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Critical discourse analysis of stakeholders of the national science and technology system of Paraguay

Análisis crítico del discurso de los *stakeholders* del sistema nacional de ciencia y tecnología de Paraguay

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A B S T R A C T

This study aimed to analyze the discourses used by the main actors involved in Paraguay's national science and technology system. The fact of inquiring about the national innovation system from the direct consultation of skateholders allowed to deepen the information provided by the policy makers. And this is where the innovative character of this material lies, in the context of research that addresses innovation policy and that focuses on the analysis of documents or statements of policy makers, while here we have worked with a multivocality that highlighted opposing discourses, others that complement each other and those dominant. Thus, from a perspective based on social constructivism -according to which language constructs social reality- the way in which the discourse of certain groups affects how the Paraguayan national system of science and technology is constituted was analyzed.

Keywords: Science; technology; science and technology; scientific development; scientific innovations; Paraguay

R E S U M E N

Este estudio se propuso analizar los discursos usados por los principales actores implicados en el sistema nacional de ciencia y tecnología de Paraguay. El hecho de indagar sobre el sistema nacional de innovación a partir de la consulta directa a los *skateholders* permitió profundizar por sobre la información que aportan los *policy makers.* Y es aquí donde radica el carácter innovador de este material, en el contexto de investigaciones que abordan la política de innovación y que se centran en el análisis de documentos o declaraciones de los *policy makers*, mientras que aquí se ha trabajado con una multivocalidad que puso en relieve discursos opuestos, otros que se complementan y aquellos dominantes. Así pues, desde una perspectiva basada en el constructivismo social -de acuerdo con la cual el lenguaje construye la realidad social-, se analizó la forma en que el discurso de determinados grupos incide sobre cómo se constituye el sistema nacional de ciencia y tecnología paraguayo.

Palabras clave: Ciencia; tecnología; ciencias y tecnología; desarrollo científico; innovación científica; Paraguay

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INTRODUCTION

The widespread belief that the progress of nations is linked to the added value of the products provided by knowledge and the place where it places them in the market, justifies the State's concern for the good management of scientific development. Thus, the tendency to consider the beneficial impacts of the same in matters such as health, food, habitat, comfort, education, transport, and communication, among other things, require strong investments and the design and implementation of assertive public policies in this regard. (Dávalos, 2017).

Today, the concepts of globalization, competitiveness and economic growth often carry enormous weight in discourses around scientific and technological development and innovation, whether from an academic, political, or business point of view (Nokkala, 2007; Eizaguirre, 2015). Globalization must be understood as a process that implies a series of transformations in the spatial organization of social relations and transactions, through which new interactions and flows are generated at the interregional and intercontinental level (Nokkala, 2007).

On the other hand, competitiveness arises as a need on the part of the productive sectors to locate themselves adequately within the framework of the globalized economy that, today, has a significant impact on the world community (García Govea et al., 2012).

Scientific development is subject to the competence of the implementation of certain public policies that are, in the current context, influenced by the role of certain international organizations that advocate the harmonization of policies on science and technology at the global level (Eizaguirre, 2015).

As far as Paraguay is concerned, the National Council of Science and Technology [CONACYT] (2017) emphasizes the fact that the market and coordination between the public and private sectors have several failures that must be overcome, since they hinder private investment at a desirable level that benefits society. through the implementation of public policies on science, technology, and innovation.

In the last decade, R+D spending in Paraguayan GDP continues to be one of the lowest globally and regionally. This is represented by the fact that Paraguay allocated 15 monetary units per 1000 units of its GDP, equivalent to 0.15% to promote research and technological development activities in the country (CONACYT, 2018).

Within the member countries of the Mercosur bloc, spending on R+D (2018) far exceeds that in Paraguay, with Uruguay allocating 0.42%, while Chile allocates 0.36% and Brazil, a leading country in the region, allocates 1.26%. These percentages show a Latin American average of R+D expenditure of 0.62%, far from the 0.15% of the Paraguayan case.

As stated in the intermediate results of the PROCIENCIA Program (2020), one of the main obstacles to the development of Science and Technology in Paraguay has been, as in other countries of the region, the weak articulation between the different actors and functions of the system. To this is added the additional difficulty in small or medium-sized countries of low capacity in the training of human resources dedicated to scientific and technological activities (CONACYT, 2020). The report also argues that the Science and Technology sector in Paraguay is heavily dependent on public support.

Between 2013 and 2017, an extensive consultation process was conducted in which various government representatives and experts from different areas participated to generate the Paraguay 2030 National Development Plan (2014). It set out the country's vision for the next two decades. The achievement of such a plan implies, as has been suggested, a partnership between the private sectors and the government sectors. It also proposes to promote the attraction of foreign investment through foreign trade.

According to CONACYT (2017) Faced with the challenges, it is evident that the realization of the Paraguay 2030 vision inevitably requires the resignification of the role of scientific research and technological development as strategic means to reduce poverty, promote inclusive economic growth and achieve Paraguay's insertion in the world.

