrative and operational support to develop proposals and execute research projects.	20%	23%	56%
d20	System of communication, dissemination and dissemination of poor results.	14%	30%	56%
d8	Limited capacity (competitiveness) to obtain national and international financing.	14%	31%	56%
d15	Management difficulties in establishing collaboration agreements with governmental and non-governmental organizations.	21%	24%	55%
d9	Limited culture of research leadership and support in the service by the Directorates/Heads of research.	21%	26%	53%
d16	Absence of strategies and activities to promote and direct young researchers.	23%	27%	50%
d17	Lack of annual calls for research promotion (research projects, scholarships, pre- and postdoctoral contracts, stays abroad, acquisition of infrastructure).	23%	26%	50%
d4	Little integration of the research service with the problems of the local or departmental environment.	24%	26%	50%
d10	Little interest of teaching and student staff in research.	23%	27%	50%
d2	Policies and lines of research indefinite and not systematized at the institutional level in the university.	25%	27%	48%
d14	Frequent political changes with changes in priorities and objectives within the University.	33%	24%	42%

Note: D – Disagreement, N – Neutral, A – Agreement

Table 18 presents **the opportunities** in the case of Paraguay. Interestingly, Paraguay shows similar results to the Bolivian case. The majority of respondents, more than 50%, are very satisfied with the availability of international research networks and with research collaboration

agreements with Latin America and Europe. In addition, Paraguayan universities have made a great effort for students to carry out internships in companies compatible with their studies and have access to competitive funds for doctoral scholarships in national and international universities.

Table 18: Results of the "OPPORTUNITIES" analysis

Code	Factor	D	N	A
o1	**Existence of different research networks at international level (Latin American and European).**	**13%**	**29%**	**58%**
o3	**Agreements with institutions and / or some companies for the realization of practices by students of last years.**	**16%**	**32%**	**52%**
o10	**Existence of links and collaboration agreements with other Latin American and European universities.**	**22%**	**28%**	**50%**
o14	**Ability to access competitive funds for scholarships for doctorates for national researchers to train in universities of high international prestige.**	**30%**	**26%**	**44%**
o5	**International calls in force around research in the different areas of knowledge.**	**24%**	**35%**	**41%**
o4	Collaborations with companies in specific research and/or advisory projects	22%	39%	39%
o9	New technologies and accessible information systems for research.	28%	34%	38%
o7	Annual promotions of young professionals, with potential research capacity.	35%	32%	33%
o2	Coordination between national universities through the country's University System.	33%	35%	33%
o6	Presence and development of technological platforms at the regional level that support, extend and reinforce research and innovation and its internationalization.	30%	39%	31%
o13	Technological development and growth in research that affects institutional positioning at national, regional and international levels.	36%	33%	31%
o11	Active presence of a Vice Ministry of Science, Technology and Innovation/ National Council of Science and Technology and with national policies and programs around research and with decision-making and organizational capacity in the sector.	41%	33%	27%
o8	Motivation and responsiveness of professional groups that have had fewer opportunities and prominence in research.	33%	41%	26%
o12	Internal and external economic resources are available to support research.	50%	29%	22%

Note: D – Disagreement, N – Neutral, A – Agreement

Table 19 presents **the threats** in the case of Paraguay. The results highlight the important problems in the institutions sector. There is a low culture of designed research, insufficient coordination in research programs at the institutional and governmental levels. The priority of research has slowed down during the economic crisis in the country, leading to low political and financial support from the government for the development of research.

Table 19: Results of the "THREATS" analysis

Code	Factor	D	N	A
a20	**Poor research culture in the national education system**	**10%**	**9%**	**80%**
a12	**Research is not a priority for the government in periods of cuts and crisis.**	**10%**	**11%**	**79%**
a11	**Under political and financial commitment of the Government with the investigation.**	**10%**	**14%**	**76%**
a13	**Insufficient coordination in research between university, company and State.**	**10%**	**17%**	**73%**
a5	**Little involvement of companies, institutions and social organizations to do research with the university.**	**12%**	**17%**	**72%**
a18	Flight of talents and researchers to other countries due to salary and other regulations.	12%	17%	71%
a2	Absence of clear regional priorities in research by the Departmental Government.	10%	20%	70%
a17	Global financial constraint following the COVID-19 crisis.	13%	18%	69%
a16	Little support from research funding programs for young researchers, prioritizing more established and experienced scientists.	15%	17%	68%
a15	Technological, equipment, human resources and research support gap with respect to competing research centers and groups.	13%	20%	67%
a3	Little appreciation of research in our country and in the institution itself	11%	23%	66%
a14	Insufficient coordination at the institutional level between the different key actors to organize research	16%	20%	65%
a9	Limited dissemination of research results by National and Institutional Bodies	13%	23%	64%
a4	Absence of strategic and diverse incentives to promote research and innovation by the Government and the Institution.	12%	25%	63%
a19	Bureaucratic difficulties for the registration of patents and authorship for the results of the University's research.	12%	27%	61%
a7	Little competitiveness in national or international calls for attracting resources for research.	17%	24%	59%
a8	Waste of agreements as external sources of financing.	15%	27%	58%
a1	Non-compliance with national policies that promote research in universities.	16%	28%	56%
a6	Absence of national or regional calls to participate/compete in the development of research.	17%	29%	54%
a10	Continuous changes in Investigation Managers: charges subject to political change.	19%	30%	51%

Note: D – Disagreement, N – Neutral, A – Agreement

5.3.3. SWOT analysis based on profile within the organization, in Paraguay

As in the case of Bolivia, the objective of this chapter is to analyze the elements of the SWOT according to the different profiles of the Respondents of Paraguay, such as the officials of the ministry, directors of high and medium levels of the IES, the members of the research centres

and the researchers. This will help you understand if there are differences or similarities in your assessment.

The four elements of the SWOT analysis were analyzed based on the profile of the respondents in the organizations to see if their valuations differed according to their position in the organization.

First, an average of 1 to 5 was calculated on a Likert scale for each element of the Strengths, Weaknesses, Opportunities and Threats in the case of the 5 profiles analyzed. The detailed results of Paraguay's analysis are presented in the Annexes. Table 20 presents only the first highest mean values of the SWOT items in the case of the 5 profiles analyzed.

Table 20: SWOT analysis according to the different profiles of the respondents

Profile	STRENGTHS		WEAKNESSES		OPPORTUNITIES		THREATS	
Ministry Official workers	The Research Area Management Staff is committed to research policies and goals	3.30	Limited number of researchers at the university	4.80	Existence of different research networks at international level (Latin American and EU)	4.30	Little appreciation of research in our country and in the institution itself	4.80
	Accessibility to bibliographic sources and virtual information systems	3.00	Limited knowledge of strategies to attract and maintain private financing	4.50	Active presence of a Vice-Ministry of Science, Technology and Innovation/CONACYT and with national policies and programmes	3.00	Technological, equipment, human resources and research support gap	4.50
	There is executive will to strengthen research management at the institutional and national levels	3.00	Limited capacity to secure national and international funding	4.50	Internal and external economic resources are available to support research	3.00	Absence of strategic incentives to promote research and innovation by the Government and the Institution	4.50
Member of the senior management of the University	The Research Area Management Staff is committed to research policies and goals	3.4	Limited number of researchers at the university	3.9	Existence of different research networks internationally (Latin American and EU)	3.8	Poor research culture in the national education system	3.9
	Policies and lines of research defined at the institutional level at the university	3.2	Scarce and unstable public funding for research	3.8	Agreements with institutions and / or some companies for the realization of practices by students of last years	3.7	Research is not a priority for the government in periods of cuts and crisis	3.8
	Accessibility to bibliographic sources and virtual information systems	3.2	Limited knowledge of strategies to attract and maintain private financing	3.8	International calls in force around research in the different areas of knowledge	3.7	Absence of clear regional priorities in research by the Departmental Government	3.7

