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Sharing Chinese and Peruvian Visions about the Future Chancay Port: Exploring Opportunities under the Belt and Road

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Abstract

Chancay port is the largest Chinese investment in the Latin American port network. This mega infrastructure of U$ 3 billion by the Chinese firm COSCO Shipping Ports aims to generate transformations in the South American shipping network and become a hub for Chinese containerized exports along the continent. However, while the investors have clear objectives, Peruvian authorities still lack strategies for taking advantage of this deep-sea port hub that would receive the latest generation of container ships from Asia. Based on a context of radical transformations in the global shipping networks and the opportunities emerging from the Belt and Road Initiative, this study contributes to the exchange of the current Chinese and Peruvian visions about the future of the Chancay port, aiming to help authorities and economic leaders to orient significant transformations in the transpacific maritime corridor in benefit of both countries.

Keywords: Transpacific corridor**,** Port infrastructure, Asian Ports, Chancay Port, Belt and Road Initiative, Economic Corridors, Hinterland, Territorial development, Megaprojects.

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SHARING CHINESE AND PERUVIAN VISIONS ABOUT THE FUTURE CHANCAY PORT: Exploring Opportunities under the Belt and Road Initiative

Omar Narrea MSc[1]

1. Introduction

Chancay port is the most important Chinese investment in the Latin American port network, led by the Chinese firm COSCO Shipping Ports. With an investment of USD 3 billion, this mega infrastructure aims to transform the West Pacific Cost shipping network and will become a hub for Chinese containerized exports along South America. This hub role is also part of a changing process of global logistics networks. It is assigned a new physical role to port infrastructures in response to ships that are increasingly larger and capable of traveling longer distances than their predecessor versions. As a result, the benefits of a hub port do not lie exclusively in productivity since it helps to reduce geographical distances with new transcontinental shipping services.

At the same time, ports also are seemed as gateways of local production with international markets. The "hinterland" role of a port involves transformations. The Asian region shows ports fully integrated into territorial development strategies or economic corridor models. In the case of the port of Shanghai, 60% of incoming cargo is carried to the neighboring provinces of Hangzhou and Nanjing, connected by a multimodal network of approximately 500 kilometers that includes train services and highways (Zhang et al., 2009). Complementarily, other instruments of territorial development operate around ports, such as industrial parks and special economic zones, which in the Chinese case are one of the most evolved instruments, to the point of being responsible for 11% of Chinese GDP (Kou & Zhang, 2020).

Even though investors in the port of Chancay have clear objectives, Peruvian authorities lack strategies to take advantage of this port hub that would receive the latest generation of container ships from Asia. Therefore, against the background of radical transformations in global maritime networks and the opportunities arising from the Belt and Road Initiative, the main objective of this study is to contribute to the exchange of the current Chinese and Peruvian visions on the future of the port of Chancay to help authorities and economic leaders to guide the significant transformations of the transpacific maritime corridor to the benefit of both countries.

As a first objective, this study explores the Chinese investor's vision of the project with a particular focus on the corporate´s business model in the shipping industry, where COSCO Shipping presents strengths for operating with a logic of horizontal and vertical integration. With the presentation of data about the cargo traffic in the West Pacific Cost, it is argued that a steady increase for container ships in the countries nearby the Chancay Port and the other two regional hubs ports (Manzanillo and Panama) will allow a new

[1] The author expresses his gratitude with the Center for China and Asia-Pacific Studies at the Universidad del Pacífico for the financial and academic support and promoting his participation in seminars to receive valuable comments from Peruvian and Asian academics and practitioners. He also acknowledges the contribution of professors Irina Calvo and Jesús Barreto from the University Faustino Sanchez Carrión about the value chains in the Chancay Hinterland. Finally, the author wishes to thank María de los Ángeles Arévalo for her quality research support in this study.

hub port in the south in line with the current evolution, in ship-size and cargo volume, of port infrastructures in the world.

Secondly, this study identifies key factors to broaden the vision of the Chancay port towards a "hinterland development model" to expand the impacts beyond the hub role. National strengths support the position of Chancay as a port with hinterland functions since it has four economic corridors whose non-traditional production oriented towards international markets is rising, and there is a potential for industrial parks nearby the port site thanks to human capital in spades. The study also identifies strategies around ports in Latin-American to develop their hinterlands. In particular, it shows that hubs ports in Colombia and Mexico have successfully implemented industrial parks and special economic zones to boost productivity and add value to the production of the hinterlands.

In the next phase of this research, a second working paper will focus on what policies, infrastructure programs, and strategies to attract investments are shaping the economic corridors under the BRI to develop competitiveness for attracting Global Value Chains. Economic corridors under the framework of the BRI are driver forces of the Transpacific trade for enhancing the access of east and west Chinese provinces and ASEAN countries to the markets of the Pacific Alliance countries (Peru, México, Chile, and Colombia). Thus, the next phase of this research will try to hold lessons of good practices to implement around the Chancay Hinterland.

This study presented six chapters to advance the proposed objectives. The first part explores the transformations of the Peruvian port network and the global logistics system to contextualize Chancay port. Also, highlight the roles in the transpacific route. Subsequently, the previous work of Narrea and Martinez (2021) is analyzed deeply to analyze the strengths of the competitiveness of the hinterland's productive chains and identify opportunities and challenges to add value. The following chapter attempts to learn from territorial development experiences around ports by identifying successful cases in Latin America that could represent lessons for the hinterland model around Chancay. Based on the elements of the first chapters, the sixth chapter identifies the opportunities that the Belt and Road Initiative would bring to the Chancay port within the framework of the transpacific corridor. Finally, the last chapter presents a model that synthesizes the strengths of Chancay for its hub functions, ending with an agenda for transforming the opportunities into a territorial development model for the hinterland.

2. The Chancay port in the global logistic network

This section moves away from the typical description of the physical characteristics of the port of Chancay. This chapter explores the role of the port in terms of the transformations of the global shipping industry (technology, logistics, and business models). It also takes into account the role of the Peruvian port in the Western American Pacific route. This underlines the strategic potential of the Chancay port infrastructure in the global logistics system, which will have the capacity to move 1.5 million TEUs in its first stage.

2.1. The Chancay port project

In January 2020, the south pier of the Callao port operated by DP Ports served the "APL Esplanade," the largest vessel to arrive in Peru with a capacity of 13,892 TEU and the need for a draft of 12.9 meters. Classified as a "very large containership," the APL

Esplanade surpasses the Neo-Panamax generation of ships (up to 12,500 TEU), whose standard is the physical limit allowed to pass through the Panama Canal. This shows the growth of the last ten years in Callao's capacity to receive ships. On average, it has gone from receiving Panamax-type ships (between 3,000-5,000 TEU) to receive 27% of Post-Panamax ships (between 5,000-9,000 TEU) in 2019. This development is in line with the trend of "gigantization" of ships. This is a strategy of the international logistics system to adjust to the accelerated world trade and the increased demand for exchanging countries for their territories. The aim is to reduce the average cost per container and reduce fuel consumption, which is one of the major components of costs and carbon emissions (Sanchez et al., 2020).

Table 1: Capacity of ship receiving vessels - Main Peruvian container ports

Port	Vessel size
Callao- South Pier Container Terminal - DP World	15,000 TEU- New Panamax
Callao- APM Multipurpose North Terminal	9,200 TEU - Post Panamax 2
Paita	8,000 TEU - Post Panamax 2
Chancay	18,000 TEU- Triple E

Source: Peruvian Transportation Infrastructure Investment Supervisory Agency (OSITRAN)

Peru opted for the strategy of increasing its capacity to receive larger ships. Thus, in 2020, 333 container ships arrived in Paita and 1116 in Callao, for which infrastructure projects and expansion investments were essential. Currently, Callao South Pier is seeking to build a new pier capable of handling up to 3 Neopanamax vessels simultaneously. Likewise, the port of Paita will carry out its expansion project to start receiving Post Panamax-type vessels. According to Sanchez et. al (2020), the projections for the arrival of giant ships in Latin America came in advance in 2017, which allows us to believe that the new forecasts for the arrival of the latest generation of vessels will be met (very large containership, and ultra-large containership that have in common a length of 400 meters and over 15,000 TEU). Thus, shipping companies could bring 300-meter vessels to their West Coast routes in 2022 and 18,000 TEU vessels in 2024 (Ibid.).

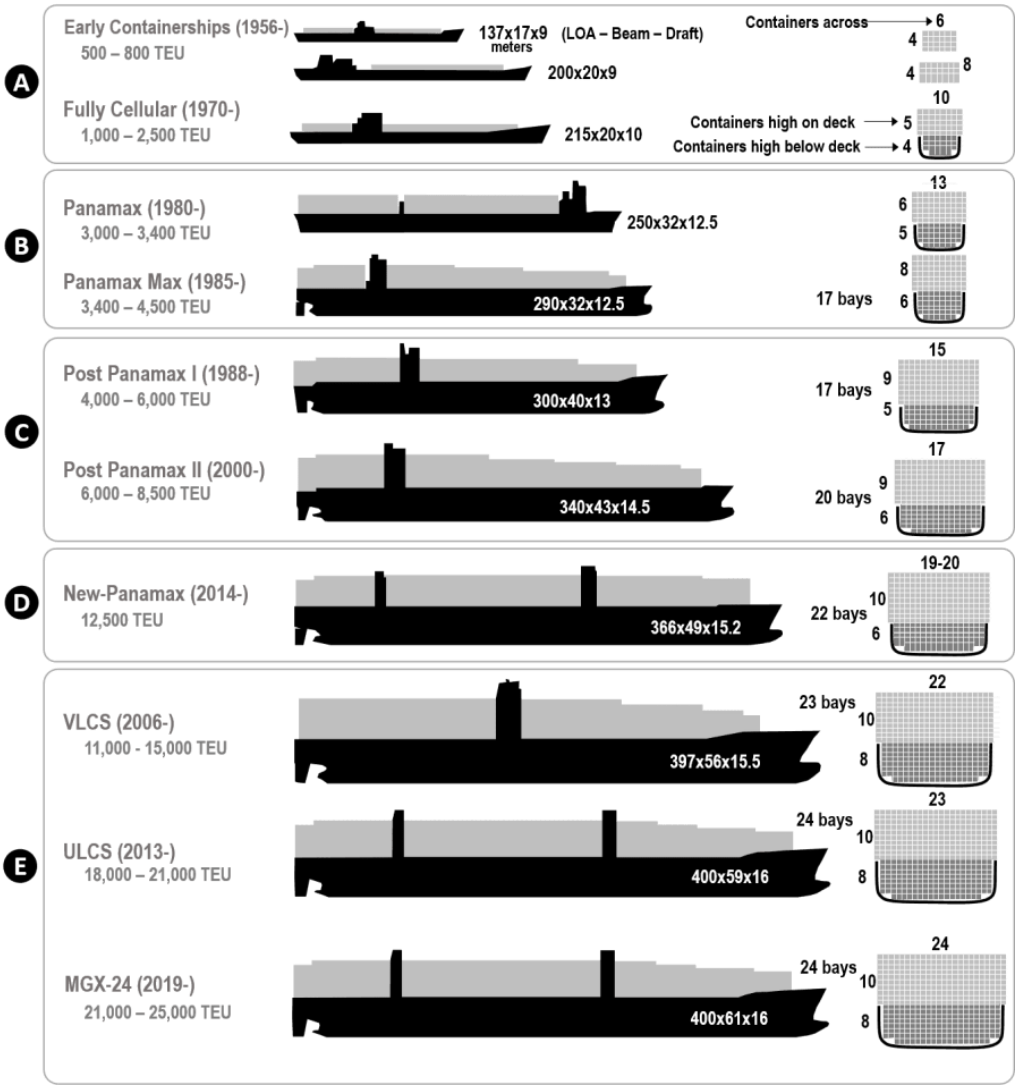
2.1.1. The size of the vessels allowed to use the port of Chancay

