Science Diplomacy for Scientific and Technological Cooperation: Challenges for Colombia's Government

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Introduction

Over last decades Colombia has focused its national and international efforts to foster international cooperation. Different administrations harmonized Colombia's foreign policy to achieve national goals. One of these goals was the promotion of Scientific and Technological Cooperation. Different key countries played an important role in this sense: historically the United States (due to the common interest in cooperation in the field of security), Brazil, Germany, India, Japan, Spain. This cooperation was established with the support of academia (universities, research institutions), the government (Administrative Department of Science, Technology and Innovation -COLCIENCIAS-, Ministry of Information and Communication Technology) and international cooperation agencies: JICA (Japanese International Cooperation Agency), DAAD (German Academic Service for Exchange), USAID (United States Agency for International Cooperation). (Embassy of Columbia in India, 2019

The Ministry Foreign Affairs and COLCIENCIAS were the promotors of strategic agreements, that have approached Colombia's interests to other worldwide interests, For example in multilateral organizations and conferences such as the United Nations Conference for Climate Change UNFCC), United Nations Programme for Development (UNDP), United Nations Development Fund for Women (UNIFEM), UNASUR (Union of South American Nations). In general terms, Colombia was the

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promotor of a joint and common work in different topics, highlighting the need of international cooperation to achieve common goals. Colombia enhanced the need for international scientific cooperation with a particular interest in specific fields: technology transfer, innovation, intellectual property.

Colombia's policymakers and diplomats had a clear idea of how international scientific collaboration works:

"scientifically advanced countries share similar research profiles that stimulate collaboration among them, and these countries collaborate in all major scientific fields. Developing countries, in contrast, are more likely to specialize in a few areas of science, often in fields that relate directly to some national need" (The Royal Society, 2010).

This article aims to describe the Colombian strategy to promote international scientific collaboration and the challenges that it implies for its future. The challenges include i) the need to have a close relationship with countries that nowadays play a fundamental role for scientific and technological development; ii) the need to have a national strategy that can describe the expectations of the country; iii) the need to train policymakers and officers who will be in charge to lead those negotiations.

Methodology Used for this Study

This study presents data examined, collected and analysed from different sources and perspectives:

- Interviews with Colombian diplomats and policymakers
- A review of the latest agreements signed between the government of Colombia and different international academic cooperation agencies
- A review of literature related to Science and Technology cooperation in in Colombia and in developing countries

Challenges for Colombia's Scientific and Technological Cooperation

There are specific challenges that include i) the need to have a close relationship with countries that nowadays play a fundamental role for scientific and technological development of Colombia; ii) the need to have a national strategy that can describe the expectations of Colombia; iii) the need to train policymakers and officers who will be in charge to lead those negotiations. (Embassy of Colombia in India, 2019).

• *Close relationship with countries that nowadays play a fundamental role for scientific and technological development*

Although the level of scientific capacity differs according to the country, there will always be perspectives, expectations and common interests for collaboration between developed and developing countries (Wagner, Science, 2001). In this sense, Science Diplomacy plays a fundamental role. Colombian diplomats, researchers and policymakers must be trained in this sense so they can have effective participations in the permanent negotiations. Countries such as Canada, China, United States, Germany, Japan and India are the nations who lead scientific and technological development, according to the OCDE (Organization for Economic Cooperation and Development) annual report 2018. These countries offer different channels to cooperate and it implies a deep knowledge of their motivation: geographic proximity, history, common language, specific problems, expertise, economic factors are the main drivers for collaborative research.

• *A national strategy that can describe the expectations of the country*

Institutions that promotes science and technologic initiatives and issues have played an essential role in societies for reaching economic development, for instance, Colombian's government has appointed through the Ministry of Information and Communications Technology and COLCIENCIAS.

According to this, the main effort is led by the Ministry of Information and Communications Technology who promotes policies, programs and projects in technologies and communications in order to improve the quality of life of Colombian citizens, and also to establish general conditions of operation and commercial exploitation (Mintic, 2017).

On the other hand, COLCIENCIAS is in charge of formulating short – medium and long term policies in science and technology, through supporting and funding researchers' education, but also it promotes science, technology and innovation development integrated to productive processes in the economy. It is creating a new culture that allows new values and generate knowledge and innovation in the country.

According to Colombian Government Plan (2018 – 2020) which pretends to generate a great pact that involves public and privates in order to dynamism economic development, given that reason, Government distribution of national budget has been designed 20,8 billons USD (1,9 %) in science and technology with the aim to face the challenges and problems in this field (National Planning Department, 2018).

