

# The BRICS: Strategies, Challenges and Opportunities in the Biotechnology Sector<sup>1</sup>

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The BRICS has been acting as a protagonist in contemporary era. Formed by Brazil, Russia, India, China and South Africa, it has been recognized as one of the key coalitions in the international system, becoming a promising diplomatic political entity, in which it perceives that the structure of global governance must be altered. In this scenario, Science, Technology and Innovation (STI) is considered as a means for encouraging developmental improvements, and initiatives in the Biotechnology sector should be investigated. Considering this, We hypothesize that the BRICS' strategies forge challenges and opportunities that comprise Biotechnology sector. However, are there convergences, complementarities and / or competition on this subject? We aim to analyze the biotech role in the BRICS agenda, conceiving that BRICS search for development comprehends improvements in food, energy and medicine production, mainly when its blueprint concentrates global population (42%), territory (26%) and output (27%), and each BRICS member is a leader of a developing region. Methodologically, empirical evidence can be found in qualitative and quantitative sources based on sociological, political and juridical analysis, allowing us to investigate if / how Biotechnology has been conceived in the BRICS' strategies.

Key-words: BRICS - Science, Technology and Innovation - Biotechnology

## Introduction

The BRICS is a group that proposes a different political engineering. According to a *sui generis* policy-making process, Brasil, Russia, India, China and South Africa started to cooperating under the motivation of financial analyses that describe them as dynamic countries in the following decades. In spite of financial analysts genuine reports, qualitative sources illustrate how an strategic

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thinking had been developed before, demonstrating a diplomatic mobilization that preceded those reports and that contributed to do not attract suspicions about this maneuver.

The BRICS cooperation plan comprises a gradual expansion. Development is the key-word for grasping the BRICS meaning, yet it must be conceived in a broad sense: among others, it encompasses finance, security, education, cultural approaches. In addition, Science, Technology and Innovation (STI) can be seen as a core aim in the BRICS priorities, and Biotechnology is a burning issue in its strategic project, since it deal with energy, medicines and agriculture, which are basic topics at the development agenda.

This research is organized in three sections. Firstly, we propose a reanalysis on the BRICS foundation, verifying the inaccuracy of the group as a result of the financial market perception. Moreover, we investigate the characteristics of the BRICS agenda, marked by an enlargement process. Thereafter, we identify the STI sector as one of the main drivers in the promotion of development, describing the main political and pragmatic initiatives that have contributing for institutionalizing an STI platform. Lastly, we make inquiries about the Biotechnology sector into the BRICS initiative, through which we discuss i) the prominent position of its members as producers of biotech products, ii) the political platform that has been offered for effective results, iii) the potential for outstanding effects, considering the biodiversity of the BRICS member, and iv) the desire to set a different way of promoting development.

## 1. The BRICS in the Contemporary Interstate System.

The BRICS is a group formed by Brazil, Russia, India, China and South Africa. As developing countries, its members demonstrate potential influence on world politics, and has had increasing recognition through intergovernmental cooperation and effective implementation of collective international policies. Although in an official version it is recognized as a creation of analysts from the financial market, especially the report written by Jim O'neil (2001), the perception of a political strategy that ties these countries had already been observed previously.

Contradicting O'neil (2001) as the first to realized the BRICS potential, it has roots before his enlightenment. Among other examples, in Brazil, studies conducted in the 1990s revealed an *intelligentsia* that would foreshadow the vaunted analysis in the following decade. Prates' (1996) research shows that, in the political environment of that time, the cooperation horizon between Brazil, Russia, India and China was already part of Brazil's diplomatic planning, underpinning i) articulation in international forums, ii) greater participation in the coordination of global economic

activities, (iii) development strategies, and (iv) reconciliation of globalization with a socio-political orientation.