One of the transformations proposed by the Chancay port project is the construction of an operational infrastructure that guarantees the handling of new-generation ships, taking advantage of the natural potential of a draft over 16 meters. With the transformation of the global logistics chain, this port will be prepared to receive "ultra-large containership" category vessels with capacities exceeding 18,000 TEU. This type of vessel includes the Triple E ships that are purpose-built to optimize global long-distance routes to transport at low unit costs per container, as well as to gain efficiencies in environmental management by reducing fuel consumption through a slow speed that can reduce consumption by almost 40% and emissions by around 50%.

The expansion of the Port of Panama in 2016 meant a change in logistic possibilities by expanding the capacity of use to 12,000 ships per year and the passage of larger container ships. This investment of almost U$6 billion generated a ripple effect on shipping routes operating in the American West Pacific area by allowing it to use new generations of container ships. At the same time, this meant a challenge for Latin American ports because although ports such as Guayaquil or San Antonio can receive

vessels of almost 400 meters in length, their draft and infrastructure prevent them from receiving container cargoes with capacities greater than 18,000 TEU.

Illustration 1: The evolution of container ship



Source: Rodrigue (2020).

This context would put the Chancay port at the forefront of the West Pacific coast ports due to its natural draft characteristics and its design with machinery and facilities that are especially suitable to receive the new generation of container ships. Thus, Chancay would be evaluated as a node that would allow west coast shipping routes to bring to the south Pacific vessels of maximum capacity that can pass through the expanded Panama Canal.

2.1.2. The role of COSCO Shipping

As it is known, since 2019, the port operator is the consortium Consorcio COSCO Shipping Ports Chancay Peru, where the local mining company Volcan Compañía Minera S.A.A. is the Peruvian partner with 40% of the shares, and COSCO Shipping Ports has the remaining 60%. Beyond the size of the Chinese partner in the port sector,

there are two relevant points to highlight regarding its influence on the shipping business model on a global scale:

- COSCO Shipping Ports (CSP) is a company with a global network (Europe, Asia, and America) of 12 ports (13 million TEU) and China of 23 ports (48 million TEU), making it the third-largest port in the world. It also highlights that CSP already operates in the Pacific a terminal in the port of Seattle. In the Mediterranean, it also has terminals in the strategic ports of CSP Bilbao and CSP Valencia. Later will be seen that this characteristic makes CSP a logistics platform for several global shipping routes.

Illustration 2: Ports in the COSCO Shipping Ports network (2020)

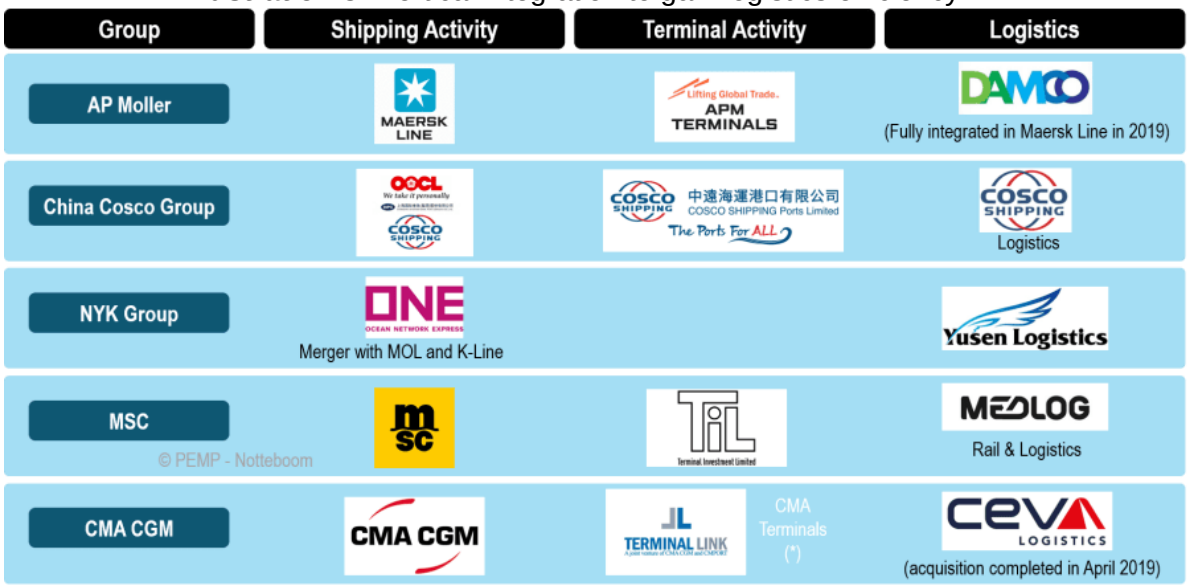
Source: COSCO Shipping (2021)

- COSCO Shipping Ports (CSP) has a business model of vertical and horizontal integration. CSP belongs to COSCO Shipping Group, which is a leading shipping conglomerate that also has COSCO Logistics. In this way, there are not only economies of scale due to the size of the port but also because of the strong integration with shipping lines that would facilitate the arrival of routes and their frequency according to the port's cargo demand.

There is also horizontal integration because COSCO Shipping Group follows the global trend of shipping lines seeking alliances among themselves to offer better route coverage under a model that moves 80% of cargo (The Economic and Social Commission for Asia and the Pacific; 2021). CSG, CMA CGM, Evergreen, and OOCL belong to the Ocean Alliance. In 2021, this alliance operated 352 containerships and 42 route services and moved 29% of total world cargo. COSCO Shipping Group services accounted for 12%, ranking third worldwide alongside CMA-CGM and below MSC (15%) and Maersk (19%).

This business model based on vertical and horizontal integration is not new in the Peruvian port network. The shipping company Maersk owns the port company APM Terminals, which is the operator of the Multipurpose North Terminal of the Port of Callao. Maersk joins the global shipping 2M Alliance with the Mediterranean Shipping Company, which has a transport capacity of 2,308,000 TEU. Besides, considering that two of the six largest worldwide port companies have operations in Peru, the arrival of COSCO would offer advantages from the synergies with the well-developed Peruvian port network.

Illustration 3: Vertical integration to gain logistics efficiency

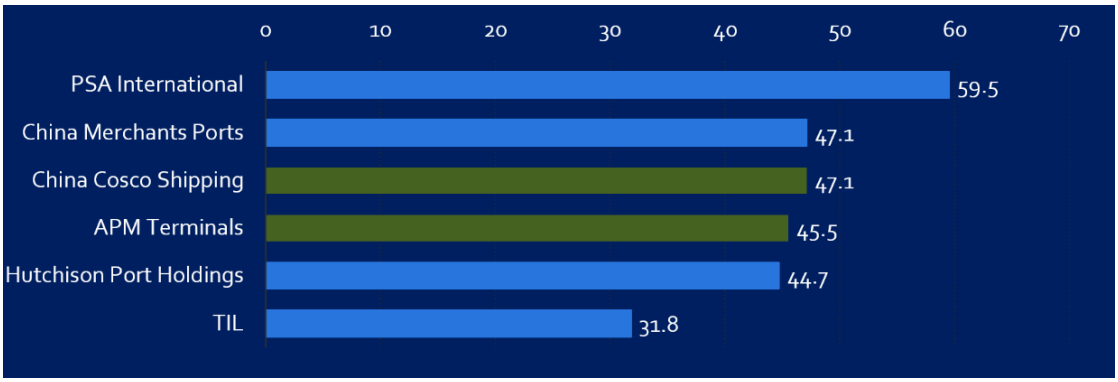


Source: Notteboom, Pallis & Rodrigue (2022)

Illustration 4: Horizontal integration to expand route networks

Source: Notteboom, Pallis & Rodrigue (2022)

Illustration 5: Major marine terminal operators worldwide in 2020, based on equity adjusted throughput (in million twenty-foot equivalent units)



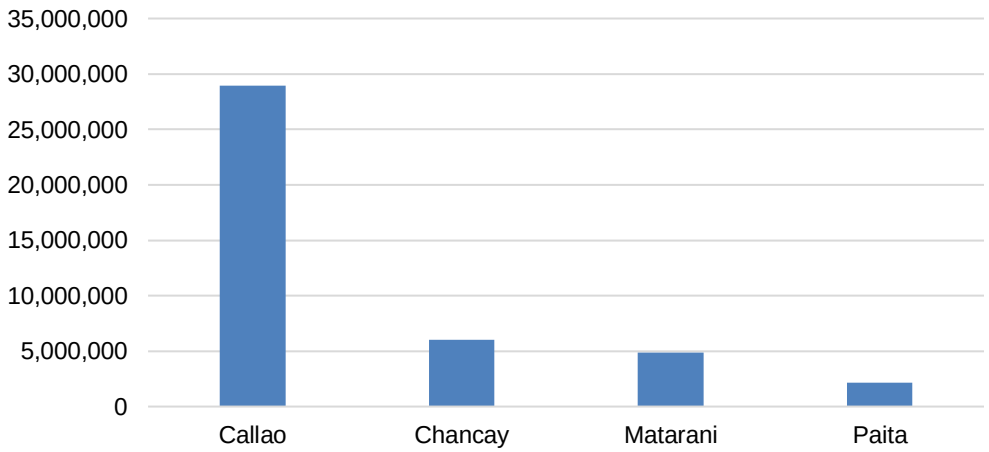
Source: Statista (2021)

2.1.3. A future mega port in the South Pacific

Based on Economic Commission for Latin America and the Caribbean (ECLAC) data, we can find the ranking of the largest container ports in the Latin American region, where the ports of Colon (Atlantic of Panama), Santos (Atlantic of Brazil), and Manzanillo (Pacific of Mexico) stand out for cargo volumes greater than 3 million TEU per year. There is a second group with the ports of Cartagena, Panama, Callao, and Guayaquil, which mobilize between 2.8 and 2 million TEUs. The next group has between 1.3 and 1.8 million TEUs. As the positions in the ranking of ports have remained stable over the last five years, the port of Chancay may be placed between the ports of San Antonio of Chile (1.6 million TEU) and the port of San Juan of Puerto Rico (1.4 million TEU) so that it will occupy the 11th position in the region.