From the beginning of the second half of the twentieth century, science and technology and innovation policies were based on the impact that research and development have on the economy and society of each country. Indeed, it is often assumed that they have as their ultimate purpose to finance research for scientific-technological development and innovation, responding to socioeconomic objectives such as national security, economic growth, well-being, and the environment (Eizaguirre, 2015).

On the other hand, these policies require a certain justification that, in the framework of a globalized economy such as the current one, usually focuses on the economic impact that scientific-technological development and innovation has on a country in relation to other countries in the region or the globe. That is why there is a series of systems for measuring scientific and technological development and innovation focused on the economic dimension of its impact. This is justified if one considers that current political discourses tend to maintain that the intensive technology of science in our societies operates as an engine of competitiveness and economic growth (Eizaguirre, 2015).

Regarding the generalized concept of innovation systems, in "National Innovation System – Scientific Concept or Political Rhetoric", Reijo Miettinen (2002) seeks to arrive at a clear understanding of the development, application and transformation of the term national innovation system (NSS) in Finland's science and technology policy. The adoption of SIN as a fundamental term in the country's science and technology policy in the early 1990s operates as a starting point for a comprehensive analysis of what Miettinen calls an imprecise boundary metaphor, rooted not so much in experience and knowledge, but rather in service as an important organizational concept.

Miettinen (2002) begins by examining how the national innovation system was adopted in Finnish science and technology policy, from an international "factory" of policy-making language. As a new policy tool developed by researchers from science and technology policy units, universities and business schools, the national innovation system became a rhetorical tool for national policymaking.

On the other hand, the studies that address the Paraguayan national system of science and technology are meager and are reduced to detailing the current regulations and characterizing how science evolved in the country. Added to this limitation is the fact that they are based on documents or statements issued by policy makers. Hence the need to collect first-hand information provided by the actors that make up the National System of Science and Technology and from this to conduct a critical discursive analysis.

It has also been found that studies referring to science and technology systems focus on describing the ways in which skateholders relate to science and technology policies, with a gap in the approach to the analysis of the voices of their protagonists in the first person from a critical approach.

Having observed all these factors, this study aimed to analyze the discourses used by the main actors involved in scientific-technological development and innovation – researchers, university academic managers, officials and entrepreneurs – to contribute to the description of the current state of science in Paraguay and its place in the globalized knowledge society, analyzing the discourse constructed by the different stakeholders.

From a perspective based on social constructivism "according to which language constructs social reality" (Fernández Zubieta, 2009), the way in which the discourse of the different stakeholders affects how the Paraguayan national system of science and technology is constituted, as a created social reality, was analyzed. In this way, this research was aimed at studying the influence of these social groups, about the processes of validity and scientific justification in the Paraguayan context.

According to the Global Competitiveness Report 2017-2018, issued by the World Economic Forum (WEF), 2018), the Paraguayan economy has a low capacity in terms of financing scientific, technological and innovation developments. Among the country's most significant

innovation deficits are infrastructure, higher and university education, and readiness to assimilate modern technologies and innovate.

According to the CONACYT report (2017), to achieve the qualitative and quantitative leap in scientific and technological production, it is essential to create new spaces for participation between the agents of the national innovation system, public and private; and develop a research, development and technological innovation agenda that responds to policy and sectoral, socio-economic and environmental needs.

According to the perspective of this work, social phenomena are constructed from the interaction between different actors. In this case, scientific and technological development to promote Paraguay's economic growth and insertion in the world involves three privileged sectors: the academic sector, which is responsible for carrying out the relevant research that makes such development possible; the Government, which establishes the legal and regulatory framework for the management and financing of the national science and technology system; and the private sector, which also affects the financing of scientific and technological development by virtue of increasing its productivity..

Studying the discourses referring to scientific and technological development and innovation by these sectors will be of particular interest to account for the extent to which they are articulated or differ in this respect. This will make it possible to account for the convergent and divergent positions underlying the social construction of the Paraguayan national science and technology system and to what extent these positions affect the current processes of transformation of this promoted by the State.

The main objective of the research was to analyze the discourses used by the main actors involved in the national science and technology system (researchers, university academic managers, officials, and entrepreneurs) to describe convergences and divergences that influence the current state of science in Paraguay and its place in the globalized knowledge society.

METHODOLOGY

This is an exploratory study in which a particular case is addressed on which no similar specific studies have been found, since the discursive construction generated by the main actors linked to scientific and technological development in Paraguay is analyzed (Hernández Sampieri et al, 2014).

Based on this, an analysis was made of the interviews with referents and actors who make their contribution to the organization and dynamics of the Paraguayan scientific-technological system or who meet it. The variety of interviews allows access to a multivocality, from the collection of speeches to various actors: academic managers, scientific researchers, entrepreneurs, and officials.

