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The bioceanic connection and its importance for the Brazilian economy

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ABSTRACT
This research will introduce the bioceanic connection project between the Atlantic and Pacific oceans, condocted by Brazil, Argentina, Chile, and Paraguay. It's a project of great importance for South American geopolitics once that it will give the permition to a better regional integration, mainly for these four leading countries. In this study, Initially, the consequent impact on Brazil that the dependence on the use of Atlantic ports brings will be discussed, as well as the project's prospects for the country, in sequence, will be presented the bioceanic corridor project, its current implementation status and,its significance for the regional economy will be emphasize, specifically outlining the benefits for Brazil. Shortening maritime routes to Asian markets, which are key destinations for Brazilian products, will reduce logistical transport costs for nacional goods, thus, they will be able to gain a competitive advantage over international rivals.

Keywords: Bioceanic connection, Regional integration, South American geopolitics.

INTRODUCTION

The integration of the South American continent, a long-held dream since the Congress of Panama, convened by Simón Bolívar in 1826, has always been a long way from becoming a reality. Much of the difficulty in making this integration effective is due to the characteristics of the geographic space, which does not help the countries that share the South American space to get closer together.

By studying the geopolitics of South America, one can clearly see the distinct interests of the three great geopolitical blocs that make up the South American space: to the north, Venezuela, part of Colombia and the Guianas are attracted to the North Atlantic Ocean and the Caribbean Sea; to the west, part of Colombia, Ecuador, Peru and Chile have their greatest interest in the Pacific; and to the east Brazil, Uruguay and Argentina, overlooking the South Atlantic, tend to turn their eyes only to the Atlantic. Paraguay and Bolivia, two Mediterranean countries are totally dependent on their neighbors for access to the sea, both to the east as well as to the west. Added to this is the existence of two major obstacles that limit circulation within the South American space; the Andes mountain range and the Amazon rainforest.

In recent years, the growing increase in the volume of international trade and fierce competition between different market players has accelerated existing projects, but which had not been put into action. The regional integration of South America has ceased to be just an old desire for better coexistence among

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the South American peoples to become a necessity for economic survival in the face of the current paths of globalization.

The present work aims to present the project to connect the Atlantic and Pacific oceans, the so-called bioceanic link, which is being conducted by Brazil, Argentina, Paraguay and Chile. The research will also discuss the logistical implications of this project and identify the economic and social benefits that will be generated by it.

BIOCEANIC CONNECTION: PERSPECTIVES FOR BRAZIL

According to Raddatz, *et al* (2014), Brazilian products have suffered a significant loss of competitiveness over the years, coming from Mato Grosso, Mato Grosso do Sul, Rondônia, the southern part of Amazonas and Acre. This loss occurs not only because of the lack of infrastructure in the country, with the well-known problem of long road routes, the lamentable state of conservation ofBrazilian roads, congestion in ports or even because of the high port tariffs, which are considered one of the highest in the world. Added to all this is the fact that Brazilian exports are very dependent on the use of ports in the Atlantic Ocean, located at a great distance from Asian markets, the main export destinations for Brazilian products.

As inferred (Raddatz, *et al*, 2014), due to the complexity of the issues involving trade in the country, the creation of means to achieve a better and greater commercialization of its products is understood as an important chapter for its development, as an active member of the global economy. The project of the bioceanic corridor, route or link, a project fostered, among others, by the incessant search for competitiveness and economic development, can be used as a tool for Brazil to achieve its commercial objectives.

According to (RADDATZ, *et al*, 2014), for the Brazilian territory, the Bioceanic Route comprises a project that aims to promote the reduction of distances between the national production sector and foreign consumer markets. For the Brazilian economy, exports comprise an element of paramount importance, since part of the national production, especially that of commodities, has the Asian market as the main destination of its exports.