Similarly, in the Peruvian port network, the port of Chancay will quickly stand out as the second-largest port in terms of container tonnage. Although it will not surpass the Callao port, it will be the second port in terms of bulk cargo, such as the port of Matarani, and the second port in terms of containers (Paita port). Thus, the Chancay port project will be a megaproject for both the region's and the country's port system.

Chart 1: Peruvian ports by cargo in metric tons, 2019



Fuente: Peruvian Foreign Trade Society (2019) - COMEX

Table 2: Major ports in the region by container cargo, 2018

	Country	Name of the Port or Port Zone	Throughput (TEU) 2018
1	Panama	Colón (MIT, Evergreen and Panama Port)	4,324,478
2	Brazil	Santos Port Zone	3,836,487
3	Mexico	Manzanillo, COL.	3,078,505
4	Colombia	Cartagena Bay	2,862,787
5	Panama	Panama Pacific	2,520,587
6	Peru	El Callao	2,340,657
7	Ecuador	Guayaquil (APG, private terminals)	2,064,281
8	Jamaica	Kingston	1,833,053
9	Argentina	Buenos Aires (Puerto Nuevo and Dock Sud)	1,797,955
10	Chile	San Antonio	1,660,832
11	Puerto Rico	San Juan	1,405,348
12	Colombia	Buenaventura	1,369,139
13	Dominican Republic	Caucedo	1,331,907
14	Mexico	Lázaro Cárdenas, MICH.	1,314,798
15	Costa Rica	Limón-Moin	1,187,760
16	Mexico	Veracruz, VER.	1,176,253

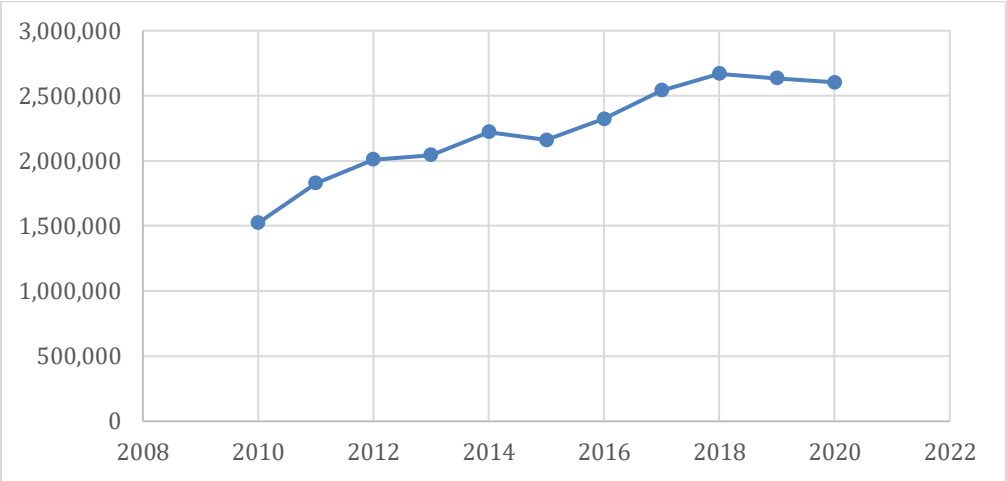
Source**:** Economic Commission for Latin America and the Caribbean (2019)

2.2. Progress in the Peruvian port network

The Chancay port project not only responds to the port operator consortium's objective but also to national needs. The following graph show a constant evolution of Peru's container port traffic from 2010 to 2020 when container demand doubled. The cargo concentration is in two ports that occupy the central part (Callao with 89%) and the north of the country (Paita with 8%). In the south, container cargo represents only 2%, with the port of Ilo standing out with 1% of the total.

Bulk cargo of solids has increased between 2010-2020 from 7.8 to 11.7 million metric tons with the participation of the ports of Callao, TP Salaverry, TP Matarani Sur, and TP San Martin. In the same period, the bulk mineral cargo increased from 16.7 to 27.9 million metric tons. The first ports were TP San Nicolas, TP Matarani Tirsur, TP Bayovar, TP Transportadora Callao, TP Huarmey. Unlike container cargo, which is concentrated in the north and center of the country, bulk cargo (solids and minerals) is diversified geographically. It indicates that maritime cargo responds to the different productive structures of the country where natural resources can be discovered throughout the country, but the highest value-added cargo is in the north and center part of the country where there is more agribusiness.

Chart 2: Evolution of Peruvian port traffic (in TEU)



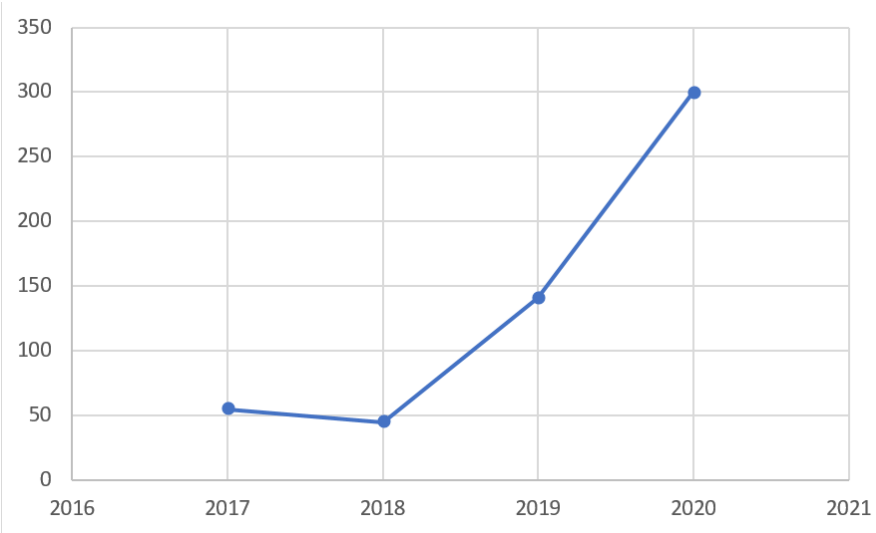
Source: World Bank (2020)

Table 3: Peruvian container ports 2010-20 (in metric tons)

Port	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Callao	11,148,321	15,947,283	19,012,212	18,280,393	20,428,460	19,092,671	18,995,246	21,927,161	22,807,924	23,239,752	23,052,167
Paita	**960,898**	**1,106,498**	**1,212,414**	**1,169,436**	**1,334,355**	**1,437,292**	**1,450,659**	**1,506,358**	**1,867,028**	**2,003,639**	**2,083,822**
Ilo	277,298	289,203	209,269	276,298	303,991	235,281	301,694	314,541	304,128	298,201	319,822
Matarani	**176,907**	**235,869**	**197,540**	**165,005**	**188,872**	**226,146**	**206,622**	**203,851**	**282,317**	**239,317**	**188,863**
Pisco	4,222	910	930	278	177	16,661	11,684	60,924	22,602	114,711	157,681
Total	**12,648,769**	**17,719,517**	**20,658,179**	**19,915,332**	**22,293,141**	**21,008,051**	**20,965,905**	**24,012,864**	**25,283,930**	**25,898,416**	**25,802,676**

Source: National Port Authority of Peru (2021)

Chart 3: Port investment evolution (in millions of dollars)



Source: Peruvian Foreign Trade Society (2020)

The increase in maritime cargo has been the result of port investments. Main container ports (Paita, Callao North Terminal, and Callao South Terminal) have received important inversions in the last decade. Moreover, with the Salaverry terminal, 200 million will be invested by 2021, as assured by the Ministry of Transportation. In addition to allowing logistic improvements, these investments have an impact on the country's competitiveness. In the national infrastructure plan, ports are included as part of the components to improve the country's competitiveness.

2.3. The Chancay port in the Latin American port network

In the year before the pandemic, Economic Commission for Latin America and the Caribbean (2019) presented its ranking of the top Latin American ports according to container cargo (TEU) and ranked Callao in sixth place. Under the same metric, the top countries are Panama (Colon/Cristobal and Balboa/Rodman), Mexico (Lazaro Cardenas and Manzanillo), Colombia (Cartagena). Another relevant data from Economic Commission for Latin America and the Caribbean to understand the operation of the American ports is the amount of TEUs that each port puts in transshipment. With this data, it was considered that those ports that transship more than 50% of their cargo follow the "hub port" model by functioning mainly as a bridge to carry cargo to other destinations. Those that receive a lower percentage of transshipment serve their "hinterland" for export or as a reception of inputs for production and consumption.

Among the five mayor ports in Latin America, three have a hub function (Colon/Cristobal and Balboa/Rodman and Cartagena). In addition, there are two more hub ports in the Caribbean (Freeport and Kingston), and they are smaller than Callao. This hub role has a significant geographic component as it places them on international maritime routes linking the Pacific with the Atlantic for trade with Asia, the two coasts of the United States and Europe.

With respect to the ports that favor the hinterlands, most of the ports in the region are Manzanillo and Santos as the ports with the most capacity. Likewise, in the Latin American Pacific, all ports mainly seek foreign trade from their hinterlands. Thus, there is a regional behavior of using ports to integrate into international trade, which means that if exportable production increases, there will be a greater demand for services and logistics infrastructure such as shipping routes and ports.

Another relevant point in the analysis is the volume of transshipment cargo, as it allows us to understand that Latin American ports not only respond to domestic needs to reach international markets. In Latin American, in addition to the five hub ports, the ports of Manzanillo (Mexico) and Santos (Brazil) transship large volumes with close to 1 million TEU each. The following four hinterland ports also transship relatively small quantities, but still significant amounts between 581 thousand TEU (Caucedo) and 477 thousand TEU (Callao).