However, defending these premises amid a complex political environment, shortly after the end of the Cold War, it would have been a risky move. In this sense, Prates (1996, p. 43-44) advised discretion, since *"Any unintended consequence of this initiative could therefore be counterproductive and would have consequences that are highly undesirable for each of the four countries"*. Planning an effective policy would require caution and parsimony. In the same chronological context, Lessa (1998) identified the construction of great axes of geographical action: the axis of the regional powers in Brazilian foreign policy. His studies about the concept of Selective Universalism intended to interpret Brazil's priorities, which led to the perception of an effort to discard exclusive and excluding relations. Consequently, Lessa (1998, p.34) realized an axis formed by regional powers, *"multi-centered at the angles a quadrilateral formed by Beijing-Moscow-New Delhi-Pretoria"*.

This reveals that, at least on the Brazilian side, a strategic perception about what the BRICS would be in the future, was already part of a diplomatic maneuver. This context contributes to demonstrate that not only a project like BRICS should be desirable for developing countries overriding needs but also that it would be necessary to find a neutral person or institution, preferable a non-State actor, someone that could perceive them first, as a scapegoat: this was the main role of O'Neil (2001).

Besides a financial realm, the BRICS has importance in terms of population, territory and strategic location, inserting the group in a dynamic that makes the difference in the traditional political map and that allows them to influence the directions of global politics. Arkhangelskaya (2015, p. 2) clarifies their attributes:

Today BRICS combines three billion people (43% of the population) in the territory of 39.7 million sq.m. (more than a quarter of global land surface), producing almost 13 trillion U.S. gross domestic product per year (21% of world production). Each of these five countries on three continents has influence in their respective regions in particular and in the world. (...) BRICS members are characterized as the most rapidly developing major economies of the world. Large number of important resources for the global economy provides an advantageous position for the states. The main common feature was that they are all developing countries with growing economies and influence, and they all strive for a free and more equitable agreement on global leadership, in which they and others will play an important role.

These characteristics paved the way for helping analysts to propel the creation of the coalition. Meeting in Ecaterimburg, Russia, these emerging states hold the first BRIC summit

(2009) to mobilize multi-dimensional diplomatic efforts. In 2011, South Africa joined the group, and the name was changed to BRICS. The group is justified as a way of complementing existing multilateral efforts, which are reflected in international development institutions (CHIN, 2014).

The group proposed both discuss and plan collaborative partnerships around the global economy and other burning issues for global development. In its first year of operation, the group concentrated efforts on world economic issues and, specifically, on the economies of the group (JYRKI, 2014, p.86). In 2012, a development bank was created, "*mobilizing resources for infrastructure and sustainable development projects in the BRICS countries and other emerging economies, as well as other developing countries*" (CHIN, 2014, p. 366). Following the previous thought, the author refers to the events during the year of 2013 when the group announced the intention to create a BRICS bank:

We have the ambition to establish the new development bank ... in August 2013, governments agreed that the BRICS Development Bank (BDB) would start with a initial capital subscribed of US \$ 50 billion (...) A month later, it was reported that the BRICS leaders made progress in negotiating the bank's capital structure, partnership, participation and governance. (CHIN, 2014, p.366).

The group officially declared that the mission of the New Development Bank (BRICS Development Bank - BDB) is to promote development.

When the BRICS was created, traditional global finance centers faced stagnation or low growth, while emerging countries experienced significant economic growth. The speech boosted by the BRICS countries emphasized economic measures, and its organization was based on four folders: Agriculture, Finance, Health and Trade<sup>4</sup>. Jyrki (2014, p.91) pointed out that this block has three characteristics to consider: 1) they are economically diversified and complementary, which can be considered as commercial advantages for member countries; 2) all these countries have turned their backs on traditional western modernization; 3) they differ from the liberal view of the West, which makes them more daring in pursuing social expectations. In cases 2 and 3, this maintains intertextuality with Said's epistemological perspective (1996 and 2011), where he recognizes the need for a less ethnocentric approach.

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<sup>4</sup> Data reported on the official BRICS website, available at <http://brics5.co.za/academicpapers/ibsa-past-brics-future/>, November 27, 2016.