Profile	STRENGTHS		WEAKNESSES		OPPORTUNITIES		THREATS	
Mid-level manager at the University	Accessibility to bibliographic sources and virtual information systems	3.60	Scarce and unstable public funding for research	3.90	Agreements with institutions and / or some companies for the realization of practices by students of last years	3.70	Poor research culture in the national education system	4.10
	It has policies and lines of research defined at the institutional level in the university	4.50	Limited number of researchers at the university	3.90	Existence of different research networks internationally (Latin American and EU)	3.60	Research is not a priority for the government in periods of cuts and crisis	4.00
	The Research Area Management Staff is committed to research policies and goals	3.40	Low participation of the population and society in general in research activities	3.80	Existence of links and collaboration agreements with other Latin American and European universities	3.40	Non-compliance with national policies that promote research in universities	4.00
Member of R&D Units or Research Centers	The research area management staff is committed to research policies and goals.	3.5	Scarce and unstable public funding for research.	4.1	Existence of different research networks internationally (Latin American and EU)	3.6	Research is not a priority for the government in periods of cuts and crisis	4.2
	Policies and lines of research defined at the institutional level at the university	3.4	Limited knowledge of strategies to attract and maintain private financing	4	Agreements with institutions and / or some companies for the realization of practices by students of last years	3.5	Under political and financial commitment of the Government to the investigation	4.1
	Team of researchers with a high level of scientific production capacity and competitive at the national level	3.4	Limited number of researchers at the university	3.8	Existence of links and collaboration agreements with other Latin American and European universities	3.4	Poor research culture in the national education system	4.1

Profile	STRENGTHS		WEAKNESSES		OPPORTUNITIES		THREATS	
Academic researcher at the University	Accessibility to bibliographic sources and virtual information systems	3.50	Scarce and unstable public funding for research	4.40	Existence of different research networks at international level (Latin American and European)- 3,79	3.80	Under political and financial commitment of the Government to the investigation	4.50
	The teaching staff is committed to the research process	3.3	Limited knowledge of strategies to attract and maintain private financing	4	Agreements with institutions and/or some companies for the realization of internships by students of last years- 3,56	3.6	Research is not a priority for the government in periods of cuts and crisis	4.5
	The Research Area Management Staff is committed to research policies and goals	3.3	Limited number of researchers at the university	3.9	Existence of links and collaboration agreements with other Latin American and European universities	3.4	Poor research culture in the national education system	4.4

It should be noted that respondents in all profiles demonstrate the commitment of research management to research policies and objectives. Accessibility to bibliographic sources and virtual information systems at the university and national levels is strongly valued as a strength by all categories, except for members of R&D units. The members of research centres highlight as a strength a team of researchers with high capacity for scientific production and competitive at the national level. The university directors of high and medium levels and the staff of the research centres point out as greater strength the existence of policies and lines of research defined at the institutional level in the university (or faculty). "The faculty is committed to the research process" is the strength identified by the profile of the researcher, while ministry officials from their perspective mention that there is a will at the executive level to strengthen the management of research at the institutional and national level.

As **weaknesses**, respondents from all categories highlight the limited number of researchers at the university. Limited knowledge of strategies to attract and sustain private funding is another weakness mentioned by all categories, with the exception of middle managers. Scarce and unstable public funding for research is also a weakness noted by all respondents, with the exception of the Ministry of Education and Science. In turn, the Ministry's staff highlights as a weakness the limited capacity (competitiveness) to obtain national and international funding. The limited participation of the public and society in general in research activities is assessed as a weakness by mid-level university managers.

Respondents recognize the existence of several **opportunities** to improve and promote research management in Paraguay. All interviewees agree that the existence of different international research networks (Latin American and European) is a great opportunity for them. In addition, agreements with institutions and some companies for the realization of internships for final year students is another opportunity pointed out by all interviewees, with the exception of ministry official workers. Members of the university's senior management, members of research units and researchers highlight the importance of the existence of links and collaboration agreements with other Latin American and European universities as an opportunity. The ministry's official workers consider an opportunity for universities the active presence of a Vice-Ministry of Science, Technology and Innovation/National Council of Science and Technology with national policies and programmes around research and with decision-making and organizational capacity in the sector, as well as the availability of internal and external financial resources to support research. The current international calls for research in different areas of knowledge is another opportunity highlighted by high-level managers such as rectors.

Concerning **threats,** it should be noted that the assessment of ministry officials workers differ from the other categories involved in this investigation. They define as threat the low valuation of research in the country and in the institution itself, the technological, equipment, human resources and research support gap with respect to competing research centres and groups, the lack of strategic and diverse incentives to promote research and innovation by the Government and the Institution. The most prominent threats are: the low culture of research in the national education system and that research is not a priority for the government in periods of cuts and crisis. For their part, mid-level managers consider the lack of implementation of national policies that promote research in universities as a strong threat, while high-level managers consider the lack of clear regional research priorities by the departmental government as a greater threat.

6. Conclusions

The main objective of this report is to generate first-hand evidence on the state of research policies and practices at the national, institutional and individual levels in the case of Bolivia and Paraguay. First, it attempts to provide an overview of the macro categories in terms of legal, economic, human resources development, R&D investments, historical and cultural contexts, and a comparable summary of research policy in both countries. In addition, current research policy and practices at the institutional level are examined, based on the KRA methodology. Finally, the evaluation of research policy and practices in both countries is carried out by the main actors involved in the process, such as high- and middle-level managers of HEIs, ministries of education in both countries, researchers, and workers in R&D units.

The national political context has a direct impact on the process of developing research strategies in higher education institutions, and on the level of performance of researchers. Starting with research policies in both countries at the national level, it can be concluded that, although research is part of national policies, it is still underdeveloped with a lack of concrete indicators for the fulfilment of policy objectives. The main actors involved in this study recognize the role of the State in the promotion, development, and support of research at the state level.

At the institutional level, each institution has its own research management model, with regulations aimed at strengthening its processes, as well as directorates and/or vice-rectories responsible for managing this research. Universities have their strategic plans that mention the aspect of research and define it as one of the main axes. Some universities have an R&D centre as an independent body managed directly by the Rectorate, while others have these units under the direction of the faculties or departments. In any case, greater visibility of the strategic plans and activities of the R&D units is required, as well as the updating of these plans considering the vanguard at the international and national level, and the particularities of each institution.

There are few doctoral programs in both countries, although the institutions conduct research in various scientific fields, producing some publications in this context.

However, the low level of English limits the production of scientific works, relevant to the international community. Definitely, it is necessary to increase the number of scientific publications, in order to achieve greater visibility on the international scientific community, and create opportunities for new international partnerships. It would be worthwhile to create platforms and/or tools for the dissemination and visibility of research results.

To improve the research capacities of human resources, it is suggested to increase participation in mobility programs for researchers and professors, and in national and international congresses.