The port of Balboa/Rodman (2.6 million TEU) has main hub functions. But, geographically, on the Pacific coast of Latin America, significant transshipment volumes are found in four other ports: Manzanillo (1.1 million TEU), Callao (477 thousand TEU), Lázaro Cárdenas (397 thousand TEU) and Buenaventura (370 thousand TEU). As we will see later, since the Mexican and Panamanian ports belong to nodes on the route to Asia, this favors them in their role as hubs for South American countries on the transpacific way.

Map 1: Main Latin American ports by container cargo and hub or hinterland function

Source: Own elaboration based on Economic Commission for Latin America and the Caribbean (2019)

Note 1: Green circles represent hub port models, yellow circles represent hinterland port models.
Note 2: There are three circle sizes according to container cargo: larger (greater than 2.4 million TEU), medium (between 1.4 and 2.3 million TEU) and small (between 800 thousand and 1.3 million TEU).
Note 3: The dots represent cities according to their size. In red, the cities with more than 10 million people, in orange between 3 and 7 million, in shaded pink between 3 and 1 million; and in pink less than 1 million people.

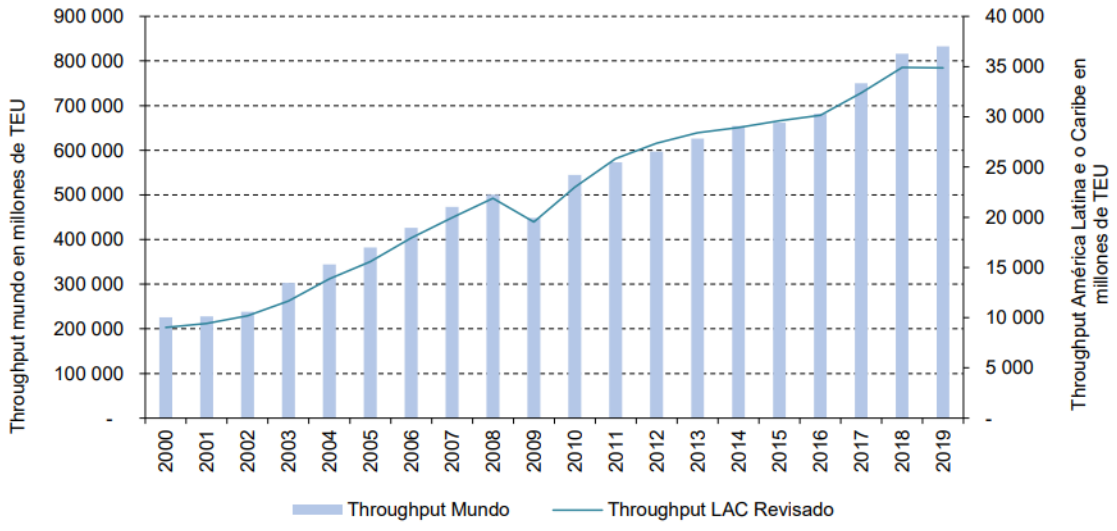
Table 4: Top 10 ports by transshipment volume in Latin America 2019

Ranking	Country	Port	Transshipment (TEU)
1	Panamá	Colón/Cristóbal/Manzanillo (Caribe)	3,804,511
2	Panamá	Balboa/Rodman (Pacific)	2,600,683
3	Colombia	Cartagena Gulf	2,118,642
4	Bahamas	Freeport	1,354,671
5	Jamaica	Kingston	1,319,760
6	México	Manzanillo	1,103,098
7	Brasil	Santos	1,093,440
8	República Dominicana	Caucedo	581,795
9	Brasil	Manaus Port Zone	512,795
10	Brasil	Suape	499,800

Source: Economic Commission for Latin America and the Caribbean (2019).

Although transshipment cargoes in the South Pacific have a lower volume, given the growth of trade in the region, there would be room to increase transshipment to a Peruvian or Colombian port. Indeed, the evidence indicates that the Latin American port network moves with the global logistics pattern of growing container traffic. There is a clear trend in our region to increase trade via containers which leads to the demand for more efficient shipping services, and this precisely has to do with shipping routes that make transshipments.

Chart 4: Evolution of container cargo in the world and Latin America

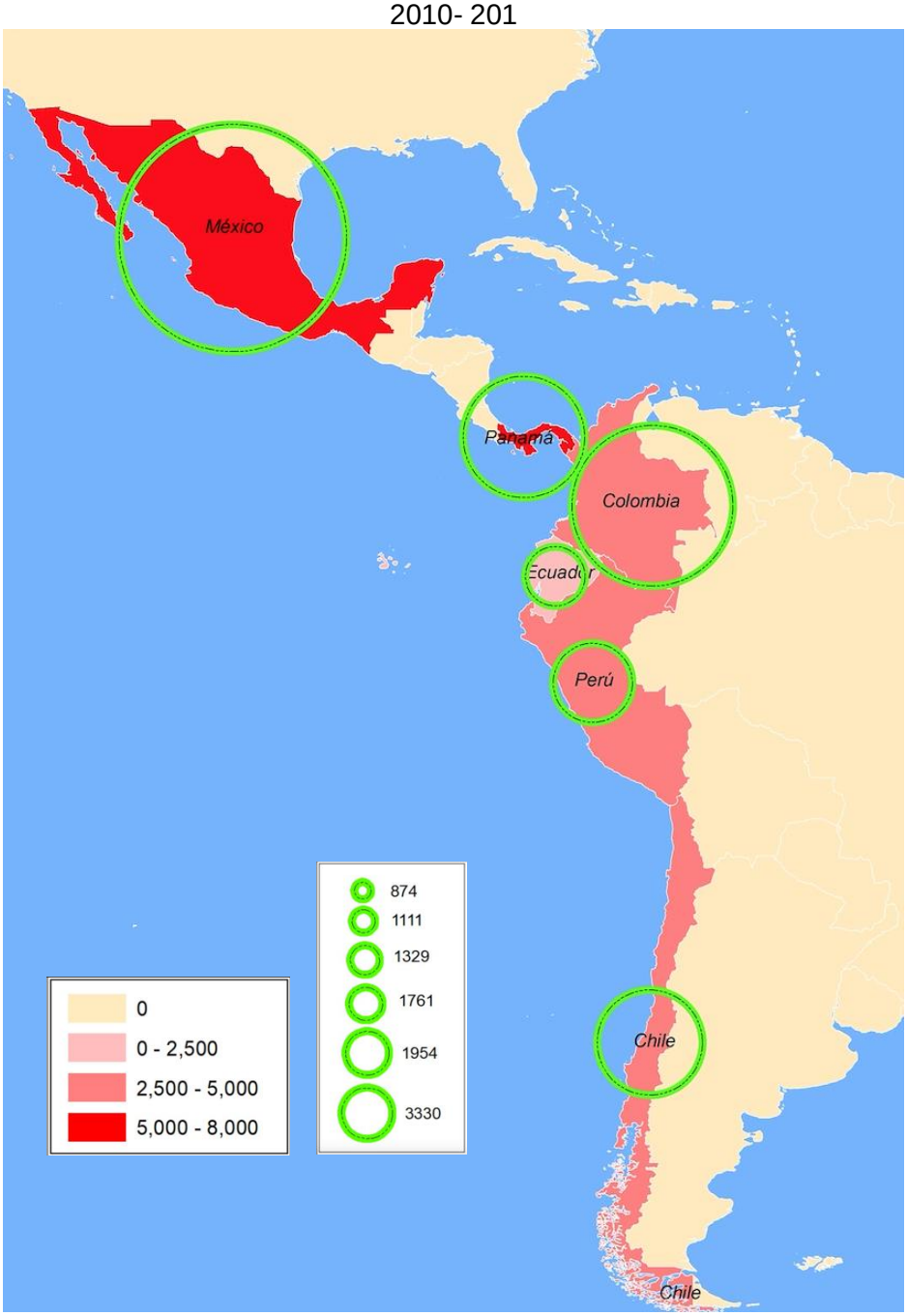


Source: Sánchez & Sánchez (2020).

Over the last ten years, there has been an increase in marine traffic in the countries of the West Pacific coast. Latin American countries positioning themselves as transpacific hubs like Mexico and Panama are the ones with the significant increase in the last decade. In the case of Mexico, the increase in those years was 3.3 million TEUs, and in Panama, the rise was 1.7 million TEUs. Likewise, in the south, Peru's neighboring

countries (Colombia, Ecuador, and Chile) accumulated 4.2 million TEU overall growth. In the Peruvian case, the increase was 1.1 million TEU. With a capacity of 1.5 million TEU and designed for a draft of 16 meters, Chancay port will help the South Pacific port network meet the increased container traffic demand. Also, this port will fit with the global trend of more cost-efficient shipping services that use long-distance routes, with the last generation of vessels able to transport more than 15,000 TEU.

Map 2: Change in Maritime container traffic (TEU: 20-foot equivalent units) between 2010- 201



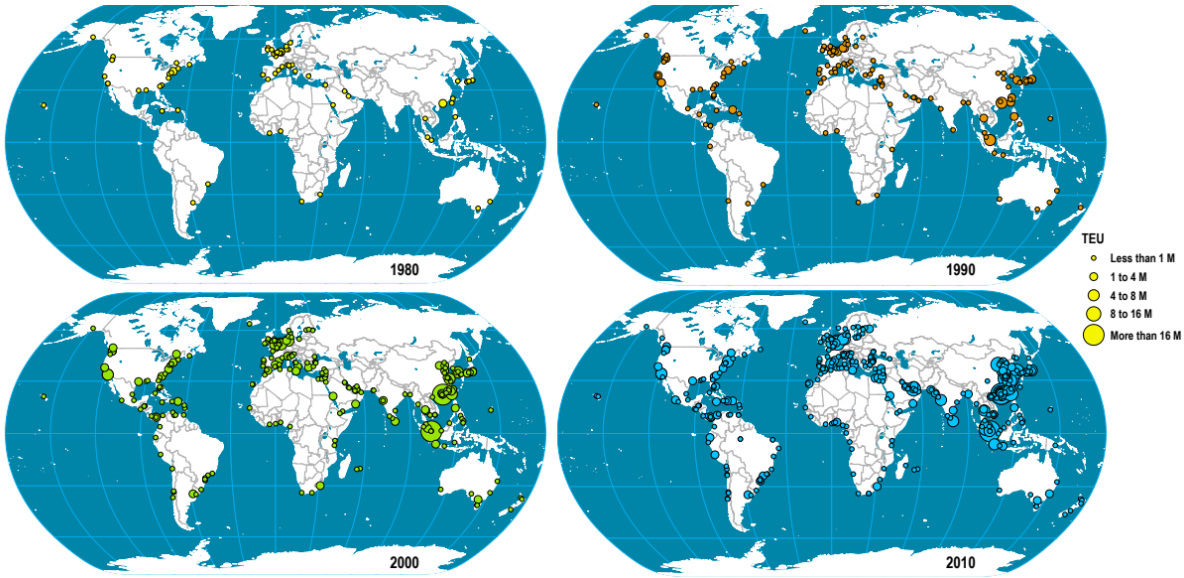
Source: Own elaboration based on United Nations Conference on Trade and Development (UNCTAD) data (n.d.)