The study is qualitative, which starts from the deep understanding of meanings assigned by the actors, of subjective motivations and inclinations, of collective construction of symbols and meanings, of rhetorical tools used.

The qualitative nature allows to construct unforeseen categories and make necessary associations to generate suggestive questions and make comparisons that lead to new revelations, in addition to facilitating the identification of relevant information.

The central purpose of this research is based on the tradition of qualitative research (Vasilachis, 2019). One of the limitations of this study lies in the scope of the conclusions (Vasilachis, 2006). To the extent that it responds to a particular experience, the conclusions that can be drawn from it will be valid primarily for the population and context defined here.

However, these limitations do not mean that, from the data obtained, its analysis and the partial conclusions obtained can no longer be extracted guidelines for lines of work or action plans that can be contrasted with other studies around the world.

In this sense, a bibliographic-documentary analysis will be carried out, in order to investigate key concepts that will allow the construction of the theoretical framework and, likewise, a

fieldwork will be carried out that will include interviews with researchers, university academic managers, officials and representatives of the Paraguayan business and productive sector.

The research design is non-experimental, using a qualitative approach with fieldwork that includes the collection of qualitative information through interviews with actors in the field and discursive analysis of projects and documents that emerge in the story of the protagonists.

Through the approach of critical discourse analysis, it is intended to account for the positions of the different actors regarding the science system in Paraguay. Following Nokkala (2007), it is necessary to consider that it is possible to understand reality through the analysis of the construction of meanings.

The main technique used is the in-depth interview with researchers, university academic managers, officials, and entrepreneurs of the productive private sector, all of them from Paraguay.

Following the methodology proposed by Sharif (2006), consisting of discourse analysis through semi-structured interviews, the researcher will take written notes during the interview, focused on the oral discussion, which will then be transcribed and analyzed.

During the analysis, parts or segments of the speeches were isolated, a particular selection of information was made that possibly another researcher would not do, moreover, the unsaid was inferred; this selection of phrases is based not only on our life experience, our sociocultural world but also on intuition and, fundamentally, on the objectives of analysis set (Schettini and Cortazzo, 2015).

The interpretation of the texts obtained through the interviews will be interpreted by the researcher in charge of this work, following the line of critical analysis of the discourse established by Fairclough (1992). This analysis is aimed at discourse and its situational context.

The analysis in question, always following Fairclough (1992), will consider three different levels: first, textual analysis, that is, the identification and description of the different discourses; secondly, the analysis of discursive practice, which involves the understanding of the conditions and different contexts of production; and, finally, the analysis of social practice, namely the discussion of discourses in social practices.

The scope of the results is analytical and descriptive, and focuses on the examination of the attributions and evaluations that the participating actors make about the place of science in Paraguay, its contribution to the progress of society, its link with the productive and business world, the support or support it receives from the State, the specific development programs that exist and, in general terms, the assessment made by the actors involved on the Paraguayan National Science and Technology System.

RESULTS

In the present work, the discourses around the national system of science and technology were taken for analysis, from the perspective adopted by Fairclough (1992), which focuses on the role of discursive activity in the constitution and maintenance of power relations, an issue that will be observed in the four subgroups interviewed: researchers, university academic managers, civil servants and entrepreneurs.

During this qualitative analysis phase, the information obtained from the interviews is grouped into topics that have a connection with each other. Topics such as "Connection between scientific system and private companies" and "Connection between science and political bodies" are merged into the same definitive theme, as are the topics "Perception of evolution of current science in Paraguay" and "Perception of the future of science in Paraguay".

Profile of interviewees

To provide a description of the participants of the interviews, different relevant characteristics have been selected such as: gender, nationality, age, positions held and academic level. These characteristics allow us to analyze the profile of each role considered and its relationship with Science, Technology, and Innovation.

The participants interviewed are of Paraguayan nationality, six interviewed by each subgroup giving a total of 24 interviews. The average age varies according to the roles they play, in terms of science and technology. In relation to the researchers interviewed, the average age is between 45 and 70 years, and all of them are currently active in their research activities. In the case of university academic managers, the average age of the interviewees is between 30 and 50 years, and all are in management positions during the last 5 years.

While those interviewed under the role of officials have an average age between 35 and 50 years, whose positions are related to ministries and institutions of education, ICT, health, agriculture, habitat, science, technology, and innovation. Finally, those interviewed under the role of entrepreneurs in the private sector of Paraguay, particularly belonging to the productive sector, are in an average age range between 50 and 70 years.

Regarding the gender distribution of the interviewees, in the case of researchers, university academic managers and civil servants, the number of people interviewed was the same, while, in the case of the role of private sector entrepreneurs, all interviewees were men.

Discourses on science

This section sought to inquire about how the interviewees build their discourses about scientific development in Paraguay, the industrialization of the country, as well as the link between scientific development and dissemination of culture, and scientific development and increase in the production of knowledge in the country.