Regarding the individual analysis based on the SWOT methodology, it should be noted that the interviewees from both countries share the opinion related to the strengths, pointing out as the main strength the accessibility to bibliographic sources and virtual information systems at the university and national level, the policies and lines of research defined at the institutional level in the university or faculty, and that research management staff are committed to research policies and objectives. Ministry officials in Paraguay also highlight as a strength the will at the executive level to strengthen the management of research at the institutional and national levels.

In relation to weaknesses, the limited number of researchers at the university level and the scarce and unstable public funding of research are the indicators valued by most of the categories in both countries. Regarding the assessment by the ministries, it can be highlighted the limited capacity (competitiveness) to obtain national and international funding in the case of Paraguay, as well as the lack of clear, defined, stable and long-term policies for the management of research and scientific production in the university, the poor coordination between areas of knowledge and the weak link between research and postgraduate training by the Ministry in Bolivia. Regarding the opportunities, it is interesting to note that the evaluation of both countries coincides, referring to the existence of different international research networks (Latin American and European), to the agreements with institutions and / or some companies for the realization of internships of final year students, and to the existence of links and collaboration agreements with other Latin American and European universities as the main opportunities. Regarding threats, all categories in the case of both countries consider that research is not a priority for the government in periods of cuts, and the crisis may be a threat. Paraguayan respondents pointed to the poor culture of research in the national education system as a threat, while Bolivian respondents referred to the government's low political and financial commitment to research as a threat.

In addition to the commitment of the main actors involved in the management of research policies and objectives, the limited number of researchers and the scarce and unstable public funding of research are the main obstacles to promoting and developing research. The analysis of these three levels allows us to know how to fill these identified gaps and create the conditions to improve the skills of human capital. In addition, the implementation of the global sustainable development agenda requires the implementation of the Sustainable Development Goals,

which, of course, requires academics to be able to critically analyse, first of all, local development and policy issues and then to reflect on how they can contribute to the achievement of the SDGs. Prioritizing the skills and competencies of human resources and investing in this context is essential to ensure the promotion and development of research at all levels.

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7. APPENDICES: Institutional analysis

7.1. Ministry of Education of Paraguay and Bolivia

Sample profile		
Gender	**Frequency**	**Percentage**
Man	5	62.50%
Woman	3	37.50%
Age		
Min	39	
Max	55	
Average	47	
Level of education		
Doctorate	3	37.50%
Master	5	62.50%
Seniority in the institution (years)		
Min	5	
Max	28	
Average	13	
Total	**8**	**100%**

WEAKNESSES				THREATS			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
d1	18%	27%	55%	**a1**	18%	45%	36%
d2	18%	36%	45%	**a2**	18%	27%	55%
d3	9%	64%	27%	**a3**	0%	45%	55%
d4	9%	55%	36%	**a4**	9%	45%	45%
d5	9%	36%	55%	**a5**	9%	36%	55%
d6	18%	18%	64%	**a6**	9%	55%	36%
d7	18%	27%	55%	**a7**	9%	36%	55%
d8	18%	45%	36%	**a8**	9%	36%	55%
d9	18%	45%	36%	**a9**	9%	45%	45%
d10	18%	55%	27%	**a10**	9%	55%	36%
d11	9%	36%	55%	**a11**	9%	27%	64%
d12	9%	55%	36%	**a12**	9%	27%	64%
d13	9%	45%	45%	**a13**	18%	27%	55%
d14	27%	45%	27%	**a14**	18%	36%	45%
d15	27%	36%	36%	**a15**	18%	36%	45%
d16	18%	55%	27%	**a16**	27%	18%	55%
d17	0%	91%	9%	**a17**	9%	36%	55%
d18	0%	73%	27%	**a18**	27%	18%	55%
d19	9%	55%	36%	**a19**	18%	36%	45%
d20	27%	55%	18%	**a20**	18%	18%	64%
STRENGTHS				**OPPORTUNITIES**			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
f1	18%	45%	36%	**o1**	9%	45%	45%
f2	27%	36%	36%	**o2**	45%	45%	9%
f3	27%	55%	18%	**o3**	36%	27%	36%
f4	36%	27%	36%	**o4**	27%	55%	18%
f5	27%	36%	36%	**o5**	36%	36%	27%
f6	18%	36%	45%	**o6**	55%	27%	18%
f7	27%	64%	9%	**o7**	64%	27%	9%
f8	27%	45%	27%	**o8**	55%	45%	0%
f9	18%	55%	27%	**o9**	55%	27%	18%
f10	18%	45%	36%	**o10**	36%	27%	36%
f11	18%	55%	27%	**o11**	45%	27%	27%
f12	27%	55%	18%	**o12**	45%	55%	0%
f13	27%	45%	27%	**o13**	64%	36%	0%
f14	18%	64%	18%	**o14**	45%	27%	27%
f15	18%	45%	36%				
f16	36%	45%	18%				

7.2. Gabriel René Moreno Autonomous University – UAGRM (Bolivia)

Sample profile		
Gender	**Frequency**	**%**
Man	30	64%
Woman	17	36%
Age		
Min	28	
Max	68	
Average	49	
Level of education		
Doctoral	2	4%
Doctorate	11	23%
Master	21	45%
Degree	12	26%
None of the above	1	2%
Profile within the organization		
Academic researcher at the university	21	45%
Member of the senior management of the university (Rector, Vice-Rector and Deans)	16	34%
Member of R&D Units or Research Centres	10	21%
Seniority in the institution (years)		
Min	8 m.	
Max	40	
Average	15	
Total	**47**	**100%**

WEAKNESSES				THREATS			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
d1	13%	19%	68%	**a1**	23%	28%	49%
d2	38%	19%	43%	**a2**	11%	15%	74%
d3	23%	21%	55%	**a3**	21%	28%	51%
d4	32%	32%	36%	**a4**	17%	15%	68%
d5	15%	11%	74%	**a5**	17%	15%	68%
d6	13%	9%	79%	**a6**	28%	23%	49%
d7	17%	28%	55%	**a7**	23%	17%	60%
d8	17%	34%	49%	**a8**	26%	23%	51%
d9	30%	26%	45%	**a9**	15%	26%	60%
d10	26%	32%	43%	**a10**	28%	23%	49%
d11	28%	26%	47%	**a11**	13%	17%	70%
d12	28%	23%	49%	**a12**	15%	6%	79%
d13	38%	15%	47%	**a13**	17%	23%	60%
d14	43%	19%	38%	**a14**	32%	32%	36%
d15	38%	15%	47%	**a15**	19%	21%	60%
d16	26%	30%	45%	**a16**	26%	26%	49%
d17	34%	26%	40%	**a17**	15%	17%	68%
d18	13%	32%	55%	**a18**	11%	23%	66%
d19	17%	32%	51%	**a19**	15%	30%	55%
d20	19%	38%	43%	**a20**	15%	15%	70%
STRENGTHS				**OPPORTUNITIES**			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
f1	28%	23%	49%	**o1**	17%	19%	64%
f2	32%	32%	36%	**o2**	38%	17%	45%
f3	13%	32%	55%	**o3**	19%	28%	53%
f4	21%	19%	60%	**o4**	23%	38%	38%
f5	26%	32%	43%	**o5**	21%	32%	47%
f6	30%	38%	32%	**o6**	34%	34%	32%
f7	36%	23%	40%	**o7**	32%	34%	34%
f8	40%	26%	34%	**o8**	30%	43%	28%
f9	47%	15%	38%	**o9**	21%	28%	51%
f10	15%	28%	57%	**o10**	19%	30%	51%
f11	32%	26%	43%	**o11**	55%	19%	26%
f12	30%	36%	34%	**o12**	43%	40%	17%
f13	40%	23%	36%	**o13**	28%	49%	23%
f14	60%	19%	21%	**o14**	32%	30%	38%
f15	32%	26%	43%				
f16	47%	23%	30%				