Technical note 1: The colors of the Pacific countries depict the cargo in thousand TEU in 2019.
Technical note 12: The green circles depict the change between cargo in thousand TEU between 2010 and 2019.

2.4. Transpacific ship routes in the global logistics system

In the 1980s, the first stage of the intensive use of containers in international trade began in most industrialized countries. As a result, containers started in the most industrialized countries. Meanwhile, in the previous decade, the use of containers has been consolidated worldwide (Guerrero & Rodrigue, 2014). This change in the type of cargo has demanded an adjustment in port infrastructures to provide efficient handling according to the new logistics business model where "real-time" and "last mile" deliveries are relevant parts of this model. In the case of Peru, since the nineties, the containerization process has been overgrown, achieving a leadership level in the South Pacific.

Map 3: Evolution of container ports: 1980-2010



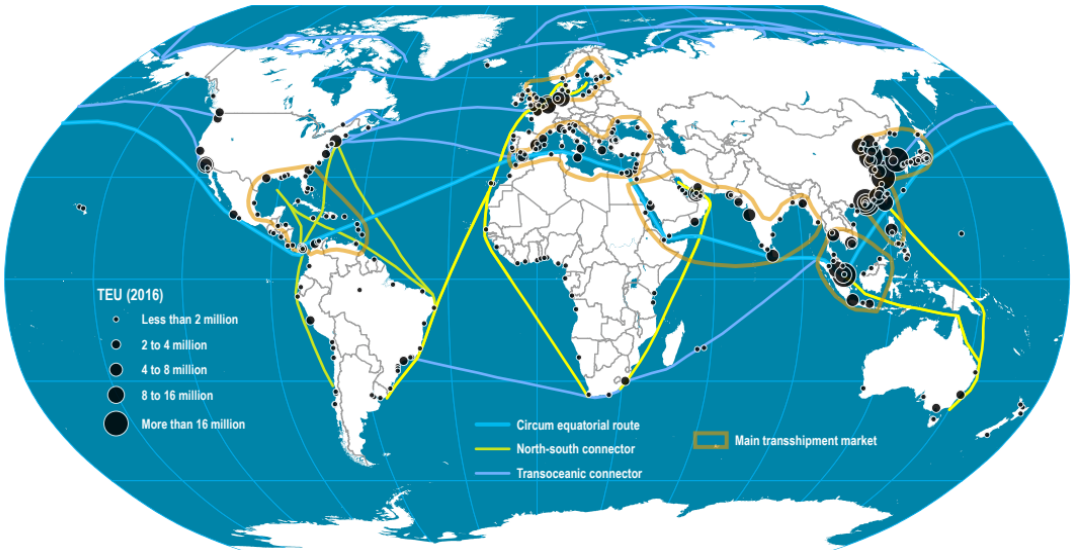
Source: Guerrero & Rodrigue (2014)

This port network has made possible a change in the world's maritime routes, which organize themselves into four major world routes. First, the circum-equatorial way links North America, Europe, and Asia through the Panama Canal, the Suez Canal, and the Straits of Malacca. The second route, the transoceanic way, links North America, Europe, and Asia mainly through the boreal part. The third route, the north-south connector, exists in all the continents to connect south countries with those of the north or with either of the two previously mentioned ways to reach the markets of other continents. Finally, the main transshipment market route in the four continents is run by those ships that seek to make global routes. Therefore, the new maritime geography is configured with international naval routes and regions with ports according to their capacity to receive containers.

This increased dependence on container ships has led prominent shipping companies to vertical and horizontal integration strategies. As a result, the top ten global terminal operators have increased their cargo handled from 168.3 million TEU in 2005 to 327.2 million TEU in 2019 (The Economic and Social Commission for Asia and the Pacific; 2021). Along with the increased port cargo, Asian ports have increased their global share from 71.5% in 2005 to 76.3% in 2020. Other maritime ports have dropped from 28.5% to 23.7%. COSCO's sharp increase in the port industry has been one of the largest, growing

from 8.1 million TEU to 46.1 million TEU in the same period, which allows it to occupy third place in the world.

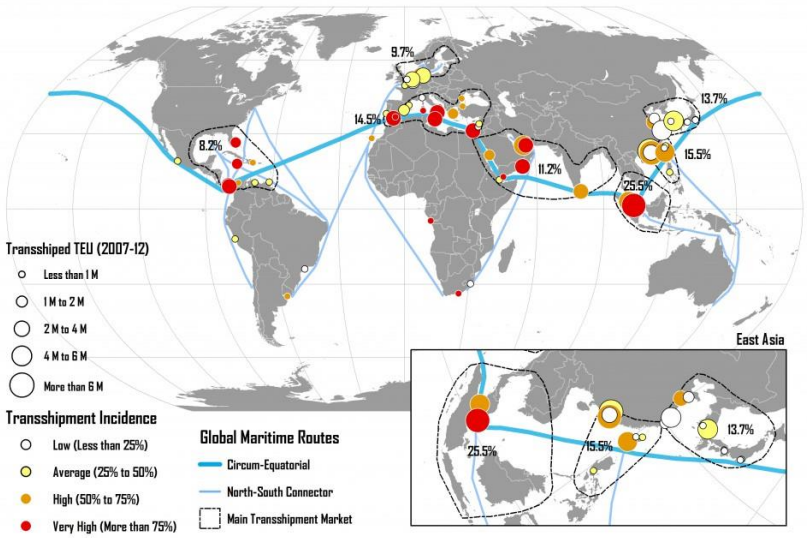
Map 4: Global maritime system and its routes by container cargo



Source: Notteboom, Pallis & Rodrigue (2022)

The role of cargo transshipment services has been central to this increase in maritime cargo traffic. It allows container ships to reach global routes to the southern meridians with little participation in international trade in previous decades or to regions of Africa and Asia that have recently joined the global economy. In this new geography, seven major transshipment zones have been formed: 1 in America, 1 in Europe, 3 in Asia, and two inter-continentals for European-African and African-Asian corridors. At the same time, it is worth noting that in the Pacific basin, 2 of these zones belong to the Asian continent, which accounts for the most significant proportion of the world's transshipment (13.7% and 15.5%). On the American continent, there is no central zone in the global transshipment on either the Atlantic or Pacific coasts.

Map 5: Main transshipment zones in the global logistics network



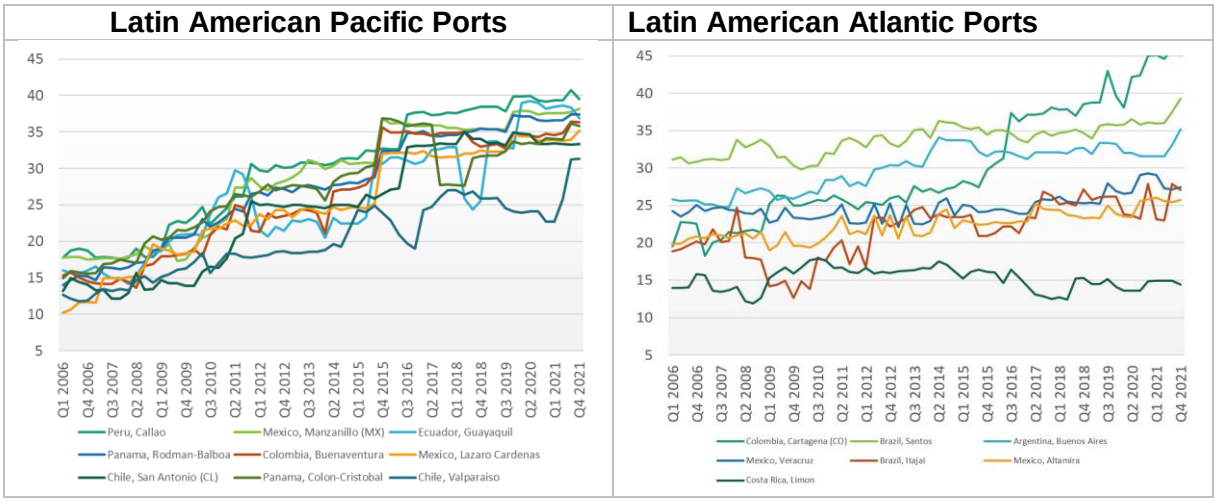
Source: Notteboom, Pallis & Rodrigue (2022)

I In line with the analysis of cargo transshipment, Callao has a relatively well-positioned role in the maritime transport system as it is the only Latin American port in the South Pacific (together with Manzanillo in North-America) with an "average" transshipment incidence. We will explore in the following sections how the global logic of the Belt of Road Initiative could boost the transpacific corridor based on their aspirations of restructuring the Chinese economy and the emerging opportunities of renewing the economic relationship with China based on the improvement of the connectivity and logistic infrastructure (Santa Gadea, 2019). As the analysis of this study is not static, in the following chapter, we will explore the connectivity of the ports in our Latin American region, which gives a framework to understand the role of the future port of Chancay.

2.5. Maritime Competitiveness Index of Latin American ports

Using the Maritime Connectivity Index conducted by the United Nations Conference on Trade and Development (UNCTAD), it is possible to have a parameter of the capacity of a country's ports for 20-foot container transport by sea. This analysis was conducted between 2016 and 2021 for the main ports in Latin America. Different trends are in evidence depending on the location of the ports. A continuous growth from low levels in 2006 is found for all Pacific ports, while the Atlantic ports are less pronounced in the same years. It shows that the Pacific ports have regained growth.