According to Cabrera, *et al* (2018), the routes used originate exclusively in ports located in the Atlantic Ocean, skirting the African continent, or crossing the Panama Canal to then reach Asian consumer markets. Due to the travel time, the cost of goods becomes more expensive due to the value of freight. The Bioceanic Connection project has as its main objective precisely to alleviate this problem, implementing via ports of the Pacific Ocean, a shorter route to the Asian continent, which would reduce distances, thus saving the cost of transporting products and making them more competitive.

THE BIOCEANIC CORRIDOR

According to (RADDATZ, *et al*, 2014) due to constant investments in transport technologies, as well as in infrastructure, the geographical boundaries between countries, cities and states are increasingly being shortened. In view of this finding, economic development on a larger scale can become a reality, which means gains not only within the economic line, but also operational advances, growth in the field of infrastructure, in the regional integration zone and, above all, it means the presence of the logistics sector in weight, which meets an investment of the level that a continental country requires.

According to (OLIVEIRA, 2011), with the promotion of the development of a region as an objective, investments in transport alone do not comprise a good enough strategy, therefore, complementary actions are necessary.Therefore, additional investments in transport infrastructure are indispensable to achieve the intended development, and alternative transport links, corridors or routes are possible.

As inferred by Raddatz, *et al* (2014), the transport corridors, using modern operational systems and infrastructure, thus making the connection between the producing areas and the consuming areas, are understood as a segment of the transport system. The purpose of creating transport corridors, according to (BARAT, 1978, p.301), from the perspective of the domestic market, aims not only to act in the commercialization of dense flows of goods (cereals, oil, ore, etc.), but also in the issue of their handling, transport and storage, allowing a gradual increase in the integration of the regions supplying raw materials and food with the industrial centers.

According to Cabrera, *et al* (2018), trade between neighboring countries comprises the purpose of the existence of these corridors, thus facilitating access to those between whom there is no access, thus enabling the main exporters to have a competitive advantage over Atlantic ports, thus integrating a promising trade.

As inferred (DOS SANTOS; CAETANO, 2020), in order to promote and encourage, in South America, the integration between countries, through the physical integration between them, the Bioceanic Connection project was born, based on the Initiative for the Integration of South American Regional Infrastructure – IIRSA, which comprises a joint idealization between governments of the 12 South American countries: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay and Venezuela.

According to (CAMPOS; FARIA, 2022), on Brazilian soil, the project that began in the year 2000, together with the summit of South American presidents takes over one of the largest roads in the world, the project advances for approximately 3,500 km, covering the cities in the interior of São Paulo, according to the Campo Grande News website, (2023, n.p), in the main line, within the strategic concept

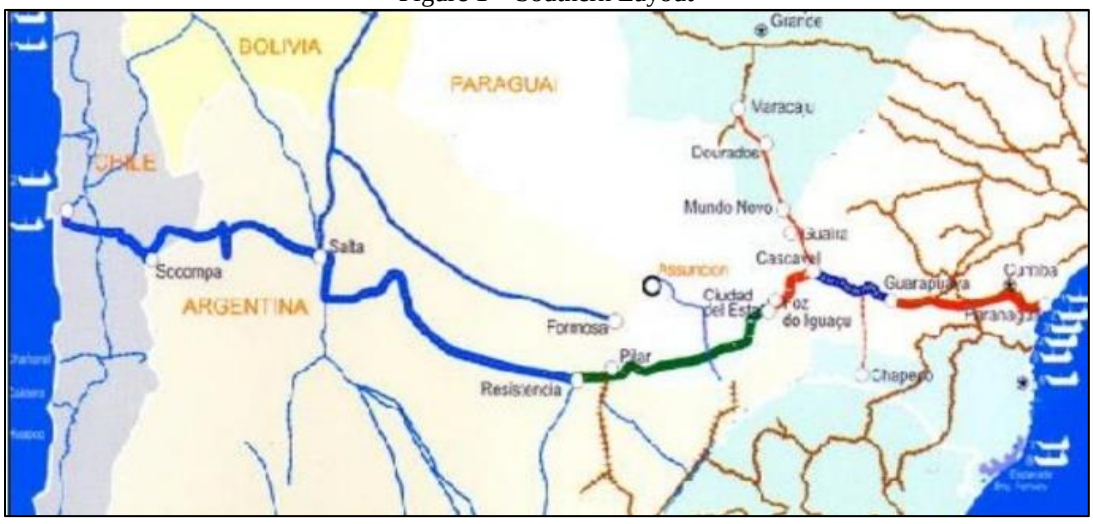
for Brazil, The project extends in the region of Mato Grosso do Sul, entering the cities of Porto Murtinho, Jardim, Caracol, Bela Vista, Guia Lopes da Laguna, Nioaque, Sidrolândia and Campo Grande.