The interviews conducted with the researchers highlighted a number of relevant issues. On the one hand, they construct a discourse in which scientific and cultural development is intricately linked to the idea of the country's progress. A discourse is evident in which the idea prevails that without scientific development there is no progress and, in addition, when specifying the Paraguayan case, it is indicated that this development is still incipient.

It is also relevant that different researchers interviewed expressed the need for scientific dissemination to be extended to society. They maintain that it is necessary for science and technology to be disseminated, to promote the cultural development of Paraguayan society. In addition, the need for certain research to be presented to the public was highlighted, an issue that would lead to certain knowledge beginning to be appropriated by society. Thus, the importance of democratizing access to these contents is emphasized, so that science is socially inserted and at a certain moment occupies the place that corresponds to it.

The perception was also highlighted that if R+D does not occupy the place it deserves, there will be no growth as a society, either economically, or socially and culturally, in justice. Compared to other countries in the region, Paraguay's national science and technology system is very recent, putting the country's science and technology at a disadvantage. At the same time, legislation on the subject is still considerably basic in the country, a factor that contributes to widening the gap between Paraguay and the nations of the region and the world.

In the case of the interviews applied to the subgroup made up of University Academic Managers, the discourse is also constructed taking scientific and technological development as a condition for progress but emphasizes the need to promote it through incentives by the State and the private sector. The budget factor also appears, as another element of relevance and as a facilitating condition for this progress.

The discourse of the managers intricately links progress with the budget, maintaining the importance of scientific research for society, and the consequent need for this sector to occupy a better position within the budget items. This subgroup also highlighted the reality of various scientific teams, which cannot deploy their full potential due to the meagre allocations to them.

The interviews with officials showed that they construct a discourse that is in accordance with that of the members of the scientific community interviewed, although it does not incorporate the claims that this subgroup maintains about the need for promotion and a greater budget and stimulus.

From this sector, the discourse that is issued maintains that the government gives a place of relevance to science in its agenda, stimulating it as it was not done in previous times. It is also recognized that this stimulus must continue to increase, since the country needs to grow in science and technology. On this aspect, progress is linked to national scientific research, while this subgroup points out the need to retain Paraguayan scientists in the country.

As for the subgroup of private sector entrepreneurs, this sector does not consider that Paraguayan science is currently contributing to the progress of society. This sector demands in a certain way that the State should be more involved, with a greater presence from the budgetary level, as well as legislating to favor this field.

The different discourses analyzed reveal the importance of improving the processes and results of the country's national science and technology system, pointing out the unimaginable possibilities and advantages of its use for the development of the country, not only at the economic level, but also at the social level, favoring the paradigm of progress, with the purpose of inserting and competing in the world science market technology and innovation.

All interviewees, regardless of their role in the national system of science and technology, understand and agree that knowledge has always occupied the principal place of economic growth and the progressive elevation of social welfare. The idea is expressed that the capacity for invention and innovation - creating new knowledge and innovative ideas, which are then translated into new products, new processes, and procedures within organizations - has fostered the continuous development of countries. Therefore, it is argued that economic growth is determined by the capacity of different actors, individual or collective, to continuously develop and apply new knowledge, which in turn translates into innovations.

As discursive differences found, the one referring to the budgetary issue is emphasized, where officials are the only subgroup that ignores this issue, compared to the rest, which refers to a lack of budget. On the other hand, the subgroup made up of private sector entrepreneurs is the one that does not consider that the scientific sector contributes – at present – to the development of the country.

Discourses on science accompanying the productive sector and private companies

This section addresses the link between science and technology and the Paraguayan productive and business sector, seeking to determine how is the relationship between science and business world, if there are consensuses or differences prevail; as well as knowing if joint programs are established, among other aspects.

The discourses on science accompanying the productive sector also revealed two linked sub-discourses, on the one hand, one referring to the current situation of the national system of science and technology, which accounts for the way in which the interaction between researchers and private companies occurs. And, on the other hand, a sub-discourse that shows a clash of interests between both spheres, which affects the support of the business community towards science and technology policies in the country.

The interviews conducted with the researchers allowed us to observe that the most deeply rooted discourse maintains that the scientific community is not aligned with the needs of the market and the productive sector. This subgroup considers that the business sector acts from a logic that does not always privilege scientific development. Despite this, he maintains that joint work is possible, although the difference in interests is marked. For example, what motivates this subgroup is the search to generate knowledge, while the business sector aims to make a profit. In this sense, the researchers consider that for entrepreneurs to support science and technology policies, they must be issues that benefit them directly and in the short term. There was also a struggle between how national development is valued compared to foreign development.

Discourses on the State supporting the national system of science and technology

Throughout this section, various issues related to the role of the State as a support to the Paraguayan national science and technology system were contemplated, as a promoter of public policies, budget manager, as well as an agent of dialogue between the different sectors involved.