The BRICS raised expectations for economic and political changes. On the one hand, in economic terms, these countries registered a significant growth<sup>5</sup>, when world GDP grew by 3.6% in 2010 and 2.5% in 2014, as estimated by the World Bank; on the other hand, the BRICS is marked by the diversity of their industries and growth forecast:

China and India are the major global technology and services factories. On the other hand, Brazil will occupy the leading position in biodiversity, iron ore, ethanol and food while Russia will in arms industry and as a supplier of oil and natural gas. (DELAGE, 2011, p.8)

Another aspect to consider, besides the economic attributes, is that rather than adopting a discourse, the BRICS has development as a subject in its essence. The official statements demonstrate efforts to build multilateral cooperation, supporting financing, development and green economy (BRICS, 2015). It should be noted that this vision of development is in line with the basis set by the United Nations Conference on Environment and Development (1992), when 172 countries agreed that *"that environment can be protected via responsible economic development patterns and that approach would ensure a healthier society in human beings which could fulfill their potential while living in harmony with nature and in relative prosperity"* (UN, 2012).

### 1. 1 The New Development Bank

The BRICS-led New Development Bank is an initiative for reaching complementation<sup>6</sup>. It does not propose to replace multilateral institutions, as Breton Woods institutions (World Bank and IMF) or any other. It emerges in 2014, through an agreement signed during the Sixth Summit in Fortaleza. According to Graça Lima (2016, p.11), the creation of the New Development Bank and the Contingent Reserve Arrangement (CRA) demonstrate maturity: it becomes the first institution in the BRICS countries with international legal personality.

Finance is a proactive face of the BRICS. Establishing its headquarters in Shanghai, the NDB provides funding to projects that promote the sustainable development of emerging economies. An example of this type of proposal is referred to CRA, which aims providing resources to member countries at risk of instability in the balance of payments. Furthermore, the CRA may

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<sup>5</sup> In 2000, Brazil had GDP growth of 4.4% in 2010 and 7.6% in 2014. In the case of Russia, GDP growth in 2000 was 10% in 2010, 4.5% in 2014 of 0.6%. India's economy had an even greater GDP growth: in 2000 it was 7.6%, in 2010 it was 10.3 and in 2014 it was 11.5%. China's economy grew by 8.4% in 2000, 10.6% in 2010, and by 7.4% in 2014. Finally, the South African economy grew 4.2% in 2000, 3% in 2010 and 1.5% in 2014. (BRICS, 2015)

<sup>6</sup> Information available at <https://www.ndbbrics.org/br.html>, on 15 January, 2017.

also act as the global fund in other emerging economies<sup>7</sup>: it was ratified at the Summit of Ufa, in Russia (2015), which established a new roadmap for the intensification of trade and investment between the BRICS, in addition to agreements for cultural exchange<sup>8</sup>.

## 1.2 International Security

Security has been shown to be a sensitive topic for BRICS. The (non)convergence of the BRICS in an agenda of international security is quite complex, considering the uniqueness of the geopolitical context and trajectory of sociocultural from each of the member countries. In this sense, the development of consensus becomes intricate, since there is not an unison voice for indicating how they should act on the international scenario in terms of security.

The disparity in capabilities create different perceptions about responsibilities. Russia and China are nuclear powers and have a permanent seat on the UN Security Council (UNSC), while India, also possess nuclear weapons, yet has not a permanent seat in the UNSC, but, together with Brazil and South Africa, aspire such a position at the United Nations. Moreover, each of these States has different relationships with security, much due to their respective geographical environments; however, all five are great supporters of sovereignty, as well as of multilateralism within the framework of international security (HERZ et al, 2011).

Despite differences in interests, identities, and domestic issues, which cannot be hidden, the five countries attain a certain convergence in international security. In the same way that the BRICS arises as a group, in certain situations, as a counterweight to the western powers, as is the case of the creation of the New Development Bank, among other joint projects, it is believed that in terms of international security the case is similar. As in the other topics on the agenda, the BRICS provides more legitimacy in the security coordination.

Multilateralism is among the stronger evidences that serve to set basis for their conciliation. The five members support that any situation involving international security should be solved by the international community, emphasizing that they defend sovereignty, and it may be perceived as one of the pillars for the foundational structure of the BRICS.