Chart 5: Maritime competitiveness index of ports



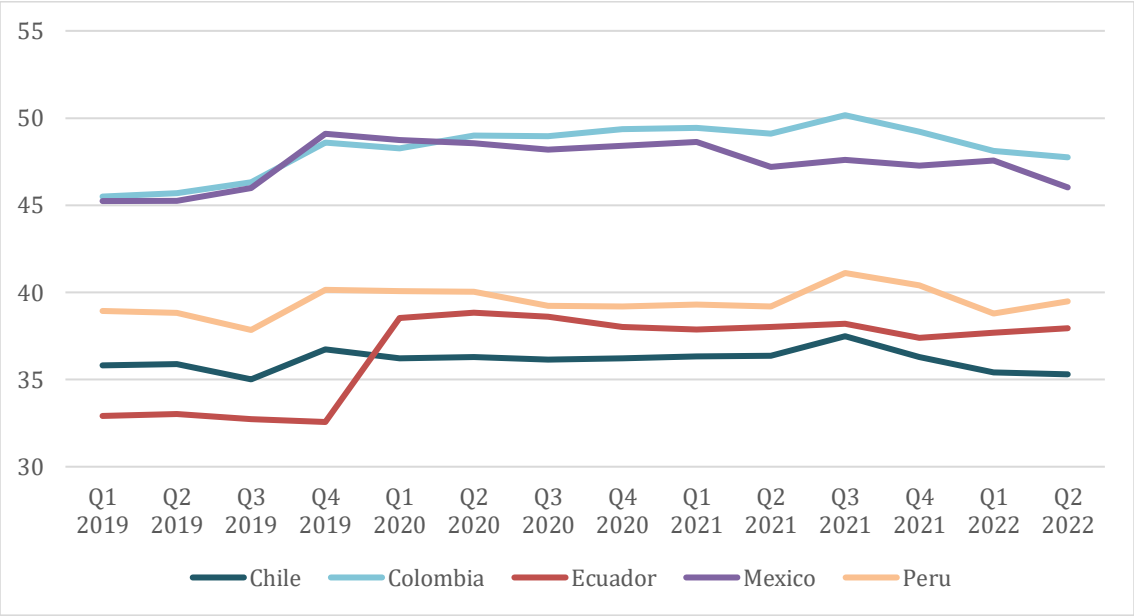
Source: United Nations Conference on Trade and Development (n.d.)

Adding the maritime competitiveness index of ports to the Maritime competitiveness index of countries confirms the leading role of the Peruvian port network at the national level. This advantage, under certain conditions, would allow the new port of Chancay to attract shipping lines of the "north-south connector" route to reach the "circum-equatorial route" with the port of Manzanillo or the "transshipment market" route through Panamanian ports.

This favorable index does not guarantee the arrival of more new ship routes, but it is in line with the reduction of costs and times from Peruvian ports that would gain competitiveness. The new direct ship routes will allow further progress in this direction, for which the business model of the port operator of Chancay, being integrated into one of the leading shipping companies, is another strength. However, it is also necessary to

evaluate the port's cargo capacity as a part of the hinterland, which will be discussed in depth in the following section.

Chart 6: Maritime competitiveness index of the main countries in the region



Source: United Nations Conference on Trade and Development (n.d.)

3. A hinterland with very competitive resources

Narrea and Martínez (2021) evaluated the territory within 500 kilometers of the Chancay port to explore its hinterland. This analysis involved the regions of La Libertad, Ancash, Lima, Huánuco, Pasco, Junín, and part of San Martín, Loreto, and Ucayali. They also highlighted the existence of economic corridors with high production levels and a wide diversity of productive chains.

Thus, the Chancay-Oyón-Pucallpa corridor is a multipurpose interregional corridor. The first segment is mining (Chancay-Oyón), and the second is forestry-agricultural production (Oyón-Pucallpa). Similarly, the production of the Bellavista-Mariscal Caceres cluster, located in the San Martin region, could stop using the port of Paita and be integrated into the Chancay-Pucallpa corridor by strengthening the Tingo Maria logistics node, which will facilitate access to the new port.

In the analysis presented below, productive strengths have been identified in the hinterland of the port of Chancay, focused mainly on agriculture, timber and trade. The economic corridors are production value chains integrated into the international economy, such as avocados. That is important because it would allow the development of the port of Chancay to consolidate its production growth. It would also strengthen regional development by providing families with income for their investments in human capital and companies with access to financing.

Based on the economic corridors, the Chancay port's hinterland is explored. This section shows the hinterland's productive resources and technical and productive capacities. First, the effective chains strengthened by the seaport of Chancay are presented.

Second, it identifies the human capital available in the hinterland to boost the quality of export products. Third, the area's environmental status is shown to understand the impact of productive activity. Likewise, to conclude with the analysis of productive clusters for the transformation of primary products, emphasis is placed on the state of the leading industrial parks promoted by the form located in the hinterland.

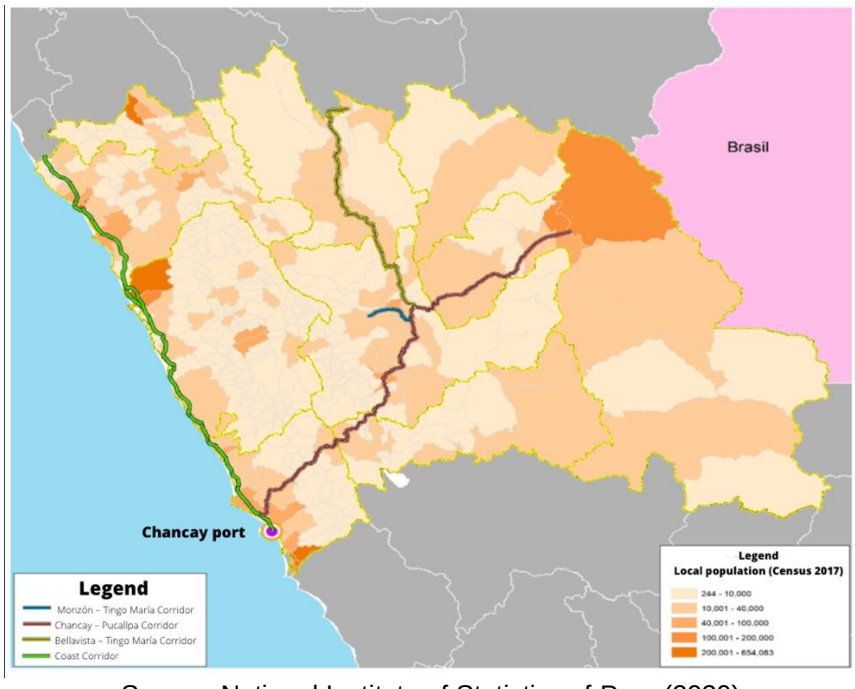
3.1. International value chains in the hinterland

The exploration carried out by Narrea & Martinez (2021) identified two relevant economic corridors for the port of Chancay: Chancay-Oyón-Pucallpa and the Bellavista-Mariscal Cáceres corridor. In addition, this project offers more information on export markets to delve deeper into the economic corridors.

In addition, this research identifies a third economic corridor that includes the Pan-American Highway North, which connects Chancay with northern Peru to the province of Chepén, in La Libertad. Also, the Monzón-Tingo María corridor is rescued, considering that the Bellavista-Mariscal Cáceres corridor connects with the Chancay-Oyón-Pucallpa corridor. The latter corridor connects the prominent coffee and cacao production centers with the processing centers located in the Chancay-Pucallpa corridor.

Thus, the analysis of economic corridors in the hinterland of the port of Chancay shows the connectivity opportunities the territory offers for the linkage of production chains promoted by exports through the Chancay Port.

Map 6: Map of the economic corridors of the Hinterland of the Port of Chancay



Source: National Institute of Statistics of Peru (2020)

On the other hand, the accelerated growth of the agricultural and timber sectors in exports in recent years at the national level is an opportunity to increase employment in the hinterland because these sectors are labor-intensive. For example, in the jungle regions, there was greater dynamism in the timber sector because Pucallpa is a hub for developing this industry. Similarly, the cacao and coffee chains have seen increased

production and exports of these products. Considering the production report by the province prepared by MIDAGRI, the analysis of the hinterland's potential prioritizes agricultural and livestock export products included in the Regional Export Plans of the hinterland's regions.

Table 5: Economic Corridors in the Port Hinterland

Economic Corridor	**Province**	**Region**	**Distance (km)**	**Time (hrs)**
Coast Corridor	Barranca, Huaura, Huaral, Canta, Casma, Santa, Huarmey, Virú, Chepen, Pacasmayo, Trujillo and Ascope	Lima, Ancash, La Libertad	480	7hr 30 min
Chancay – Pucallpa Corridor	Leoncio Prado, Padre Abad, Coronel Portillo, Huaral, Huánuco, Dos de Mayo, Daniel Alcides Carrión	Lima, Pasco, Huánuco, Ucayali	739	16hr 22 min
Monzón – Tingo María Corridor	Dos de mayo and Huamalíes	Huánuco	69	1hr 30 min
Bellavista – Tingo María Corridor	Leoncio Prado, Bellavista and Tocache	Huánuco and San Martin	381	7hr 10 min

Three relevant hinterland production nodes were identified, considering the competitive provinces, and understood as those with a productive yield per hectare higher than the national average and a share in national production higher than 1%. The eastern production node involves all the provinces of the jungle region, such as Ucayali; the jungle provinces of Huanuco; and part of the San Martin regions. The central production node mainly includes the departments of Pasco and Huanuco. Finally, the coastal production node consists of the regions of Lima, Ancash, La Libertad, and part of Cajamarca. The production of each production node is detailed as follows.

- The production node in the east has a high potential in the production of timber, coffee, cocoa, and avocado. In particular, the provinces of Tocache and Padre Abad have a competitive level in the production of coffee and cocoa, which is a reference for the product sector. Likewise, it is a strength that will complement the performance of the surrounding territories.