The interviews showed that, from the researchers, the need for the State to be more deeply involved, providing the resources that this sector needs, is made explicit. The interviews allowed to verify, within these discourses, a sub-discourse linked to the articulation between science and public policies, another referring to the role of researchers in the participation of officials; Also, a sub-discourse that describes the current situation of the Paraguayan National System of Science and Technology. There is a sub-discourse referring to political support, another on financing the scientific sector and budget; in addition to a sub-speech referring to prospects.

The discourse that builds the subgroup formed by the researchers mark not only the strong presence of the business sector in decision-making, but also the absence of a strong State in terms of allocation of resources and incentives to science and technology in the country.

Thus, the discourse of the researchers reflects the scarce support that the State provides to scientific and technological research in Paraguay. They perceive more interest on the part of officials towards the formal aspects of the projects and not towards the contribution that they can make to the well-being of Paraguayan society.

In addition, they consider that, although there is a National Science, Technology, and Innovation Policy (CONACYT, 2002), it is not articulated to provide a correct connection between the different sectors involved in scientific-technological projects.

On the other hand, the discourse of the researchers also emphasizes a need for recognition by the State, which must promote public policies in accordance with the commitment of the scientific sector, which will lead to an improvement for Paraguayan society in general. In this discourse, this lack of policies in public institutions translates into an absence of political will to use the products of science.

There was a struggle of interests between the public and private spheres, which affects researchers and their work. Even on this aspect, a complaint is made about how the State silences those investigations that show its lack of intervention or mere laziness. And the figure of bureaucracy also appears, as an agent that hinders the actions of scientists and that is imposed by the State, which privileges questions of form over results.

Researchers perceive the future of science and technology in Paraguay as hopeless. However, they maintain that, to achieve advances in science and technology, it is necessary to have as decision-makers people who are prepared and who understand the issue. At the same time, we must work with a country-vision, joining forces. It highlights the need for the State to establish timely policies and generate projects adjusted to those policies, beyond the conflicting interests that may exist between the various sectors involved.

In addition, from the needs of this subgroup it is evident that the insertion and reinsertion of scientists is necessary; intensify everything that helps to improve the transparency of STI processes: dissemination of calls, evaluation criteria, accountability; Promote links between the academic-scientific sector and private companies to find solutions to local problems.

DISCUSSION

This work allowed to observe, analyze, and compare the various positions and manifestations of the actors involved in science, technology, and innovation in Paraguay. In this regard, the theory of stakeholders formulated by Freeman (1984) is recovered, translated into national science and technology systems, which reflects how the different subgroups interviewed constructed their discourses from their own group interests and obeying them.

This data is not provided by issuing a value judgment but from the perspective that discourses have been found that complement each other and other opposites, comparing between the

different subgroups, since within these there is homogeneity of criteria. The lack of complementarity with respect to some axes on which it was investigated may be due to this difference in interests of each stakeholder. Entrepreneurs do not pursue the same interests as scientific researchers, as part of interest in the national system of science and technology.

As a result of the analysis of the data collected through interviews with different referents from different areas – researchers, academic managers, officials, and entrepreneurs – some general trends were obtained, as well as expressions.

In all the discourses analyzed, the declarative mode predominates, where the issuing subject - who would be represented by each of the interviewees, from the different subgroups- provides information referring to the assorted topics on which it was investigated. The modality it adopts, expressive, manifests the perspective of each of the interviewees, around the questions that were asked.

Language is a part of the social world of irreducible dialectics, which is interrelated with other elements of life. Thus, it connects with the social because it is the primary domain of ideology, and therefore it is the main place that power struggles have. Hence the importance of discursive analysis, as the case that this study took as an object: the discourse of the main actors involved in the framework of the national system of science and technology of Paraguay. Through the analysis of the discourses provided by the different actors related to the science, technology and innovation, it was possible to know how is the discourse that they build in reference to the performance in their functions, in each of the roles occupied by the participants of the different interviews. And an approach was also achieved to how is the link that these participants have - representing a certain reference sector of science and technology-, with respect to the other sectors.

Returning to Fairclough (1992), it must be considered that all discourse must be approached as part of a social practice, which inserts it in institutions or in situations that can condition language. In this regard, all the actors interviewed can be conditioned in the construction of their discourse. Researchers, in front of the institution before which they work as such. University academic managers, in front of their superiors, as well as civil servants, who can also be conditioned in front of society in general, by the position they occupy. And, finally, entrepreneurs, who may be conditioned – although to some extent – in the face of political power and maintain a discourse that adheres to the neoliberal view, as has been observed, privileging the interests of the market over the development of scientific knowledge per se.

Thus, what was stated by Hornidge (2011) is recovered, in relation to economic imperative and how neoliberalism emphasizes the monetary value of knowledge and private property, over scientific development or knowledge that does not generate value or economic income. This allows us to verify again what Freeman (1984) stated in relation to the interests that guide the diverse types of stakeholders.