7.3 Universidad Católica Boliviana - UCB (Bolivia) “San Pablo”

Sample profile		
Gender	**Frequency**	**%**
Man	32	57%
Woman	24	43%
Age		
Min	26	
Max	73	
Average	45	
Level of education		
Doctorate	12	21%
Degree	7	13%
Master	37	66%
Profile within the organization		
Mid-level manager at the University (Directors of Research Centres, Career Directors, Directors of Research Institutes, Heads of Department and other similar position)	19	34%
Academic researcher at the University	32	57%
Member of the senior management of the University (Rector, Vice-Rector and Deans)	2	4%
Member of R&D Units or Research Centres	3	5%
Seniority in the institution (years)		
Min	1	
Max	40	
Average	10	
Total	**56**	**100%**

WEAKNESSES				THREATS			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
d1	15%	20%	65%	**a1**	10%	30%	60%
d2	30%	25%	45%	**a2**	8%	18%	73%
d3	13%	30%	57%	**a3**	12%	17%	72%
d4	18%	30%	52%	**a4**	10%	18%	72%
d5	12%	35%	53%	**a5**	12%	18%	70%
d6	12%	8%	80%	**a6**	20%	27%	53%
d7	12%	22%	67%	**a7**	15%	25%	60%
d8	13%	32%	55%	**a8**	12%	28%	60%
d9	20%	27%	53%	**a9**	12%	23%	65%
d10	23%	23%	53%	**a10**	18%	30%	52%
d11	15%	27%	58%	**a11**	12%	7%	82%
d12	17%	18%	65%	**a12**	10%	8%	82%
d13	17%	18%	65%	**a13**	13%	10%	77%
d14	38%	22%	40%	**a14**	18%	18%	63%
d15	17%	25%	58%	**a15**	15%	15%	70%
d16	18%	30%	52%	**a16**	13%	17%	70%
d17	17%	33%	50%	**a17**	23%	8%	68%
d18	7%	22%	72%	**a18**	15%	13%	72%
d19	18%	15%	67%	**a19**	12%	32%	57%
d20	13%	27%	60%	**a20**	12%	8%	80%
FORTALEZAS				**OPPORTUNITIES**			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
f1	25%	28%	47%	**o1**	13%	30%	57%
f2	35%	32%	33%	**o2**	32%	33%	35%
f3	17%	32%	52%	**o3**	18%	30%	52%
f4	17%	27%	57%	**o4**	37%	37%	27%
f5	35%	30%	35%	**o5**	23%	43%	33%
f6	45%	28%	27%	**o6**	32%	45%	23%
f7	45%	32%	23%	**o7**	38%	35%	27%
f8	37%	35%	28%	**o8**	35%	47%	18%
f9	37%	43%	20%	**o9**	27%	47%	27%
f10	23%	32%	45%	**o10**	22%	30%	48%
f11	27%	47%	27%	**o11**	47%	30%	23%
f12	33%	40%	27%	**o12**	50%	30%	20%
f13	47%	37%	17%	**o13**	35%	42%	23%
f14	55%	27%	18%	**o14**	40%	35%	25%
f15	37%	33%	30%				
f16	55%	27%	18%				

7.4. Private University of Santa Cruz de la Sierra- UPSA (Bolivia)

Sample profile		
Gender	**Frequency**	**%**
Man	27	48%
Woman	29	52%
Age		
Min	28	
Max	70	
Average	47	
Level of education		
Doctoral	3	5%
Doctorate	19	34%
Master	27	48%
Degree	7	13%
Profile within the organization		
Mid-level manager at the University (Directors of Research Centres, Career Directors, Directors of Research Institutes, Heads of Department and other similar position)	3	5%
Academic researcher at the University	32	57%
Member of the senior management of the University (Rector, Vice-Rector and Deans)	1	2%
Member of R&D Units or Research Centres	20	36%
Seniority in the institution (years)		
Min	3m.	
Max	35	
Average	14	
Total	**56**	**100%**

WEAKNESSES				THREATS			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
d1	11%	14%	75%	**a1**	7%	30%	63%
d2	20%	27%	54%	**a2**	5%	23%	71%
d3	7%	30%	63%	**a3**	9%	21%	70%
d4	16%	25%	59%	**a4**	5%	18%	77%
d5	13%	20%	68%	**a5**	4%	16%	80%
d6	5%	14%	80%	**a6**	11%	30%	59%
d7	5%	21%	73%	**a7**	11%	29%	61%
d8	11%	32%	57%	**a8**	4%	27%	70%
d9	13%	34%	54%	**a9**	5%	25%	70%
d10	14%	34%	52%	**a10**	9%	29%	63%
d11	18%	27%	55%	**a11**	7%	11%	82%
d12	13%	25%	63%	**a12**	4%	9%	88%
d13	9%	30%	61%	**a13**	4%	20%	77%
d14	23%	30%	46%	**a14**	4%	27%	70%
d15	14%	27%	59%	**a15**	9%	16%	75%
d16	18%	29%	54%	**a16**	11%	21%	68%
d17	16%	29%	55%	**a17**	5%	21%	73%
d18	5%	21%	73%	**a18**	4%	18%	79%
d19	5%	25%	70%	**a19**	9%	34%	57%
d20	11%	32%	57%	**a20**	2%	13%	86%
STRENGTHS				**OPPORTUNITIES**			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
f1	18%	32%	50%	**o1**	18%	18%	64%
f2	20%	39%	41%	**o2**	39%	32%	29%
f3	16%	34%	50%	**o3**	21%	39%	39%
f4	27%	36%	38%	**o4**	25%	48%	27%
f5	23%	25%	52%	**o5**	25%	39%	36%
f6	38%	32%	30%	**o6**	36%	43%	21%
f7	34%	38%	29%	**o7**	39%	34%	27%
f8	38%	25%	38%	**o8**	38%	39%	23%
f9	39%	34%	27%	**o9**	27%	38%	36%
f10	14%	27%	59%	**o10**	21%	30%	48%
f11	34%	36%	30%	**o11**	55%	23%	21%
f12	27%	36%	38%	**o12**	52%	34%	14%
f13	41%	38%	21%	**o13**	32%	43%	25%
f14	57%	23%	20%	**o14**	27%	32%	41%
f15	36%	21%	43%				
f16	48%	29%	23%				

7.5. Universidad Mayor, Real y Pontificia de San Francisco Xavier de Chuquisaca USFX (Bolivia)

Sample profile		
Gender	**Frequency**	**%**
Man	40	48%
Woman	43	51%
I prefer not to answer	1	1%
Age		
Min	25	
Max	68	
Average	44	
Level of education		
Doctoral	3	4%
Doctorate	15	18%
Master	48	57%
Degree	16	19%
None of the above	2	2%
Profile within the organization		
Mid-level manager at the university (Directors of Research Centres, Career Directors, Directors of Research Institutes, Heads of Department and other similar position)	16	19%
Academic researcher at the university	67	80%
Member of R&D Units or Research Centres	1	1%
Seniority in the institution (years)		
Min	3m.	
Max	48	
Average	12	
Total	**84**	**100%**