The group has no interests in overthrow the international order. Notwithstanding disagreement with disparities, the existence of the institutional architecture and the multilateral is convenient to the BRICS. Despite a realist approach, mainly for China, Índia and Russia, due to

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<sup>7</sup> Information available on <http://brics.itamaraty.gov.br/>, on 22 April, 2017.

<sup>8</sup> Information available on <http://www.itamaraty.gov.br/pt-BR/politica-externa/mecanismos-inter-regionais/3672-brics>, on 22 April, 2017.

mutual distrust in some topics, the group maintains an "idealistic" perspective about international security: it adheres non-proliferation, fight against terrorism, building a system of international security. Among their main beliefs, the BRICS sinalizes the need for a more inclusive political environment.

An additional aspect that can be identified at the intra-BRICS cooperation is that it aims to foster mutual understanding among the countries. BRICS members recognize the importance of increasing reflection on themselves, encouraging the formulation of a perspective of "the BRICS on the BRICS". Since the Brasilia Summit (2010), there is the BRICS Academic Forum, which brings together academics from the five countries. In 2013, it was established a BRICS Think Tanks Council, composed of a think tank of each member country, which produces the annual report of recommendations to be submitted to the leaders (Lima, 2016, p.24).

In this way, the BRICS comprises a multi-subject agenda, coordinating different topics. As it can be seen, besides Science Technology and Innovation, which will be explored ahead, the main sources of cooperation in the BRICS countries understand agriculture and agrarian development, communications, education, finance, health, industry, projects of inclusion of the population, trade and labor. These are subjects constructed through a legal and flexible architecture, through soft law, which is materialized through statements, reported sets, ministerial meetings on various topics, agreements, statements and understandings.

The Science Technology and Innovation (STI) field corroborate that the political architecture has advanced substantially. As will be discussed hereinafter, the Durban Summit (2013) established mechanisms to advance the cooperation in science technology and innovation, expressed at Ministerial Meetings that seal guidelines through declarations: Declaration of eThekweni (1st Ministerial Meeting, in 2014), Declaration of Brasilia (2nd Ministerial Meeting, in 2015), Declaration of Moscow (3rd Ministerial Meeting, in 2015). In addition, the Memorandum of Understanding on Science Technology and Innovation was released at the Ministerial Meeting of Brasilia, creating an environment for thrust in an institutionalist platform in STI.

The follow-up of this multi-faceted BRICS' structure indicates a context near the Dahl's Polyarchy (2005), when it is considered in an expanded version of this concept, conceived in systemic scale. In this perspective, legitimate structures, adapted to political competition and following a peaceful evolution, by means of the evolutionary process - not conflictive -, would result in a gradual change for an essence designed to transform international politics. The BRICS countries, therefore, concentrate efforts for legitimating multilateral mechanisms, and therefore contributes for counterbalancing the interstate system created by the great powers, where actors

outside of the core cannot have a voice (TROITSKIY, 2015). In this context, in a pentarchy format, the group has development as its permanent quest.

## 2. The BRICS and Science Technology and Innovation (STI)

The BRICS has a formal framework for dealing with STI. Comprising its emphasis on development, the BRICS encompass advanced cooperation mechanisms in STI, through an architecture formed by regular meetings of STI Ministries, Senior Officials and Working Groups. The structure plan and coordination have created priority areas, financing mechanisms and dialogue that prove to be very fruitful.

The first BRICS Ministerial Meeting on Science Technology and Innovation resulted in the Cape Town Declaration (2014)<sup>9</sup>. This declaration expressed interest in identifying the paths to institutionalize cooperation, taking into account BRICS comments and suggestions from other meetings, strengthening STI aspirations. In this context, the BRICS members demonstrate the basic characteristics of the document that was subsequently signed during the Fortaleza Summit (2014), determining an intergovernmental strategic structure and defining the areas of STI that should be considered. In addition, it was further in the Cape Town Declaration that the initial 5 steps of cooperation in STI were established, in which each member should dedicate itself to one sector: a) Preservation and mitigation of natural disasters, Brazil; b) Water resources and treatment of pollutants, Russia; c) Geospatial technologies, India; d) new and renewable energy resources and energy efficiency, China e) Astronomy, South Africa.