In this sense, this conditioning considers the political or ideological effects, which in this case would be given by the effects that the different discourses could generate, since each of them is inserted in an institution or organization, as well as in a set of practices, whether scientific, political, educational, management, or productive. Hence, each subgroup presents a homogeneous discourse, according to the interests it pursues or defends.

The different speeches produced by the four subgroups interviewed showed that they complement each other in most of the topics on which they investigated. However, it also became visible how the discourses of the different stakeholders are articulated, there are discourses that complement each other and others that are clearly built from specific interests. In this regard, the speeches of the officials on financing can be recovered, which distance themselves from the discourse issued by the other subgroups. Or the discourse of entrepreneurs in relation to the primacy they give to the needs of the market, as part of an interest intricately linked to that subgroup.

The proposals formulated by Gramsci (1992) can also be recovered in this regard, around the discursive control that is generated from processes through which subjects order their discourses in social life, according to elements that they reproduce or naturalize, as part of the strategies of cultural hegemony that prevail in a given sociocultural context.

The fact that the different discourses are inserted in a certain reality or social structure and partly conditioned by it, was evident in each of the sectors interviewed. Thus, each subgroup built its discursivity conditioned by the interests of the sector of which it is part – as a stakeholder – or of the organization to which it responds. So, they cannot be analyzed separately from that reality in which they were produced, but as part of it.

In this way, the different discourses analyzed were constructed based on power relations that occur in each area, which originate -in this way- meanings and practices. Thus, it is understood how in the different areas to which access was had, the conditions that determine discursive production are not the same. These relations of domination are based on consent and sometimes the subjects fail to become aware of these or their effects on social practices.

Discourse as a social practice forces us to approach them considering the situations in which it occurred, as well as the institutions or contexts that can condition it. Their possible political or ideological effects must also be considered, since they construct and shape the common sense of a given moment.

The discourses expressed by the referents to describe the current state of the national system of science, technology and innovation in Paraguay are equally strong discourses, in the sense that each of the actors interviewed defines a power relationship with the other sectors with which it is involved.

Thus, the officials defend the position of the State with respect to public policies and establish that such policies and programs are intended to encourage the development of science, also maintaining that Paraguayan scientific development has had a remarkable growth over the last decade.

Both the subgroup made up of researchers and university academic managers define that the public policies and programs implemented are terribly slow and bureaucratic. While the one integrated by entrepreneurs maintains that there is no articulation between science and the private sector, which causes that the knowledge acquired by researchers cannot be turned over to industry to improve productivity levels and opportunities for the development of the economy and society.

The researchers' discourse emphasizes the need for the State to promote public policies that promote research in science and technology, while researchers detach the State from responsibility in a certain way, at least in terms of budgetary requirements, and participation in GDP.

Esta disputa que se da entre el Estado y la sociedad civil en torno a las políticas públicas permite retomar lo expuesto por Acuña y Repetto (2001) en cuanto al modo en que se organiza el poder en la sociedad y cómo influye el entramado de actores que se encuentran involucrados.

The interviewees belonging to the diverse groups involved in science and technology, agree that the national system of science and technology of Paraguay currently has several shortcomings or delays. These challenges include the need to establish timely policies and generate projects adjusted to those policies; Define processes and procedures that eliminate bureaucracy and impediments to access incentive plans and programs by researchers or research centers.

It is also evident, except in the discourse constructed by officials, that it is imperative to demand investment by the State, for the training of human resources and acquisition of equipment necessary for the different lines of research that are established.

And other relevant issues arise, such as the need to establish lines of research that are feasible and that allow improving the productivity and social development of the country; promoting

linkages between the academic-scientific sector and private companies; and the search for insertion/reinsertion of scientists through the generation of incentive programs and calls.

According to the researchers interviewed, Paraguay is one of the Latin American countries with the lowest indicators in terms of budget allocation in science and technology, in addition to being in the same condition in terms of the evolution of its scientific development. Although there are programs and public policies aimed at promoting scientific development, there is still an inefficient implementation of them, which causes researchers to seek training and settle in other countries.

All interviewees recognize that there is an urgent need to promote science, technology, and innovation, to address different challenges that allow improving not only the country's economy, but also improving the quality of life of its inhabitants. However, as could be observed, the discourse of the officials does not delve into a vital aspect for this impulse to science and technology: the allocation of greater budget items, which raise the meager portion of GDP that they currently represent.

An approach to the different discourses allows us to observe the power relations that intervene in the construction of these, as well as in the social relations between the different sectors, taking up what Hornidge (1995) exposed about how the discourse can make ideologies and power relations visible.

In relation to the dominant discourse, except in the subgroup of entrepreneurs, the professionals interviewed maintained the existence of a link between science, technology, and progress. The speech of the remaining three emphasizes that without science and technology there can be no progress for the country. However, the discursive differences are highlighted when considering how this scientific development should be financed, as has been observed. And at the same time, another actor is placed in a dominant position: the market, either by those subgroups that adhere to the idea that research should respond to the needs it imposes, or by those who state the opposite.