WEAKNESSES	**THREATS**

	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
d1	8%	15%	76%	**a1**	13%	31%	56%
d2	19%	32%	49%	**a2**	13%	20%	67%
d3	14%	24%	62%	**a3**	13%	14%	73%
d4	31%	19%	50%	**a4**	8%	12%	80%
d5	14%	21%	64%	**a5**	8%	14%	77%
d6	12%	8%	80%	**a6**	19%	25%	56%
d7	13%	19%	68%	**a7**	13%	35%	52%
d8	14%	26%	60%	**a8**	15%	33%	51%
d9	23%	20%	57%	**a9**	12%	20%	68%
d10	27%	23%	50%	**a10**	12%	31%	57%
d11	23%	15%	62%	**a11**	8%	11%	81%
d12	13%	19%	68%	**a12**	10%	12%	79%
d13	19%	14%	67%	**a13**	10%	11%	80%
d14	32%	24%	44%	**a14**	15%	23%	62%
d15	20%	24%	56%	**a15**	10%	18%	73%
d16	27%	21%	51%	**a16**	10%	21%	69%
d17	26%	20%	54%	**a17**	11%	15%	74%
d18	12%	14%	74%	**a18**	8%	13%	79%
d19	12%	20%	68%	**a19**	13%	25%	62%
d20	14%	25%	61%	**a20**	12%	8%	80%
STRENGTHS				**OPPORTUNITIES**			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
f1	25%	25%	50%	**o1**	14%	26%	60%
f2	32%	29%	39%	**o2**	37%	29%	35%
f3	20%	24%	56%	**o3**	20%	39%	40%
f4	17%	21%	62%	**o4**	27%	44%	29%
f5	18%	27%	55%	**o5**	20%	39%	40%
f6	30%	36%	35%	**o6**	26%	43%	31%
f7	35%	35%	31%	**o7**	37%	36%	27%
f8	32%	39%	29%	**o8**	32%	40%	27%
f9	37%	32%	31%	**o9**	29%	32%	39%
f10	20%	32%	48%	**o10**	19%	31%	50%
f11	27%	37%	36%	**o11**	36%	36%	29%
f12	37%	25%	38%	**o12**	48%	33%	19%
f13	43%	23%	35%	**o13**	33%	36%	31%
f14	52%	35%	13%	**o14**	26%	33%	40%
f15	36%	26%	38%				
f16	45%	27%	27%				

7.6. Profile of the National University of the East – UNE (Paraguay).

Sample profile		
Gender	**Frequency**	**Percentage**
Man	45	59%
Woman	31	41%
Age		
Min	24	
Max	85	
Average	48	
Level of education		
Doctoral	3	4%
Doctorate	10	13%
Master	50	66%
Degree	13	17%
Profile within the organization		
Mid-level manager at the university (Directors of Research Centres, Career Directors, Directors of Research Institutes, Heads of Department and other similar position)	1	1%
Academic researcher at the University	47	62%
Member of the senior management of the University (Rector, Vice-Rector and Deans)	11	14%
Member of R&D Units or Research Centres	17	22%
Seniority in the institution (years)		
Min	2m.	
Max	44	
Average	14	
Total	**76**	**100%**

WEAKNESSES				THREATS			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
d1	13%	18%	68%	**a1**	16%	25%	59%
d2	21%	28%	51%	**a2**	9%	18%	72%
d3	14%	24%	62%	**a3**	9%	24%	67%
d4	16%	30%	54%	**a4**	8%	24%	68%
d5	9%	30%	61%	**a5**	8%	22%	70%
d6	4%	12%	84%	**a6**	9%	32%	59%
d7	7%	25%	68%	**a7**	14%	25%	61%
d8	17%	28%	55%	**a8**	14%	20%	66%
d9	20%	29%	51%	**a9**	14%	22%	63%
d10	18%	25%	57%	**a10**	19%	23%	59%
d11	16%	32%	53%	**a11**	9%	12%	79%
d12	16%	22%	62%	**a12**	9%	8%	83%
d13	18%	20%	62%	**a13**	11%	16%	74%
d14	34%	30%	36%	**a14**	13%	17%	70%
d15	17%	28%	55%	**a15**	13%	20%	67%
d16	20%	29%	51%	**a16**	16%	16%	68%
d17	14%	32%	54%	**a17**	16%	14%	70%
d18	18%	21%	61%	**a18**	13%	12%	75%
d19	11%	25%	64%	**a19**	14%	29%	57%
d20	11%	32%	58%	**a20**	12%	8%	80%
STRENGTHS				**OPPORTUNITIES**			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
f1	32%	32%	37%	**o1**	14%	22%	63%
f2	41%	29%	30%	**o2**	36%	29%	36%
f3	34%	24%	42%	**o3**	16%	33%	51%
f4	30%	26%	43%	**o4**	21%	38%	41%
f5	39%	33%	28%	**o5**	25%	33%	42%
f6	41%	30%	29%	**o6**	30%	39%	30%
f7	47%	29%	24%	**o7**	36%	33%	32%
f8	41%	32%	28%	**o8**	36%	36%	29%
f9	41%	32%	28%	**o9**	32%	25%	43%
f10	25%	29%	46%	**o10**	30%	20%	50%
f11	37%	30%	33%	**o11**	51%	22%	26%
f12	34%	32%	34%	**o12**	53%	25%	22%
f13	49%	29%	22%	**o13**	36%	32%	33%
f14	64%	18%	17%	**o14**	36%	24%	41%
f15	42%	24%	34%				
f16	55%	17%	28%				

7.7. National University of Asunción-UNA (Paraguay)

Sample profile		
Gender	**Frequency**	**Percentage**
Man	44	51%
Woman	42	49%
Age		
Min	28	
Max	67	
Average	46	
Level of education		
Doctoral	3	3%
Doctorate	18	21%
Master	48	56%
Degree	15	17%
None of the above	2	2%
Profile within the organization		
Mid-level manager at the University (Directors of Research Centres, Career Directors, Directors of Research Institutes, Heads of Department and other similar position)	60	70%
Academic researcher at the University	22	26%
Member of the senior management of the University (Rector, Vice-Rector and Deans)	2	2%
Member of R&D Units or Research Centres	2	2%
Duration of work (years)		
Min	2	
Max	38	
Average	13	
Total	**86**	**100%**