As already expected, the Fortaleza Summit (2014) consolidated the architecture of cooperation in STI. The BRICS Multilateral Cooperation Agreement on Innovation (2014), made by strategic banks of each of the BRICS, signaled the establishment of mechanisms to co-finance STI initiatives, particularly in infrastructure and energy, in addition to encourage financial innovation. However, this agreement is part of a process that began in 2010, when they agreed on a long-term cooperation mechanism, through the Accession Protocol of the Bank of South Africa (2011), the Interbank Cooperation Mechanism ( 2011), the Agreement on Local Currency Credit Extension Mechanisms (2012) and the BRICS Multilateral Co-financing and Co-operation

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<sup>9</sup> See Brazilian Foreign Ministry website, available on [http://brics.itamaraty.gov.br/pt\\_br/category-english/21-documents/187-first-brics-science-technology-and-innovation-ministerial-meeting-cape-town-declaration](http://brics.itamaraty.gov.br/pt_br/category-english/21-documents/187-first-brics-science-technology-and-innovation-ministerial-meeting-cape-town-declaration), on 22 April, 2017.

Agreement. The intention was to create means to invest in STI, which demands establishment of means for the co-financing of projects.

This was important for the establishment of a framework agreement to structure cooperation in STI. In this context - in line with the Sanya Declaration (2011) and considering the recommendations of the 1st, 2nd and 3rd STI meeting of senior and officials in 2011, 2012 and 2013 - there were the Memorandum of Understanding on Science Cooperation Technology and Innovation. Among the aims pursued, co-generation of innovative products and knowledge, as well as the possibility of promoting joint partnership with other developing countries are considered. The memorandum prioritizes agriculture, food security, natural disasters, renewable energy, nanotechnology, computing, biotechnology, water, technology parks, STI, clean coal technology, gas, polar and oceanic science, and space technologies.

In addition, a structure was created to boost the group's initiatives in the STI sector. In this framework, the main mechanisms are: i) the ministerial conference, which determines financial and institutional initiatives, among other tasks, ii) the meeting of senior officials, who will implement decisions, review the progress of implemented projects and make recommendations and iii) the working group, which functions as a BRICS secretariat on the STI.

During this moment, there was the 2nd BRICS Ministerial Meeting on Science Technology and Innovation, which resulted in the Brasilia Declaration (2015). Taking forward previous proposals, the biomedicine sector was included among as a priority area, and Brazil's proposal to negotiate a 2015-2018 Work Plan (which was launched in 2016 at the Goa Summit)<sup>10</sup> open space for 5 priority areas coordinated by each of the countries, reinforced the idea initiated through the Cape Town Declaration. The Work Plan launched a BRICS Research and Innovation Initiative, containing: a) research infrastructure, b) coordination of national programs, c) financing program, d) establishment of a Joint Platform for the formation of partnerships in Research and Innovation. The statement supports the creation of the Young Scientists Forum and the Economic Strategic Partnership, which is under negotiation and which includes STI.

The 3rd BRICS Ministerial Meeting on Science, Technology and Innovation took place in Russia on 28 October 2015. This resulted in the Moscow Declaration, which recorded progress through the 1st Meeting on Financing STI at BRICS platform, which included: i) coordination of national programs; ii) development and implementation of a Framework Program for the financing

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<sup>10</sup> This Work Plan was adopted in October 2015 (at the Moscow Summit) and revised in October 2016 (at the Goa Summit). The content is available on [http://www.frccsc.ru/sites/default/files/BRICS%20STI%20Work%20Plan%20Final%202016\\_10\\_08.pdf?219](http://www.frccsc.ru/sites/default/files/BRICS%20STI%20Work%20Plan%20Final%202016_10_08.pdf?219), on January 5, 2017.

of joint research projects; iii) the Innovation and Research Network Platform. In addition, it is proposed to use the New Development Bank as additional financing.