According to (Raddatz *et al*, 2014), the project of the bioceanic link, connecting the Atlantic Ocean to the Pacific Ocean in South America is divided into three routes, the southern, central and northern routes, these being called corridors, routes or bioceanic connections, below these will be detailed here.

SOUTHERN LAYOUT

As shown (RADDATZ, *et al*, 2014), built for the transport of cargo between Argentina and Chile, the latter comprises the first bioceanic crossing, named Aconcagua. The rail modal was the first modal used to transport passengers and cargo between these countries. With the shortest distance between the Pacific and Atlantic ports and also the best infrastructure, the crossing runs from Valparaiso in Chile to the port of Rio Grande in Brazil, with approximately 2,200 km in length. During the winter, from July to September, this route has to deal with challenges such as temperatures of up to -20°C, with constant snowfalls and avalanches, making it mandatory to use chains in all vehicles, the passage, in these cases, is blocked for up to 20 days. The route has a 22 km downhill stretch, on the descent of the Andes Mountains through the Sierra del Caracol (Aconcagua), a stretch with cliffs and sharp curves, one of the most dangerous points of the route that has 180km of crossing the mountain range. In a favorable climate, a cargo vehicle takes an average of 6 hours to make this journey at an average of 30km/h.

Figure 1 – Southern Layout



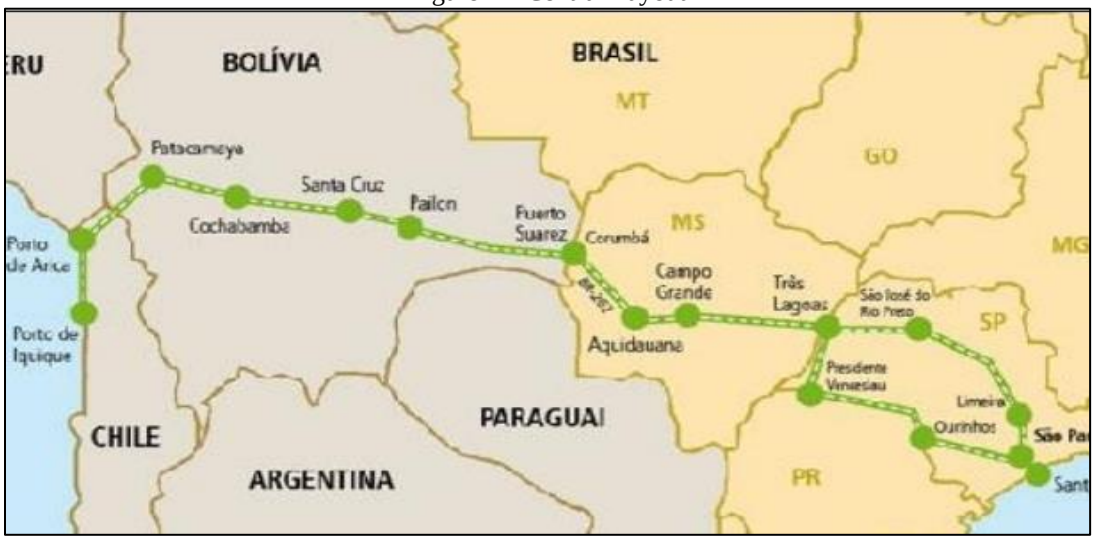
Source: Rezende (2010)