WEAKNESSES				THREATS			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
d1	6%	25%	69%	**a1**	16%	32%	52%
d2	18%	34%	48%	**a2**	10%	19%	70%
d3	14%	32%	55%	**a3**	10%	23%	67%
d4	17%	40%	43%	**a4**	15%	23%	63%
d5	8%	34%	58%	**a5**	14%	8%	78%
d6	10%	16%	74%	**a6**	23%	22%	56%
d7	10%	24%	66%	**a7**	18%	20%	61%
d8	8%	34%	58%	**a8**	16%	27%	57%
d9	23%	33%	44%	**a9**	13%	22%	66%
d10	22%	34%	44%	**a10**	22%	31%	48%
d11	16%	28%	56%	**a11**	10%	14%	76%
d12	17%	19%	64%	**a12**	11%	9%	80%
d13	13%	31%	57%	**a13**	8%	14%	78%
d14	32%	28%	40%	**a14**	13%	24%	64%
d15	17%	25%	58%	**a15**	10%	19%	70%
d16	20%	27%	52%	**a16**	14%	15%	72%
d17	20%	23%	57%	**a17**	10%	20%	69%
d18	14%	22%	65%	**a18**	8%	23%	69%
d19	15%	19%	66%	**a19**	8%	22%	70%
d20	15%	26%	59%	**a20**	7%	9%	84%
STRENGTHS				**OPPORTUNITIES**			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
f1	17%	41%	42%	**o1**	15%	31%	55%
f2	28%	39%	33%	**o2**	32%	35%	33%
f3	18%	31%	51%	**o3**	13%	31%	57%
f4	13%	25%	63%	**o4**	22%	38%	41%
f5	28%	31%	41%	**o5**	22%	36%	42%
f6	32%	34%	34%	**o6**	30%	40%	31%
f7	44%	33%	23%	**o7**	33%	31%	36%
f8	34%	40%	26%	**o8**	33%	44%	23%
f9	33%	38%	30%	**o9**	26%	40%	34%
f10	16%	32%	52%	**o10**	16%	33%	51%
f11	24%	39%	38%	**o11**	35%	39%	26%
f12	30%	34%	36%	**o12**	51%	28%	20%
f13	43%	35%	22%	**o13**	38%	34%	28%
f14	56%	28%	16%	**o14**	26%	27%	47%
f15	26%	34%	40%				
f16	42%	35%	23%				

7.8. Catholic University " Nuestra Señora de la Asunción" Unit – UC (Paraguay)

Sample profile		
Gender	**Frequency**	**Percentage**
Man	22	55%
Woman	18	45%
Age		
Min	23	
Max	70	
Average	45	
Level of education		
Doctoral	2	5%
Doctorate	3	8%
Master	28	70%
Degree	7	18%
Profile within the organization		
Academic researcher at the University	17	43%
Member of the senior management of the University (Rector, Vice-Rector and Deans)	2	5%
Member of R&D Units or Research Centres	21	53%
Seniority in the institution (years)		
Min	4m.	
Max	30	
Average	12	
Total	**40**	**100%**

WEAKNESSES				THREATS			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
d1	25%	20%	55%	**a1**	13%	25%	63%
d2	25%	23%	53%	**a2**	8%	25%	68%
d3	18%	30%	53%	**a3**	18%	20%	63%
d4	28%	40%	33%	**a4**	13%	30%	58%
d5	18%	30%	53%	**a5**	15%	20%	65%
d6	10%	20%	70%	**a6**	20%	33%	48%
d7	15%	23%	63%	**a7**	20%	25%	55%
d8	15%	30%	55%	**a8**	13%	40%	48%
d9	28%	30%	43%	**a9**	13%	23%	65%
d10	35%	18%	48%	**a10**	13%	36%	51%
d11	25%	23%	53%	**a11**	10%	18%	73%
d12	23%	20%	58%	**a12**	10%	18%	73%
d13	23%	18%	60%	**a13**	10%	25%	65%
d14	35%	25%	40%	**a14**	25%	13%	63%
d15	25%	23%	53%	**a15**	18%	18%	65%
d16	20%	33%	48%	**a16**	10%	25%	65%
d17	28%	18%	55%	**a17**	13%	15%	73%
d18	15%	20%	65%	**a18**	13%	18%	70%
d19	35%	20%	45%	**a19**	13%	35%	53%
d20	25%	28%	48%	**a20**	13%	15%	73%
STRENGTHS				**OPPORTUNITIES**			
	Disagreement	Neutral	Agreement		Disagreement	Neutral	Agreement
f1	25%	25%	50%	**o1**	8%	35%	58%
f2	33%	35%	33%	**o2**	23%	45%	33%
f3	20%	33%	48%	**o3**	18%	33%	50%
f4	23%	20%	58%	**o4**	25%	40%	35%
f5	25%	25%	50%	**o5**	23%	38%	40%
f6	40%	28%	33%	**o6**	20%	43%	38%
f7	40%	38%	23%	**o7**	30%	38%	33%
f8	33%	40%	28%	**o8**	23%	43%	35%
f9	30%	38%	33%	**o9**	20%	40%	40%
f10	25%	33%	43%	**o10**	13%	35%	53%
f11	30%	33%	38%	**o11**	28%	45%	28%
f12	33%	28%	40%	**o12**	38%	33%	30%
f13	43%	28%	30%	**o13**	23%	35%	43%
f14	48%	35%	18%	**o14**	23%	30%	48%
f15	30%	28%	43%				
f16	43%	33%	25%				

7.9 Detailed SWOT analysis based on respondents' profiles (Bolivia)

	STRENGTHS	Ministry Official workers	Member of senior management	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
f1	The teaching staff is committed to the research process	2.75	3.10	3.26	3.03	3.52
f2	It has consolidated teams of research teachers.	2.00	3.05	2.97	2.76	3.21
f3	It has policies and lines of research defined at the institutional level in the university (or in the faculty)	3.00	3.71	3.50	3.32	3.52
f4	Accessibility to bibliographic sources and virtual information systems at the university and national levels	3.75	3.57	3.50	3.12	3.62
f5	It has a team of researchers with a high level of scientific production capacity and competitive at the national level	2.50	3.00	3.03	3.09	3.50
f6	It has adequate physical structure and equipped to promote research.	2.50	3.00	2.63	2.74	2.97
f7	It has a database where statistical information on the scientific production of the institution is recorded and generated	1.75	2.95	2.63	2.71	2.99
f8	There is management capacity to obtain funding from competitive calls at national level	2.50	2.76	3.00	2.79	3.03
f9	There is management capacity to obtain funding in competitive calls at an international level	2.25	2.67	2.89	2.65	2.95
f10	The Research Area Management Staff is committed to research policies and goals	3.25	3.67	3.42	3.29	3.52
f11	We have permanent participation in local, regional, national and international research projects. (International conventions and contracts)	3.00	3.05	2.97	2.76	3.19
f12	The researchers of the university are part of research groups at the national level.	2.50	2.81	2.92	2.82	3.19
f13	There are sufficient scientific-technological resources to promote research	2.25	2.71	2.61	2.35	2.92
f14	Research support is supported by national policies	2.75	2.48	2.26	2.29	2.52
f15	There is executive will to strengthen research management at the institutional and national levels	2.50	3.24	2.89	2.88	3.05
f16	There is an administrative support service for the researcher	1.75	2.43	2.55	2.44	2.70

	OPPORTUNITIES	Ministry Official workers	Member of senior management	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
o1	Existence of different research networks at international level (Latin American and European)	4.50	4.10	3.65	3.56	3.62

	OPPORTUNITIES	Ministry Official workers	Member of senior management	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
o2	Coordination between national universities through the country's University System	2.25	3.29	3.16	3.06	2.87
o3	Agreements with institutions and / or some companies for the realization of practices by students of last years	3.25	3.81	3.38	3.50	3.37
o4	Collaborations with companies in specific research and/or advisory projects	2.50	3.43	3.14	2.94	3.03
o5	International calls in force around research in the different areas of knowledge	2.50	3.38	3.19	3.00	3.31
o6	Presence and development of technological platforms at the regional level that support, extend and reinforce research and innovation and its internationalization	3.00	3.00	2.92	2.68	3.00
o7	Annual promotions of young professionals, with potential research capacity	3.00	2.90	2.97	2.68	2.94
o8	Motivation and responsiveness of professional groups that have had fewer opportunities and prominence in research.	2.75	2.86	3.00	2.94	2.88
o9	New technologies and accessible information systems for research	3.25	3.38	3.03	3.00	3.16
o10	Existence of links and collaboration agreements with other Latin American and European universities	2.75	3.57	3.49	3.21	3.41
o11	Active presence of a Vice-Ministry of Science, Technology and Innovation/National Council of Science and Technology and with national policies and programs around research and with decision-making and organizational capacity in the sector	3.25	2.48	2.70	2.35	2.62
o12	Internal and external economic resources are available to support research.	3.25	2.52	2.76	2.32	2.57
o13	Technological development and growth in research that affects institutional positioning at the national, regional and international levels	2.25	2.95	2.86	2.85	2.90
o14	Ability to access competitive funds for scholarships for doctorates for national researchers to train in universities of high international prestige	3.50	3.10	3.24	2.97	3.05