Another innovative measure of the Moscow Declaration was the inclusion of another round of 5 new STI sectors. Thus, a common effort was proposed in the challenges and the advance of leadership in new initiatives: besides the creation of the BRICS Young Scientists Forum and the BRICS Network University, they agreed cooperating in Biotechnology and Biomedicine (Brazil and Russia); Information Technology and Computing (China and South Africa); Polar and Oceanic C&T (Brazil and Russia), Nanotechnology (India and Russia) and Photonics (India and Russia)<sup>11</sup>.

The 4th BRICS Ministerial Meeting on Science Technology and Innovation took place in Jaipur on October 8, 2016. Although BRICS member did not share the content of the STI agenda in Jaipur, the media networks outline the main subjects addressed in the meeting<sup>12</sup>. One of the novelties is the three-edge approach: 1) institutional construction, 2) implementation and integration, 3) inclusive response and collective solutions. This converges with the purpose of intensifying, diversifying and institutionalizing the proposals in STI, through innovation and research. In addition, at the Goa Summit, a Partnership Program in Innovation and Entrepreneurship was launched with the purpose of encouraging STI in the BRICS.

Considering STI in BRICS, there is a perception about scarce analysis on this topic, besides considerations about its consequences for providing improvements in human conditions. This gives vitality to what Khan (2015, p.208) says, for whom "*the BRICS are a powerful economic, political and scientific production block.*" All STI projects proposed have as their main focus the determination to provide advances that focus on generalized benefit. They are technologies with a very strong emphasis on the need of developing countries that find mutual interest in overcoming adversities and challenges.

### 3. Biotechnology

Biotechnology is a powerful STI area in the contemporary age, comprising both old techniques and a revolutionary perspective for the future. Sheila Jasanoff (2012) reinforces that Biotechnology in prehistoric times was present in food, fuel, clothing and shelter, but also refers to techniques for altering cell structures, mainly after researches that identified the DNA structure

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<sup>11</sup> Data available at <http://capes.gov.br/sala-de-imprensa/noticias/7845-universidade-em-rede-do-brics-contara-com-12-programas-brasileiros> , on 25 December 2016.

<sup>12</sup> More information available at <http://currentaffairs.gktoday.in/tags/jaipur-declaration> , consulted on 22 January, 2017.

(1953). This associates biotechnology as strategic knowledge, where a great value lies in horizontal cooperation. Following Chang's (2009) rationale, it is in this second case (modern history) that the benefits of this sector will be reaped and will constitute development.

In this sense, It convenes to mention the article 2 of the Convention on Biological Diversity, that establishes:

*"Biological diversity"* means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.

*"Biological resources"* includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.

*"Biotechnology"* means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use. (...)

This points out an engineering process for making or modifying organisms. It shows that, when gradually incorporate into modernity, Biotechnology is able to deal with challenges in the areas of food, health and energy. According to Freire (2014, p.13) these are three major challenges in the 21st century. It is in this sense that the possibility of a positive response is believed, when Jasanoff (2012) questions whether the technological revolutions of our times will favor emancipation or recolonization. It is believed that technological change in biotechnology may be in line with the economic and social development planned by BRICS.

Hence, this corroborate the idea that autochthonous production or co-production is an authentic development strategy. Besides, the scientific evolution enable states to broaden their importance in the interstate system. This becomes a new expression when convenes that Biotechnology is associated with biodiversity, which is an element present in the BRICS assets and represents a strategic value.

A less unequal logic, a synergy has been built by BRICS, generating knowledge diffusion and articulating STI co-production. Amid expectations of scientific progress in biotechnology and other sectors, BRICS members are among the most significant and have institutionalized a strategy which is expressed through the Biotechnology Industry Organization report: according to Pugatsh

(2014, p.7) the BRICS members are already considered among the most influential states in the Biotechnology sector<sup>13</sup>.

Each member of BRICS is the leader of a specific area of influence. Owners of biodiversity stocks, the BRICS finds in Biotechnology the possibility of being protagonists of a new industrial revolution: Biotechnology associated with biodiversity has the capacity to transform the socioeconomic panorama of the developing countries and represents a strategic asset for the countries that have it. One of the challenges, however, is that the development of biotechnology can benefit the holders of genetic stocks: in this case, the BRICS have the opportunity to become protagonists of this scientific-technological revolution.