CENTRAL LAYOUT

In the central region of Brazil is located the second bioceanic corridor, with approximately 3,500km in length, the crossing took place through an agreement between Brazil, Chile, Bolivia and IIRSA. As in the southern corridor, a challenge faced by this route is the climate, as this one, which has approximately 200 km of crossing through the mountain range, faces temperatures that reach -10° C, also requiring the use of currents in some seasons. Located in the middle of the main production centers of the country, this route for agricultural commodities has one of the best logistical potentials. (Raddatz, *et al*, 2014).

The main challenge faced by this route comprises the lack of safety in road transport, in the crossing in Bolivian territory, because in this stretch the crossing can be more unsafe than in Brazil. (Raddatz, *et al*, 2014), One of the main factors that discourage the use of this route is precisely the lack of security, due to the high incidence of cargo theft, a crime that is usually practiced by gangs called "Bolivian Pirates". The collection of tolls in the perimeters of each city or the blocking of traffic by means of barriers, unfortunately, are obstacles created by the governors of the municipalities located along the route, Due to the lack of sufficient contingent and the lack of structure to prevent the action of these gangs, the police become inefficient and, as a result, There is an increase in the cost of international transport. The layout of this route is shown in Figure 2 below.

Figure 2 – Central Layout



Source: Klein (2011)

NORTHERN LAYOUT

Connecting the city of Rio Branco in the State of Acre to Matarani and Ilo in Peru, the third and recently inaugurated bioceanic corridor, according to what Raddatz, *et al* (2014) shows, comprises a new option with little customs control for cargo transport. In the latter, differently from the central and

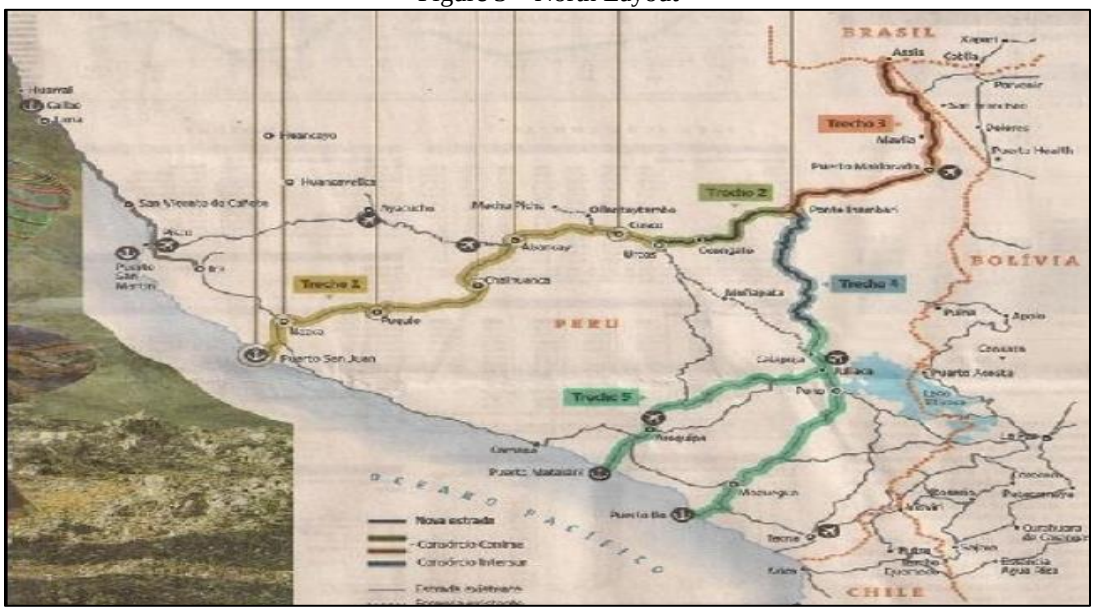
southern corridors, on its roads the minimum temperature reached is -5°C, which makes the occurrence of blizzards and avalanches less likely. The entire length of the northern corridor, except for the existence of a ferry on the border of the states of Rondônia and Acre, over the Madeira River, has an entire paving structure.