	WEAKNESSES	Ministry Official workers	Member of senior management	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
d1	Limited number of researchers at the university	4.75	3.95	4.00	4.00	3.96
d2	Policies and lines of research indefinite and not systematized at the institutional level in the university	3.00	3.43	3.08	3.26	3.37
d3	Poor coordination between the areas of knowledge and weak link between research and postgraduate training	4.25	3.76	3.53	3.76	3.61
d4	Little integration of the research service with the problems of the local or departmental environment	4.00	3.38	3.42	3.50	3.27
d5	Low participation of the population and society in general in research activities	4.00	3.90	3.47	4.12	3.80
d6	Scarce and unstable public funding for research	4.25	4.48	4.05	4.32	4.25
d7	Limited knowledge of strategies to attract and maintain private financing	4.25	4.10	3.45	3.65	3.93
d8	Limited capacity (competitiveness) to secure national and international funding	4.00	3.67	3.39	3.38	3.69
d9	Limited culture of research leadership and support in the service by the Directorates/Heads of research.	3.75	3.48	3.16	3.32	3.56
d10	Little interest of teaching and student staff in research.	2.50	3.48	3.32	3.62	3.39
d11	Limited methodological support, administrative and operational support to develop proposals and execute research projects.	3.75	3.67	3.45	3.53	3.55
d12	Little appreciation and recognition of research activity at the institutional level and with a view to progress in the professional career	3.75	3.52	3.76	3.65	3.75
d13	Absence of clear, defined, stable and long-term policies to manage research and scientific production at the University	4.50	3.38	3.47	3.65	3.70
d14	Frequent political changes with changes in priorities and objectives within the University.	3.25	2.76	3.24	3.09	3.22
d15	Management Difficulties in establishing collaboration agreements with governmental and non-governmental organizations	4.25	3.05	3.34	3.38	3.61
d16	Absence of strategies and activities to promote and direct young researchers.	4.00	3.48	3.18	3.29	3.43

	WEAKNESSES	Ministry Official workers	Member of senior managem ent	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
d17	Lack of annual calls for research promotion (research projects, scholarships, pre- and postdoctoral contracts, stays abroad, acquisition of infrastructure, etc.)	3.25	3.05	3.13	3.26	3.51
d18	Poor innovative and research culture in the public and business sectors	4.00	3.76	3.76	4.03	3.88
d19	Little training in R+D+i (Research+Development+Innovati on) in university postgraduate degrees	4.00	3.62	3.68	3.71	3.80
d20	System of communication, dissemination and dissemination of poor results	4.00	3.43	3.50	3.38	3.70

	THREATS	Ministry Official workers	Member of senior management	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
a1	Non-compliance with national policies that promote research in universities	3.75	3.48	3.66	3.71	3.70
a2	Absence of clear regional priorities in research by the Departmental Government	4.25	4.19	3.95	3.94	4.01
a3	Little appreciation of research in our country and in the institution itself	3.75	3.62	3.71	3.94	3.86
a4	Absence of strategic and diverse incentives to promote research and innovation by the Government and the Institution	4.00	3.95	3.97	3.94	3.96
a5	Little involvement of companies, institutions and social organizations to do research with the university.	4.25	3.86	3.95	4.03	4.00
a6	Absence of national or regional calls to participate/compete in the development of research.	3.50	3.67	3.39	3.44	3.53
a7	Little competitiveness in national or international calls for attracting resources for research.	3.75	3.81	3.61	3.74	3.60
a8	Waste of agreements as external sources of financing.	4.00	3.81	3.68	3.88	3.56
a9	Limited dissemination of research results by National and Institutional Bodies	4.25	3.86	3.74	3.71	3.80
a10	Continuous changes in Investigation Managers: charges subject to political change.	3.75	3.52	3.68	3.38	3.69

	THREATS	Ministry Official workers	Member of senior management	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
a11	Under political and financial commitment of the Government to the investigation	4.25	4.19	4.32	4.09	4.15
a12	Research is not a priority for the government in periods of cuts and crisis	4.00	4.19	4.29	4.24	4.34
a13	Insufficient coordination in research between university – company – State	4.50	3.95	4.00	3.97	4.08
a14	Insufficient coordination at the institutional level between the different key actors to organize research (different faculties, Rectorates, Administrative Services and researchers)	4.25	3.33	3.68	3.56	3.66
a15	Technological, equipment, human resources and research support gap with respect to competing research centres and groups	4.00	4.05	3.87	3.85	3.87
a16	Little support from research funding programmes for young researchers, prioritising more established and experienced scientists	4.50	3.62	3.79	3.62	3.82
a17	Global financial constraint following the COVID-19 crisis.	4.00	4.14	4.00	3.82	3.98
a18	Flight of talents and researchers to other countries due to salary and other regulations	4.25	4.24	4.34	3.91	4.12
a19	Bureaucratic difficulties for the registration of patents and authorship for the results of the University's research.	3.75	3.90	3.58	3.59	3.74
a20	Poor research culture in the national education system	4.25	4.00	4.24	4.09	4.25

7.10. Detailed SWOT analysis based on respondents' profiles (Paraguay)

	STRENGTHS	Ministry Official workers	Member of senior management	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
f1	The teaching staff is committed to the research process.	2.75	2.86	3.35	3.31	3.33
f2	It has consolidated teams of research teachers.	2.25	2.36	3.17	3.10	3.05

	STRENGTHS	Ministry Official workers	Member of senior management	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
f3	It has policies and lines of research defined at the institutional level in the university (or in the faculty)	2.25	3.21	3.48	3.43	3.22
f4	There is accessibility to bibliographic sources and virtual information systems at the university level and at the national level.	3.00	3.21	3.63	3.26	3.48
f5	It has a team of researchers with a high level of scientific production capacity and competitive at the national level.	1.75	3.14	3.18	3.40	2.95
f6	It has adequate physical structure and equipped to promote research.	2.25	2.86	3.22	2.98	2.82
f7	It has a database where statistical information on the scientific production of the institution is recorded and generated	2.00	2.79	2.63	2.83	2.80
f8	There is management capacity to obtain funding from competitive calls at national level	2.25	3.00	2.98	2.98	2.85
f9	There is management capacity to obtain funding in competitive calls at an international level	2.00	2.93	3.15	3.10	2.79
f10	The research area management staff is committed to research policies and goals.	3.25	3.36	3.38	3.52	3.29
f11	We have permanent participation in local, regional, national and international research projects. (International conventions and contracts)	2.50	2.86	3.11	3.21	3.13
f12	The researchers of the university are part of research groups at the national level.	2.00	2.86	3.09	3.24	3.06
f13	There are sufficient scientific-technological resources to promote research.	1.75	2.21	2.78	2.86	2.68
f14	Research is supported by national policies.	2.50	2.36	2.60	2.52	2.38
f15	There is executive will to strengthen research management at the institutional and national levels.	3.00	3.07	3.35	3.24	2.74
f16	There is an administrative support service for the researcher	1.50	2.86	2.77	2.98	2.38