It is important to point out, first of all, that the concept of Science Diplomacy has not been integrated in the Colombian foreign policy, however, nowadays the enormous gaps and backlogs in science and research have been notices, for that reason Ministry of Information and Communications Technology (Ministry of Information and Communications Technology of Columbia website) has already made a diagnostic identifying the follows problems:

- Low diversification and economic complexity of the productive apparatus in terms of exports are concentrated in first-time goods.
- Decreasing capabilities in adaptation to technological advances in companies.
- Lower personnel training in science and technology.
- Insufficient sources of funding for innovation
- Lower investment in technology and research in companies and the Government

Second, science diplomacy is not officially included as a practice of Colombia's foreign policy, however, the Ministry of Foreign Affairs is proactive and it promotes the development of cohesion and collaboration with international counterparts, considering the comparative advantages of Colombia. For instance, the government stablished a law called *"Spin-offs law"* to promote a deeper training of Colombian professionals and researchers. The law also includes the policy of attraction of Colombian personnel who live abroad and who are highly qualified (effective reinsertion of migration) (National Planning Department, 2018). Colombian diplomatic missions play a key role in these processes.

Third, Colombia is the second country with the highest biodiversity per square meter on the planet, 53% of its continental surface is covered by natural forests and it has 311 types of different continental and marine ecosystems. (SiB Colombia, 2018) The government has a strategic programme which involves partnership with local administrations. The aim of the programme is to promote awareness, conservation, management and sustainable use of biodiversity in the Colombian territories through science, technology and innovation. (COLCIENCIAS, 2016). It is important to highlight that due to the peace agreements Colombia has experienced a different and positive perception of the international community. The armed conflict has mined in the past the countries' development, however now Colombia focuses its efforts to these specific fields:

1. Biodiversity Issues
2. Research, Development and Innovation in Biotechnology
3. Mentality, Culture and Communications

- ***Train policymakers and officers who will be in charge to lead science diplomacy negotiations***

Even though Science Diplomacy has not already been officially recognized as a foreign policy practice in Colombia, there is an awareness of the need of cultivating professional who can lead the country's science diplomacy strategy. Colombia needs young academies, highly qualified, adaptable professionals, young scientists' associations, capacity building programs. They can instrument science-policy mechanisms and can be significant representatives in strategic conversation that can lead to a higher and long-term cooperation.

Conclusion and Recommendations

First, scientific and technological cooperation plays a very important role for Colombia' economic growth, this is why, the government is aware about the needs to harmonize its national needs and strategies with countries that could offer opportunities for international cooperation. Colombia has already stablished solid scientific and technological cooperation channels with countries such as: Brazil, Germany, India, Japan, Spain and the United States. Institutions like the Ministry Foreign Affairs and COLCIENCIAS have been the vehicle of strategic agreements, that have approached Colombia's interests in international organization and topics.

Second, there are specific challenges to achieve a solid collaboration in terms of science and technology. These challenges were previously explained: i) the need to have a close relationship with countries that nowadays play a fundamental role for scientific and technological development of Colombia; ii) the need to have a national strategy that can describe the expectations of Colombia; iii) the need to train policymakers and officers who will be in charge to lead those negotiations.

Finally, for the current government is crucial to work on those challenges in order to obtain a solid and long-term international cooperation. The Colombian Government Plan (2018 – 2020) has already established the framework of the social and economic growth, in this sense, its foreign policy has to reflect Colombia's perspectives.

It is certainly known that there are opportunities to start promoting science diplomacy as a priority in Colombian foreign policy, considering the role that science and technology plays for its economic growth.

The government should address their efforts in the following fields: (a) to reinforce the collaboration with industrialized and developing countries that allow access to information and research cooperation, as Brazil and India, (b) to encourage the awareness of science in citizens, companies and local government, so they can be more involved in protecting the environment and in scientific research, (c) to promote the presence of diplomat personnel with scientific backgrounds that can become "scientific attaches", (d) to reinforce the communication and alliances between the private sector, governmental institutions and academic units as universities and think tanks, (e) to develop new and own technology with a high impact and access to all Colombian citizens in order to generate a social cohesion, economic growth and the achievement of the Sustainable Development Goals (SDGs), f) to make all national efforts to accomplish the objectives of the Colombian Government Plan (2018 – 2020), giving a priority to science and technology.

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