According to (RADDATZ et *al*, 2014), the route begins in Porto Velho (RO) through the BR-364 highway and continues through Rio Branco in Acre on the BR-317 highway. Carried out through theAmazon jungle and the Andean peaks, the crossing of this corridor has, through the mountain range, 170 km of crossing, which are used more for tourist movement than for cargo transport. This, understands, to the products of the north of Mato Grosso that have as destination the Asian market, a viable alternative, this crossing is located at a distance of about 2700 km from the ports of Chile, which have an idle capacity of approximately 50% and still have the same depth as the main Brazilian ports, between 10 and 14 meters, Still, these offer some advantages, such as time savings.

As evidenced by Raddatz, *et al* (2014), the Pacific Road, in Peruvian lands, follows different routes, one towards the port of Matarani, following Lake Titicaca, using the PE-034 highway, and the PE036 to the port of Ilo. The other route follows the PE-030 highway passing through Nazca and Cuzco, towards the port of San Juan de Marcona. The city of Rio Branco in Acre on the BR 317 highway comprises the starting point of the exit to the north of the country, it is only a little more than 300 km from the state of Acre to the border with Peru. Within the Amazon there is also a fork in the road on this route, one branch goes towards Lake Titicaca in the city of Puno leading to the ports of Matarani and Ilo, the other goes towards Cuco, passing through Nazca and ending in the Pacific. According to (Raddatz; et al 2014), occupying a strategic position, Acre has a 6-day route to reach Asia, which is also a cheaper route, as it excludes the need to use the Panama Canal crossing and thus avoiding the payment of its fees. The layout of this route is shown in Figure 3.

According to (Raddatz, *et al*, 2014), the crossing of theAmazon in the Andes Mountains demands extra attention from those who transit through it, precisely because it is a very recent reality and that still requires a lot of adjustment to actually put imports and exports into operation through this route. The biggest obstacle to this type of cargo transport comprises precisely the natural barrier of the Cordillera that affects all accesses to the Pacific, with an extension of 8000 km and 160 km of width, counting on harsh winters. Among the precautions that must be taken by those who use this crossing, the main one is in relation to climate change, because in the forest being on average 30 degrees, the climate is hot and humid, when reaching 4,725 meters above sea level, the air is dry and thin and on average the temperature is -5 degrees.

Figure 3 – North Layout



Source: Brito (2009)

LOGISTICAL ASPECTS OF THE PROJECT

In terms of travel time, the project reduces the transport of commodities to Asia and Oceania by 17 days. It is a significant path for the relief of the Port of Santos (SP), reducing the distance and time for Brazilian exports and imports between potential markets in Asia, Oceania and the West Coast of the United States through the Pacific route. (ALMEIDA, n.d.)

Engaging again in the perspectives for the Brazilian Midwest, as inferred (CONSTANTINO, *etal*, 2023), the project moves the promise of transforming Mato Grosso do Sul into a logistics hub or a goods distribution center, since the route can attract foreign investments, thus stimulating the formation of partnerships, regional development and integration.

According to the Dourados Agora Newsletter (2023, n.p), the Midwest region moves the country in the field of agricultural production, being able to reduce to about 12 days less, that is, by 23% the travel time to China, for example. Unlike the old circuit used, already mentioned above, which was used to reach Asia, the Panama Canal, etc. The new one uses the Paraguayan Chaco as its central axis, considerably shortening the route, and is even called the Panama Canal on land.