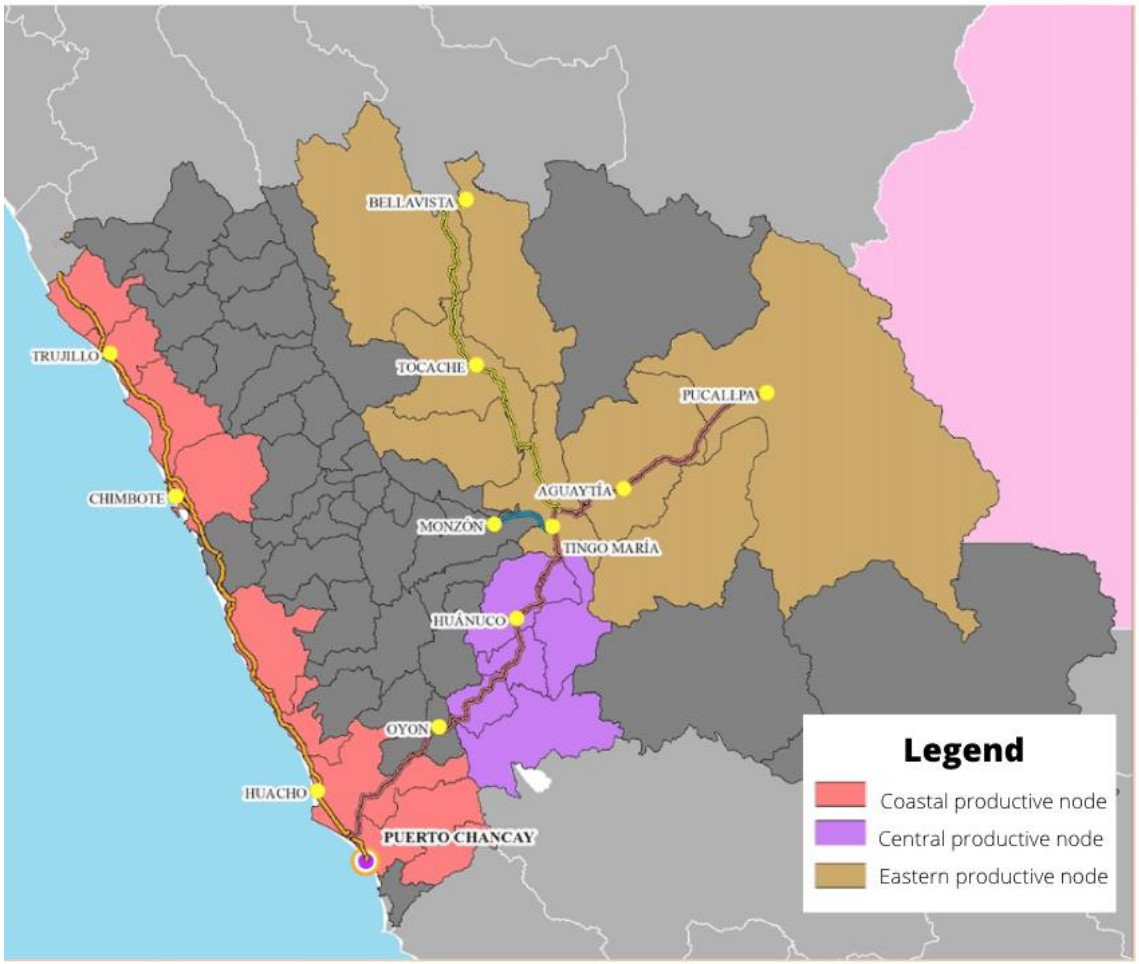
- In the central productive node, which includes the provinces of Huánuco and Pasco, the production of aguaymanto is a highly exportable product. The area accounted for more than 50% of total output in 2019, with the port of Chancay being an alternative to expedite the export process.

- The Pacific coast productive node stands out for the high production of export referent products. Viru, a province with high national competitiveness, is a reference for developing this effective node.

In the hinterland, there are economic corridors and production organized in production chains where Peru plays a leading role in the world export market, such as avocado, where Peru is the second largest exporter worldwide. The leadership in the world production of these chains responds to the volume of its production and territorial strategies where its links are highly productive. Furthermore, according to clustering and agglomeration economies (see the following diagram as an example), a competitive business environment exists when production nodes are connected to collection centers

that allow processing plants to exploit their installed capacity. Likewise, this competitive climate allows good accessibility to storage centers before entry to ports or market outlets. The following lines analyze essential production chains in the hinterland to see the state of their links and thus define their preparedness to take advantage of the accessibility to the Asian market that the future port of Chancay will allow.

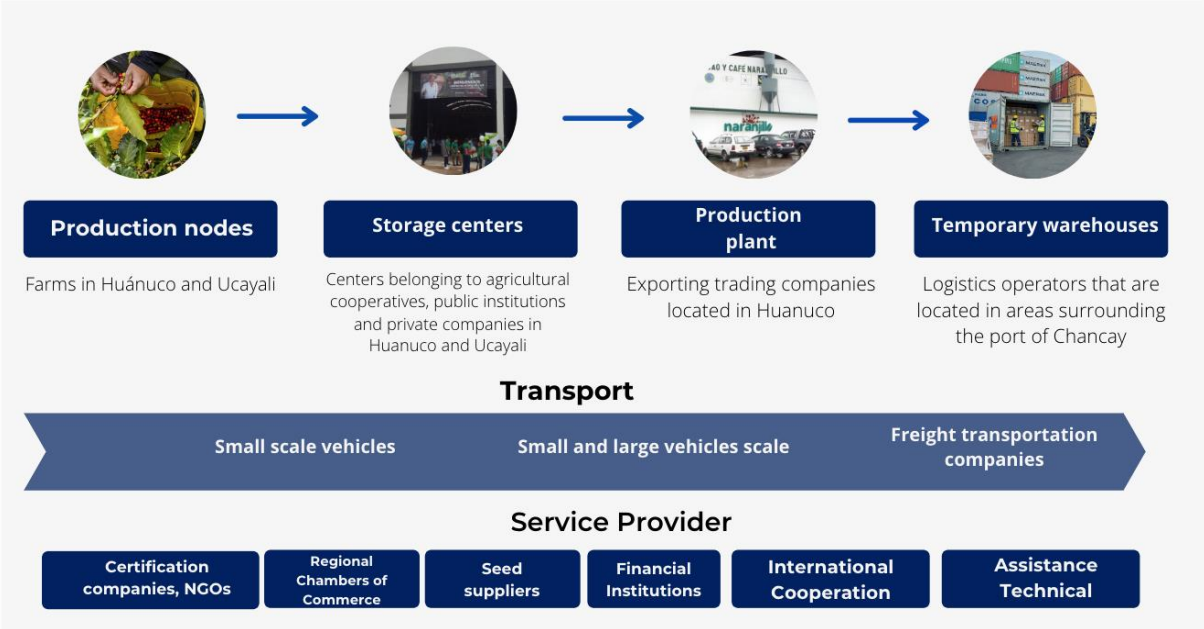
Map 7: Productive nodes in the hinterland of the Chancay Port



Source: Own Elaboration

In the hinterland, there are not only economic corridors, but also production organized in production chains where Peru plays a leading role in the world export market, such as avocado, where Peru is the second largest exporter worldwide. The leadership in world production of these chains responds not only to the volume of its production but also to territorial strategies where its links are highly productive. According to clustering and agglomeration economies (see the following diagram as an example), a competitive business environment exists when production nodes are connected to collection centers that allow processing plants to exploit their installed capacity. Likewise, this competitive climate allows favorable accessibility to storage centers prior to entry to ports or market outlets. The following lines analyze the most important production chains in the hinterland to see the state of their links and thus define their state of preparedness to take advantage of the accessibility to the Asian market that the future port of Chancay will allow.

Illustration 5: Coffee value chain



Source: Ministry of Transportation and Communications (2016), World Bank (2016).

3.1.1. Avocado value chain[2]

At the international level, Peru is the third largest avocado producer in the world, concentrating 7% of production for 2019 (+9% compared to 2015). However, its yield in the year under study (12.52 ton/ha) was 18% higher than that of Mexico, the world's leading avocado producer. That situation put Peru at the international level, considering that its export season (May and June) is complementary to Mexico's production and shows sustained growth in output over the last six years.

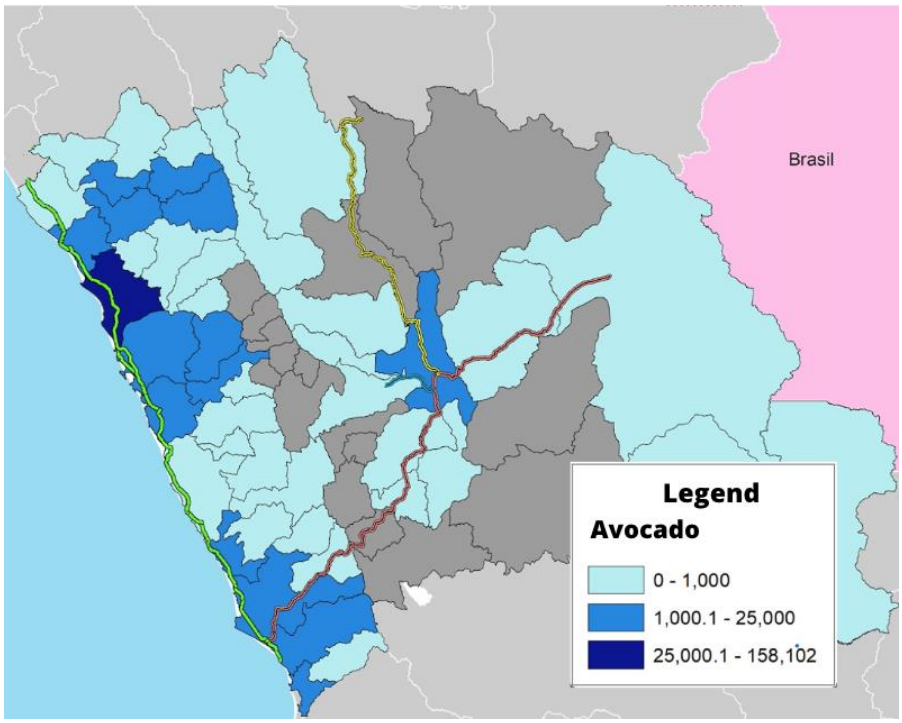
Likewise, Peruvian exports of this product reached 247 thousand tons in 2019, which represented a growth of 27% over the previous year, and 12% of the total exported in the world in 2019. Of this total, two of the central exporting regions - La Libertad, with 30% of total national exports, and Lima, with 29% - are part of the hinterland.

Hinterland departments concentrated 54% of production in 2019. The northern node of the hinterland includes the provinces of Lima, Ancash, and La Libertad, which represent 52.8% of the total produced in the country in 2019. In that area, Viru stands out, which accounted for about 30% of the national production in that year. In the central node, San Martin, Huanuco, and Ucayali regions are located with a total output of 1%. In this sense, the competitiveness of the hinterland in this product is concentrated in the cost of production, which is also focused on the export of the Hass avocado.

Sociedad Agrícola Drokasa exported US$60 million; Agrícola Cerro Prieto, US$ 54 million; Avocado Packing Company, US$ 43 million; and Consorcio de Productores de Fruta S.A., U.S. $36 million. It is essential to note the diversification of this group of companies in exports since they are also engaged in marketing blueberries and other agricultural products.

[2] The world production data mentioned in the supply chain analysis are based on information provided by FAO. Export data were provided by SUNAT and domestic production by MIDAGRI.

Map 8: Avocado production in the hinterland of the Port of Chancay



Source: Peruvian Ministry of Agrarian Development and Water Irrigation (2020)

According to the study of Logistics Chains prepared by the MTC, storage centers in La Libertad and Lima in the hinterland make the avocado export chain more dynamic. In terms of export processing areas, there are packing houses in Lima and Trujillo that are responsible for sorting, packing, and storage for the shipment of the product to the port of Callao or Salaverry. In this sense, in the avocado production chain in the hinterland of the Port of Chancay, one challenge is to improve agricultural productivity in the coastal area by including more medium-sized exporters, taking as a starting point the strength offered by its proximity to consolidated companies.