This reveals power relations, as Fairclough and Wodak (1997) argue, which in this case are constructed and reproduced through discourse. And the sector of researchers in science and technology is affected by them since the reality in which they operate is built from a dominant discourse that does not privilege the scientific development of the country.

And here we can return to Van Dijk (1996) in relation to how the abuse of power is reproduced and legitimized from the discourse of dominant groups. The situation faced by researchers, who must leave their country to continue training in foreign research teams, or who must arrange their work in such a way that they are inserted in the interests of the agenda, which privileges specific studies, is an example of this. Thus, discourse is part of social practices, rather than an expression of them, and contributes to the (re)production of certain practices.

It is also relevant what Van Dijk (2000) exposed in relation to ideological analysis, since, both in the subgroup formed by officials and in the one integrated by referents of the business and productive sector, a discourse appears that seeks to deemphasize the negative about each of these sectors, as well as to emphasize -on the contrary- what they consider positive. So, the State looks the other way in the face of the problem of the scarce budgetary allocation in science and technology, and the business community emphasizes its collaboration in financial matters but does not assume that privileging only those investigations that the market could demand is not entirely positive for the scientific development of the country.

The sector that most discursively emphasizes the lack of alignment between the needs of the market and Paraguayan scientific development is that made up of private entrepreneurs, who build their discourse from what they consider to be the main shortcoming that currently occurs, in the field of science and technology in the country. Reference was even made to a divorce between the scientific sector and the reality of the Paraguayan market.

Likewise, the discourses analyzed by the diverse groups considered in this study expressed the need to achieve synergy and articulation of work, due to the dependence that exists between them.

Although all the speeches are considered equally strong, it may be that, from the point of view of budget definition and approval of public policies related to research, the discourse of officials exerts greater power over the other groups involved in the national science and technology system.

The construction of the different discourses obeying the interests of each sector was again revealed when analyzing those referring to the current situation in science and technology in the country, where a discrepancy arose between the subgroups consulted. On the one hand, researchers and university academic managers argue that science, technology, and innovation in the country is still in a precarious situation in terms of investment and definition of public policies that support the growth of science in the country. Both subgroups maintain that there are still many challenges to be faced, such as: the definition of clear lines of research for their application to problems that affect the country and that their solution could improve the lives of its inhabitants; training of new researchers; insertion and reintegration of researchers through different incentive programs; investments in equipment and resources necessary to carry out the proposed research tasks, among others.

On the other hand, what was expressed by the officials shows that this sector is not incredibly involved in the development of public policies and projects of the national science and technology system, due to the scarce participation in them.

Finally, entrepreneurs in the private productive sector of Paraguay argue that the area of science, technology and innovation could help increase productivity and economic and social development of the country, if a consensus is reached with the needs of the market, which according to the discourse that builds this subgroup, appears as the actor that holds real power. in decision-making that can foster or stagnate the country's scientific development.

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In this regard, the academic managers expressed in their responses that, although there was evolution, it was not extremely high if the metrics of publications and investment are considered in comparison with the countries of the region. This is attributed to the fact that there are no defined lines of research that position the country as a generator of knowledge.

For their part, the officials consider that the evolution of the Paraguayan national science and technology system has been remarkable in the last five years, however, they highlight the need to make greater investment in this area, to be able to insert/reintegrate researchers and to invest in equipment and resources necessary for daily research work. Finally, productive entrepreneurs in the private sector maintain that their companies have advanced thanks to the evolution of international science, but that they do not see advances in science at the national level that can be applied to their daily work and allow them to obtain competitive advantages over other companies in the region and the world.

All sectors involved in science, technology and innovation agree on the advantages and benefits that their development can mean for the country, nationally and internationally. The main benefit that the scientific-technological system would grant to Paraguay is greater productivity in its processes, insertion and positioning in the world market, reactivation of the national economy, social welfare, competitiveness in global scientific-technological fields, highly qualified labor, self-sufficiency in technological aspects, easy adaptation to changes worldwide, among other aspects.

Likewise, researchers, university academic managers and businesspeople agree that the economic and financial operates as an obstacle to scientific development, while from the State their representatives do not delve into the issue. As has been found, in Paraguay little is invested in research, which prevents the execution of projects because two of the main risks of operating with public funds is the lack of constancy of cash flow.

As indicated above, for the constant evolution and development of the Paraguayan national science and technology system, it is necessary for the national Government to have and promote a clear research policy of the national government, so that higher academic institutions and organizations encourage and encourage professionals to venture into this activity.