According to (CAMPOS; FARIA, 2022), the bioceanic corridor, also, with the objective of boosting the movement of products, will build a road bridge in the municipality of Porto Murtinho (MS) located in the southern part of the Pantanal, on the banks of the Paraguay River, border territory between Brazil and Paraguay, with roads and customs, which will connect Brazil to the city of Carmelo Peralta in Paraguay. Porto Murtinho has approximately 15 thousand inhabitants, of which 80% of the population lives mostly from fishing tourism. This project, budgeted at around 75 million dollars, has the contribution of Itaipu Binacional for its construction.

According to the Dourados Agora Newsletter (2023, n.p), the project called Binational Bridge, has the possibility of reducing the distance to Asia in Brazilian exports by two weeks. Collecting data regarding the impact on the movement of products, it is noted that the production of grains in Mato Grosso do Sul exceeds by more than four times that of the entire production of Paraguay, therefore, for the flow of its production, the corridor will mean a reduction of 25% to 30% in its costs.

As shown by Asato, *et al* (2019), emphasizing the logistical bias of the project, it is pertinent to address that according to the Transport and Logistics Union of Mato Grosso do Sul (SETLOG/MS, n.d.), through the large undertaking of the construction of the Binational Bridge, and all the consequent integration between Brazil, Paraguay and Chile that will be made possible, For exports, the corridor will be able to count on a reduction of up to 12% in freight. With this bridge, that is, with the breaking of this geographical barrier, not only issues related to the export of products and the reduction of the maritime route to other continents are discussed, but also, in Paraguayan territories, procedures that make the paving of highways (approximately 500km) more viable, and in Argentina another 24km, with the first intent, precisely, to facilitate logistics and, secondly, to extend the entire corridor to boost tourism.

BIOCEANIC CORRIDOR: ECONOMIC ASPECTS

According to the Correio do Estado website (2020, n.p), based on the purpose of creating the Bioceanic Connection, which consists precisely of bringing an improvement in export processes through the implementation of a more efficient route, within this line of exports, it should be mentioned that the State of Mato Grosso do Sul will be the most benefited in

Due to the high handling potential that it has, with the Route, the demand of Asian countries for products from Mato Grosso do Sul, such as Fish, Chicken and Pork will increase and, consequently, thestate's exports will increase. According to a study carried out by the Federation of Industries of Mato Grosso do Sul (FIEMS), this potential could reach the order of 1.5 billion per year.

Also, according to the website Correio do Estado (2020, n.p), as shown by data from the Secretariat of Foreign Trade (Secex), from 2015 to 2020half of Mato Grosso do Sul's exports went towards China and the island of Hong Kong, including beet and cane sugars, corn, chemical wood pulp, soybeans, sucrose and beef, among the main exported products and, in the same period, 13% of exports were destined for countries such as Thailand, Japan, South Korea and Malaysia.

According to the website ms.gov.br (2024, n.p), pointed out by Secretary Jaime Verruck of the Secretariat for the Environment, Development, Science, Technology and Innovation (SEMADESC), during the year 2023, around US$ 6.5 billion of the exits from Mato Grosso do Sul were conducted to Asia and nations linked to the bioceanic route, the total accumulation of this volume in general exports brings together US$ 10.5 billion.

According to data from the Rotabioceanica.com.br website (2021, n.p), due to the high population of countries such as China, with a size of 1.443 billion inhabitants, followed by India, representing 1.366 billion, a great demand is generated for products produced in Brazil.

Also, according to the website ms.gov.br (2024, n.p), taking more current aspects and looking at the data from the Foreign Trade (Conjuncture Letter) compiled by (SEMADESC), it is possible to signal the growth of the agricultural sector in the first quarter of 2024 based on the first quarter of 2023, since, analyzing this relationship, it is possible to notice an increase of 4.5% in exports, which suggest $2.185 billion in the quarter.