Biopiracy has long been a problem. According to Magalhães (2010) the biopiracy has served to supply the need of the sector of innovation in Biotechnology. This has led to the mobilization of developing countries to amend international law standards, especially in TRIPS and the Patent Cooperation Treaty (PCT), in order to identify the origin of genetic resources and associated traditional knowledge, what offer the possibility of avoiding mistakes in patent law, besides the search for sharing benefits, when a substance is collected in a another country. Among the countries active in this mobilization, there are those who form the Group of Like Minded Megadiverse Countries (LMMC)<sup>14</sup>. Created in 2002, the group has 14 members<sup>15</sup> that represent 60 to 70% of the planet's biodiversity. One of the outcomes of the group was the Nagoya Protocol on Access to Genetic Resources and Benefit Sharing (2010)<sup>16</sup>.

Efforts to build STI through biodiversity is a potential for the Biotechnology sector. This can be seen in the UNASUR integration process, where Science and Technology Council (COSUCTI) has been the main regional cooperation environment. In this sense, the document Proposed Framework Program for Science, Technology and Innovation of UNASUR (2012-2016), recognizes STI as one of the central themes for strengthening UNASUR's integration into three priority areas: i) renewable energies, ii) Biotechnology and iii) exchange of experiences.

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<sup>13</sup> The report analyzes Biotechnology projects of the eight states that most contribute in this field: Brazil, China, India (the only developing countries), South Korea, Russia, Singapore, Switzerland and the United States. According to the report, these countries have Research and Development strategy in biotech sector, which is treated as a priority for the strategic interests of these states: “*the importance of biotechnology for the future social and economic development is illustrated by almost all states currently*” (Pugatch, 2014, p.7).

<sup>14</sup> According to information available at <https://lmmcgroup.wordpress.com>, on 27 May, 2017.

<sup>15</sup> Bolivia, Brazil, Colombia, Ecuador, India, Indonesia, Kenya, Madagascar, Malaysia, Mexico, Peru, Philippines, Democratic Republic of the Congo, Venezuela.

<sup>16</sup> The Nagoya Protocol entered into force in 2014, after the deposit of the 50th instrument of ratification. Information available at <https://www.cbd.int/abs/>, on April 20, 2017.

Almeida (2005) considers the emergence of hierarchical competition via leadership in the production of a new international productive matrix. In this regard, BRICS is a valuable platform, since it has created an environment for joint technology production, as has been observed in the institutional structure created by the BRICS in STI since the Cape Town Declaration (2014). The business coalition to research and development institutes, advancing in the State-enterprises-academia complex in the field of Biotechnology, is crucial to provide the development of new generation products. The institutionalization of the STI sector in BRICS is at the heart of both the developmental proposal and the geopolitical environment that reconciles its members, where Biotechnology represents a golden opportunity for reaching development and other strategical goals.

## Conclusion

Biotechnology is an effective strategy for promoting development, and BRICS countries are enjoying the golden opportunity to invest in this burning issue. Since they are jointing efforts to produce state of the art technologies, for which have been creating a institucional structure in STI for making flourish this purpose, BRICS demonstrate a autochthonous perspective on how to development themselves peacefully without contradict the rules designed during the last centuries an that form the contemporary interstate system.

There are signals of a desire for promoting a new normative perspective through the BRICS initiative. Notwithstanding limitations, the BRICS partnership indicates a horizon where developing countries create mechanisms both for strengthening their participations in setting norms in the interstate system and spurring solutions for the provocative criticism of Chang (2009), where a perspective of "development without development" must to be overcome.

Biotechnology offers an opportunity for tackling with this challenge. This field represents a key role in the strategy of triggering a technological revolution in three main areas: energy, medicine and agriculture. These topics can be considered as pillars for the human development, indicating that more than a scramble for power and richness, the BRICS brings in its essence a search for blooming human safety together with an effective participation in the interstate system as norms makers, not as rule takers. Therefore, Biotechnology paves the way for human development and legitimize the BRICS political activity.

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