Scientific research in Paraguay is incipient. There are several reasons, but among the main ones is that universities dedicate very little to encourage the production of scientific and technological knowledge, so it is necessary a regulation that obliges universities to systematically incorporate research and requires a quality policy of such productions, also demanding from the State a greater investment in the areas of science and technology, in order to assume a real interest in the sector and its social valuation. The private sector and universities must work together for the insertion of researchers in their facilities and work teams, with the fundamental purpose of promoting the incorporation of R+D for the search for solutions that allow the public sector to justify an investment and the private sector to generate profitable solutions.

For all the above, it is observed that all areas of social life are crossed by the presence of science and technology (political, economic, social, cultural, educational, etc.), which infers the need to articulate the old schemes of defined public policies with new policies that consider social and economic change worldwide. through the analysis of the different lines of research that have a greater boom today.

In addition, the discursive analysis highlighted problems and perceptions that show that the system formed by the public sector and the private sector does not work properly, since it is arbitrarily determined which are the research projects to be developed without taking into account the real needs of society in post of its benefit.

Given the current situation in science and technology in Paraguay, as well as the low representation it has in the country's GDP, it is clear that the State must seek a greater percentage of the national budget to be allocated to scientific research, a need directly pointed out both by the researchers themselves and by university academic managers. that they should be the voice consulted by the government, to make real contact with the issue. In this sense, a percentage of the national budget should be allocated to scientific research, selecting projects that are priorities for the welfare of society.

Likewise, a national scientific research policy should be established to guide and use resources in a pragmatic manner so that Paraguayan society benefits from investments in the sector, which cannot be reduced to satisfying market requirements.

The discursive analysis carried out allowed a series of contributions that allow a better understanding of the current situation of the national science and technology system in Paraguay and how it is perceived by its main stakeholders.

As a central contribution to knowledge in the specific field of discourses on science and innovation, this study contributed as a novelty the study of complementarity and differences in the discourses of different types of stakeholders, in relation to a National System of Science and Technology, in this case that of Paraguay, an issue that to date had not been addressed. The present study is the first of its kind in this regard.

Likewise, the fact of inquiring about a national innovation system based on the direct consultation of those parties involved in it allowed to deepen the information provided by policy makers. And here the innovative nature of this study is again underlined, in the context of research that addresses innovation policy and that focuses on the analysis of documents or statements of policy makers, while here we have worked with a multivocality that highlighted opposing discourses and others that complement each other.

Thus, the focus of the contribution lies in the critical analysis of the discourses of skateholders of a national system of science and technology. In the literature review, no similar studies of this nature have been found in science and technology systems, in which public policies on science and technology are analyzed from different discourses, without limiting themselves to the analysis of the documents of policy makers. Thus, the discursive practices of the scientists themselves, of academic managers in function, businessmen and civil servants have been recovered and articulated, an issue that has allowed to verify divergences of criteria, as well as agreements, mostly referring to the relevance of Science and Technology for the country, as well as the need to promote it to improve the national system of science and technology.

The discourse of the different stakeholders highlighted that they construct their discourses according to the inherent interests of the subgroup they integrate. Thus, businesspeople gave primacy to the need to cover the interests of the market, while officials did not perceive – or at least did not express – the budgetary problems that affect the development of science and technology in a country in which economic indicators have been positive during the last decade.

In relation to the need for evolution of the national system of science and technology, it is perceived in all the interviewees the intention to collaborate with the other sectors involved in the definition of public policies, with the purpose of taking to another level the science, technology and innovation of Paraguay, in order to achieve a positioning and competitiveness at the global level.

Another contribution, no less important, is related to highlighting how the discursive constructions of the four subgroups interviewed revealed the deficiencies that to date persist in the national system of science and technology in Paraguay, even though there are trained and trained human resources. This is linked to a lack of support from the State and the inefficiency of the set of public policies established in relation to this area. There is no articulation between national and international policies, which hinders the possibility of aligning and adapting to the regional and global context, considering what are the current fields of research, the aspects of science in which greater innovation is needed, incentive programs and training worldwide that could be implemented in the country, among other aspects.

It is also intricately linked to the lack of funding and budget denounced by researchers, managers, and entrepreneurs. The problem of the lack of articulation between the State and the national system of science and technology was expressed by the four subgroups, although in the case of officials it was expressed as a need for legislation that gives support to the national system of science and technology, and not as a direct claim to the State. as happened with the speeches of scientists, academic managers, and entrepreneurs in the private sector.

Finally, although there is a constant promulgation of institutional discourses on the importance of science, technology and innovation as fundamental pillars to encourage the development of the country - with important advantages over other policies - there is a large gap between the discourse and the facts that are carried out, which means that science and technology are not effectively promoted in the country. This is reflected in the meager budgetary distribution it receives and in its low representation in Paraguayan GDP.

Therefore, at present, scientific, and technological policy in Paraguay does not have a preponderant place in the government's plans, much less has it been related to a strategy of scientific, technological, and innovative development, beyond the fact that all the actors interviewed have intricately linked science with progress.

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