According to the website ms.gov.br (2024, n.p), for the secretary Jaime Verruck, from SEMADESC, the numbers for the first quarter of 2024, comprise good indicators in the field of foreign trade, the sale of Soybeans reached an increase of 19.95%, compared to 2023, an accumulation of US$ 642,200,455.00, products such as Cellulose and Frozen Beef, also obtained an increase, however, sugar was the product that obtained the highest percentage increase in the table: 67.12%, totaling US$ 163,853,009,000.

As for the main destinations of products from Mato Grosso do Sul, as discussed on the website ms.gov.br (2024, n.p), the country that maintains the leading position in the ranking is China, which even, in the first quarter of 2024, increased its participation in purchases, bordering on 44.21% of the total (US$ 924,576,014.21). The United States follows in second position with (US$ 124,449,845.00, or 5.95%), ahead of countries such as the Netherlands, Indonesia and India, which takes fifth place in this ranking, Argentina is in sixth position, as it reduced the level of purchases from Mato Grosso do Sul by 47.7%, in the last quarter compared to the beginning of 2023.

BIOCEANIC CORRIDOR AND REGIONAL INTEGRATION

Putting on the agenda, the regional integration between the Brazilian borders and the specific public policies that involve it, as shown (DOS SANTOS; CAETANO, 2020), it is pertinent to indicate the Border Strip Social Development Program (PDFF), and the projects of the Initiative for the Integration of South American Regional Infrastructure (IIRSA) created in 2000.

According to (HONORIO, 2013), IIRSA can be considered as the first movement of South American regionalism with a focus on the consolidation of integration and cooperation initiatives among Latin countries. In this sense, being inserted

In the development platform, the Bioceanic Route, aims to encourage the modernization of communications, transport and energy structures and regional cooperation.

With regard to the development of communities, through the promotion of integration provided by the corridor, (Asato *el al*, 2022), states that:

> This route, which uses the Bioceanic Route and, consequently, the Bioceanic Road Corridor, can provide a chance for a change in local perspective, mainly from the investments made in infrastructure of all kinds in the border area that includes Porto Murtinho and Carmelo Peralta, valuing the collective interest of local communities. In addition, an increase in the realization of works on the roads of Mato Grosso do Sul on the route from Campo Grande to Porto Murtinho is expected, promoting connectivity and regional integration and imposing an incentive for the internationalization of small and medium-sized companies in these territories that will be impacted by the Corridor.

According to (ALMEIDA, n.d.), physical, commercial, economic, energy, political and cultural are some of the dimensions with which the South American integration process can be analyzed. By deepening regional integration, road, rail and waterway corridors make it possible to boost and create new trade and investment flows. In Mediterranean areas, such as Mato Grosso do Sul or the Paraguayan Chaco, the Bioceanic Corridors allow access to Pacific ports in an efficient manner.

Second (DOS SANTOS; CAETANO, 2020), the physical and economic integration provided through the project can serve as a means to strengthen ties between the countries involved, thus creating greater cooperation and interdependence between Brazil, Chile, Paraguay and Argentina, consequently contributing to joint growth, peaceful conflict resolution, political stability, among others.

According to (BASTOS, n.d.), acting as a driver in previously isolated cities or territories, the corridor will provide possibilities for development and economic growth. Major transformations may occur in the cities of Porto Murtinho, Carmelo Peralta, Pozo Hondo or Missão de La Paz, such as the creation of local jobs, thus motivating young people to stay in their cities of origin to work, thus avoiding their displacement to other urban centers.

In rural areas, according to (Bastos, n.d.), due to the advance of commerce and productive activities, as well as in small urban centers, benefits can be observed, such as quality Internet, high supply of telecommunication devices and computers. At the same time, technical courses, higher education courses will have their offers boosted, including by companies.