	OPPORTUNITIES	Ministry Official workers	Member of the senior management of the University	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
o1	Existence of different research networks at international level (Latin American and European).	4,25	3,79	3,58	3,57	3,79
o2	Coordination between national universities through the country's University System.	2,75	3,21	2,95	3,05	2,89
o3	Agreements with institutions and / or some companies for the realization of practices by students of last years.	2,50	3,71	3,68	3,48	3,56
o4	Collaborations with companies in specific research and/or advisory projects	2,50	3,36	3,35	3,14	3,21
o5	International calls in force around research in the different areas of knowledge.	2,75	3,64	3,34	3,24	3,23
o6	Presence and development of technological platforms at the regional level that support, extend and reinforce research and innovation and its internationalization.	2,75	3,14	2,95	3,05	3,09
o7	Annual promotions of young professionals, with potential research capacity.	2,25	2,86	3,20	2,95	2,80
o8	Motivation and responsiveness of professional groups that have had fewer opportunities and prominence in research.	2,50	2,79	2,97	2,95	2,77
o9	New technologies and accessible information systems for research.	2,25	3,36	3,15	3,10	3,17
o10	Existence of links and collaboration agreements with other Latin American and European universities.	2,75	3,50	3,43	3,33	3,44
o11	Active presence of a Vice Ministry of Science, Technology and Innovation / National Council of Science and Technology and with national policies and programs around research and with decision-making and organizational capacity in the sector.	3,00	2,86	2,80	2,81	2,61
o12	Internal and external economic resources are available to support research.	3,00	2,50	2,66	2,93	2,51
o13	Technological development and growth in research that affects institutional positioning at national, regional and international levels.	2,00	2,86	2,95	3,24	2,93
o14	Ability to access competitive funds for scholarships for doctorates for national researchers to train in universities of high international prestige.	2,25	3,07	3,18	3,26	3,18

	WEAKNESSES	Ministry Official workers	Member of the senior management of the University	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
d1	Limited number of researchers at the university	4.75	3.86	3.85	3.79	3.93
d2	Policies and lines of research indefinite and not systematized at the institutional level in the university.	3.75	3.07	3.42	3.50	3.34
d3	Little coordination between the areas of knowledge and weak link of research with postgraduate training.	4.00	3.50	3.46	3.67	3.75
d4	Little integration of the research service with the problems of the local or departmental environment.	3.75	3.50	3.31	3.21	3.44
d5	Little participation of the population and society in general in research activities.	4.00	3.43	3.80	3.76	3.84
d6	Scarce and unstable public funding for research.	4.25	3.79	3.92	4.07	4.40
d7	Limited knowledge of strategies to attract and maintain private financing	4.50	3.79	3.65	3.95	3.95
d8	Limited capacity (competitiveness) to obtain national and international financing.	4.25	3.29	3.51	3.55	3.76
d9	Limited culture of research leadership and support in the service by the Directorates/Heads of research.	4.00	3.14	3.20	3.48	3.57
d10	Little interest of teaching and student staff in research.	3.75	3.50	3.25	3.29	3.43
d11	Limited methodological support, administrative and operational support to develop proposals and execute research projects.	4.25	3.21	3.45	3.55	3.66
d12	Little appreciation and recognition of research activity at the institutional level and with a view to progress in the professional career	4.00	3.14	3.72	3.60	3.83
d13	Absence of clear, defined, stable and long-term policies to manage research and scientific production at the University.	4.25	3.07	3.65	3.40	3.82
d14	Frequent political changes with changes in priorities and objectives within the University.	4.00	2.79	3.25	3.17	2.99
d15	Management difficulties in establishing collaboration agreements with governmental and non-governmental organizations.	4.00	3.36	3.46	3.52	3.54
d16	Absence of strategies and activities to promote and direct	3.50	3.00	3.38	3.60	3.47

	WEAKNESSES	Ministry Official workers	Member of the senior management of the University	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
	young researchers.					
d17	Lack of annual calls for the promotion of research (research projects, scholarships, pre and postdoctoral contracts, stays abroad, acquisition of infrastructure, etc.).	3.50	3.36	3.22	3.50	3.80
d18	Poor innovative and research culture in the public sector and in the business sector.	4.50	3.43	3.60	3.79	3.89
d19	Little training in R + D + i (Research + Development + Innovation) in the university postgraduate degrees.	4.00	3.43	3.52	3.55	3.94
d20	System of communication, dissemination and dissemination of poor results.	3.75	3.36	3.48	3.48	3.71

	THREATS	Ministry Official workers	Member of the senior management of the University	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
a1	Non-compliance with national policies that promote research in universities	4.00	3.07	3.57	3.79	3.74
a2	Absence of clear regional priorities in research by the Departmental Government	4.25	3.71	3.82	4.10	4.08
a3	Little appreciation of research in our country and in the institution itself	4.75	3.29	3.72	3.69	4.09
a4	Absence of strategic and diverse incentives to promote research and innovation by the Government and the Institution	4.50	3.43	3.69	3.81	4.07
a5	Little involvement of companies, institutions and social organizations to do research with the university.	4.25	3.64	3.80	3.90	4.18
a6	Absence of national or regional calls to participate/compete in the development of research.	3.75	3.50	3.42	3.57	3.69
a7	Little competitiveness in national or international calls for attracting resources for research.	4.50	3.43	3.49	3.40	3.87
a8	Waste of agreements as external sources of financing.	4.00	3.21	3.34	3.48	3.86
a9	Limited dissemination of research results by National and Institutional Bodies	3.75	3.43	3.75	3.81	3.84
a10	Continuous changes in Investigation Managers: charges subject to political change.	4.25	2.93	3.32	3.79	3.65

	THREATS	Ministry Official workers	Member of the senior management of the University	Mid-level manager at the University	Member of the R&D Units	Researcher at the University
a11	Under political and financial commitment of the Government to the investigation	4.00	3.50	3.95	4.14	4.45
a12	Research is not a priority for the government in periods of cuts and crisis	4.00	3.79	4.03	4.21	4.45
a13	Insufficient coordination in research between university – company – State.	4.25	3.64	3.89	3.88	4.28
a14	Insufficient coordination at the institutional level between the different key actors to organize research (different faculties, Rectorates, Administrative Services and researchers)	4.25	3.29	3.55	3.74	3.92
a15	Technological, equipment, human resources and research support gap with respect to competing research centres and groups	4.75	3.50	3.78	3.86	3.94
a16	Little support from research funding programs for young researchers, prioritizing more established and experienced scientists.	3.75	3.50	3.75	3.90	3.95
a17	Global financial constraint following the COVID-19 crisis.	4.50	3.71	3.78	4.05	4.07
a18	Flight of talents and researchers to other countries due to salary and other regulations.	4.00	3.43	3.94	4.10	4.11
a19	Bureaucratic difficulties for the registration of patents and authorship for the results of the University's research.	4.50	3.00	3.89	3.55	3.92
a20	Poor research culture in the national education system	4.25	3.86	4.11	4.12	4.41