According to Bastos, (n.d.), increasing the supply of jobs, as well as the population, the level of income, the development of the territories, have strengthened the way in which the prospects of career advancement and social mobility are observed. However, even with all these advantages brought to the territories, it should be noted that this favoring will not reach everyone, because, due to market demands, there will be those who will be permanently or temporarily displaced. It will be up to governments to create public policies for the inclusion of all, thus ensuring a space for training and improvement.

In addition, according to Dos Santos and Caetano (2020), although the project aims to unite countries, it can also, contrary to its original objective, bring even more challenges to integration and generate geopolitical concerns. The quest for leadership and economic benefits can serve as a trigger for the emergence of trade disputes and rivalry between countries. An example of this can be the construction

of infrastructure in border territories, which can generate tensions related to sovereignty and national security.

Still, within this perspective of challenges and focusing on the environmental issue, even if one understands the great project of the implementation of the Bioceanic Route, as a project that will bring numerous benefits and advantages, it is also necessary to take into account the negative impact on the environment that its implementation will bring to the regions that are part of the route. Such impacts, however, do not have a certain identification and, either, can they already be anticipated, moreover, there is still no effort, in fact, to find the means to identify, mitigate, avoid and compensate for them. (ARGELLO, *et al*, 2023).

BIOCEANIC CORRIDOR: STRENGTHENING TOURISM

According to (DOS SANTOS; CAETANO, 2020), in the border regions between cities, states and countries, the growth of tourism also includes one of the possibilities brought by the Bioceanic Route, due to the attractions, among others, of the destinations of Bonito and the Pantanal in Brazil. As shown (Asato, *et al*, 2019) a range of different forms of tourism can be covered, among them, cultural and event tourism in regions such as Porto Murtinho, which has more than 20 historic buildings and Jujuy in the Argentine territory, contemplation tourism, present in all countries that are part of the route, adventure tourism, wine tourism in the region of Salta in Argentina and tourism in natural areas such as the Atacama Desert.However, a challenge is present in the question of transforming this expectation into reality, because between the state of Mato Grosso do Sul and the countries that are part of the route, the existing relationship, so far, is almost insignificant. This is due to the fact that integration between countries is still embryonic.

In addition, it is valid to state, according to (Asato *et al*, 2019) that the positive externalities that the Bioceanic Corridor can bring go beyond progress and dynamism, the corridor can make possible a significant improvement in the quality of life of the population living around the countries that are part of the project, through growth linked to educational and cultural integration, generating income, thus strengthening the union between peoples. As inferred by Asato *et al*, (2019), observing the importance for social promotion, dynamization of the economy and for the intercultural movements that the activity of tourism has, it becomes extremely important to understand that local development goes beyond just economic growth, which has a broader concept approaching the idea of providing quality of life, In other words, placing the human being at the center of the issue of development, one of the foundations of the creative economy.

FINAL THOUGHTS

The Bioceanic Corridor, when fully implemented, will represent a significant improvement in the efficiency of international cargo transport for Brazil. From all that has been studied, it is evident that this corridor offers several logistical and socioeconomic advantages.

When operational, the Bioceanic Corridor will significantly reduce the transit time of goods by providing a more direct route between South American and Asian markets, which can result in substantial savings for transport companies and their customers.

What's more, the corridor offers the possibility of diversifying transport routes, reducing dependence on traditional routes. This will make supply chains more secure and flexible, while also making them less vulnerable to disruptions.

Regional integration is also a point to be taken into account. This project will help develop economic partnerships between South American countries, not only in terms of trade but also in tourism.

It is important to note that the implementation of the Bioceanic Corridor presents challenges. These include the need for significant investments in infrastructure, the need for coordination between different countries and the need to ensure that the corridor is operated in a way that is sustainable.

Finally, it can be said with relative certainty that the Bioceanic Corridor will offer great potential to provide greater regional integration of the South American continent, especially among the countries involved in the project, and that Brazil will be greatly benefited, as its products will have more competitive prices in the international market.

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