3.1.2. Blueberry value chain

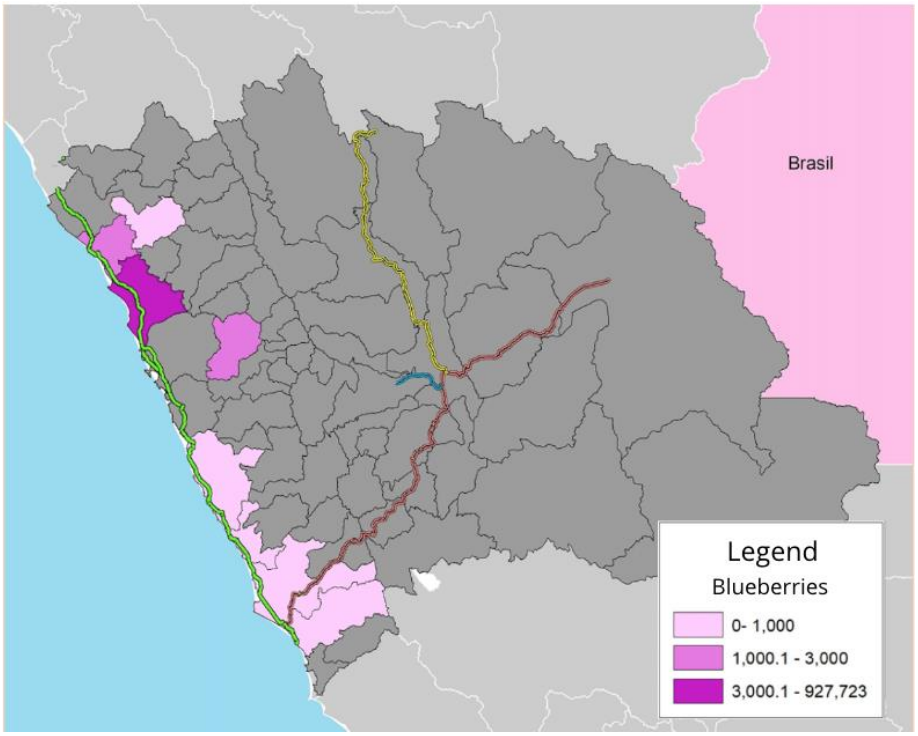
Peru is the third largest blueberry producer in the world, concentrating 17% of production for 2019 (+50% than 2018), and its yield in the year under study (16.75 tons/ha) has been 125% higher than that of the USA, the principal blueberry producer in the world. This product, like avocado, positions Peru strategically internationally, considering that this superfood has accelerated growth in the last six years. Likewise, Peruvian exports reached approximately 122 thousand tons in 2019, representing a growth of 69% over the previous year and 18% of the total exported worldwide in 2019. Of this total, the essential region - La Libertad, with 67% of total national exports - is part of the hinterland.

The blueberry production chain is focused on the production centers located in the coastal area and is traded in the international market via the port of Callao. The leading blueberry agro exporters located in the hinterland were also identified. Camposol exported US$182 million; Hortifrut - Perú, US 101 million; and Agrícola Santa Azul, US 52 million. These companies are also engaged in the marketing of other agricultural products.

Regarding the representativeness of production to the country's total, Virú, province of La Libertad, has concentrated almost 75% of the total production with a yield (ton/hectare) higher than the national average in 2019. The whole production is concentrated between September and December.

The companies have production complexes in La Libertad, Lima, Ica, etc. At this stage, the products are harvested and taken to a nearby processing center. Next, the product is cleaned, sorted, packaged, and palletized. Then, since most of the product is destined for export, it is taken to temporary warehouses next to the port of Callao for export by sea. Thus, the Chancay port would have advantages in terms of distance and cost over the port of Callao for exporting this product.

Map 9: Blueberry production in the hinterland of the Port of Chancay (tons)[3]



Source: Peruvian Ministry of Agrarian Development and Water Irrigation (2020)

3.1.3. Coffee value chain

Internationally, Peru is the seventh largest coffee producer in the world, concentrating 3.6% of production for 2019 (-2% than 2018), and its yield in the year under study (1.01 ton/ha) has been only 3% lower than its Colombian peer which is the leading regional competitor. Likewise, between 2015 and 2019, national production grew by 44%, representing an opportunity supported by the increase in specialty coffee production. Similarly, Peruvian exports of this product reached approximately 227 thousand tons in 2019, which represented a growth of 12% over the previous year, and 2.5% of the total exported worldwide in 2019. Of this total, the second exporting region - Lima, with 24% of total national exports - is part of the hinterland. This situation is particular to the production chain since Lima is not a coffee producer. However, the companies that

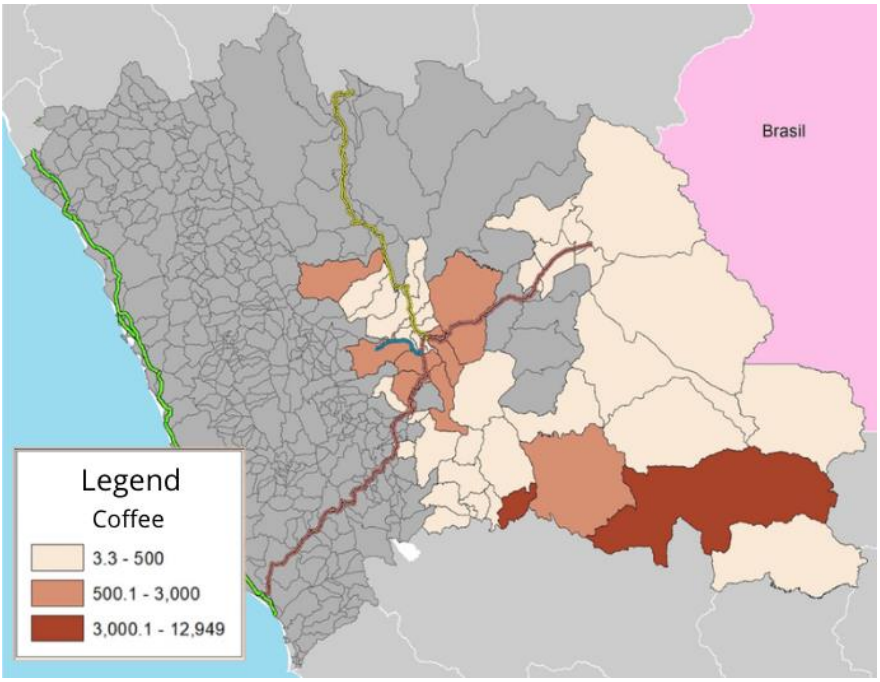
[3] The analysis of coffee production in the hinterland of the port of Chancay was carried out at the district level.

collect and export coffee are located in the Peruvian capital, which would explain this situation.

The leading coffee traders located in the hinterland were identified. Procesadora del Sur exported USD 49.6 million; Perales Huancaruna, USD 40 million; OLAM Agro, US 29 million; and Cooperativa Agraria Cafetalera Alto Mayo, USD 11 million. The latter company is a reflection of the characteristics of this chain, whose leading producers are coffee growers' cooperatives.

The coffee-growing areas in the area of influence of the port of Chancay can be divided into two productive sectors. In the central node are the San Martin, Huanuco, and Ucayali departments, which will account for 10% of the country's total production in 2019. In this cluster, the average yield is lower than the national average, mainly explained by the low productivity of the province of Leoncio Prado. Despite this, the San Martin region shows a higher yield that could contribute to the improvement of the neighboring regions. In this sense, the joint development of this productive node is an opportunity for the interregional growth of the product.

Map 10: Coffee production in the hinterland of the Chancay Port (in tons) [4]



Source: Peruvian Ministry of Agrarian Development and Water Irrigation (2020)

In the hinterland, vital collection centers provide the chain dynamically and facilitate income for coffee growers. There are also processing plants in Tingo María that provide added value. Adding the processing plants in San Martin would create a chain that evolves towards external markets.

The export companies and cooperatives in charge of the collection provide technical and technological assistance services to growers and carry out the necessary procedures for phytosanitary certification of the plots. Similarly, the processing plants are in charge of bagging and transformation, roasting, roasting, and grinding -when the final product is instant coffee or its derivatives-. Likewise, the exporting companies and plant owners are

[4] The analysis of coffee production in the hinterland of the port of Chancay was carried out at the district level.

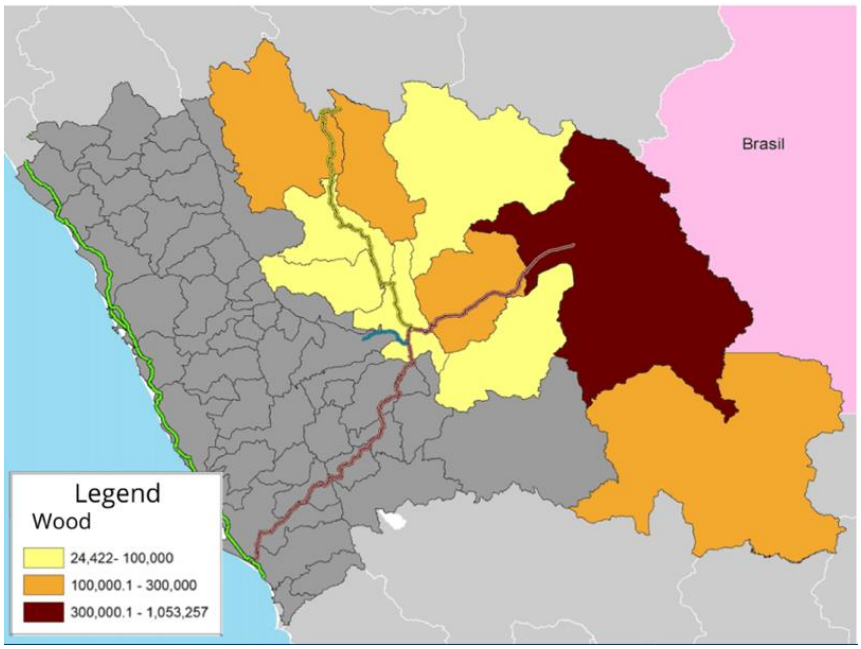
responsible for obtaining the necessary phytosanitary certificates to export the product. In the case of organic products, exporting companies hire specialized companies that provide credentials for good agricultural practices, social responsibility with farmers, and complimentary coffee certifications.

One challenge now is to improve the road infrastructure that connects the producing districts to the collection center in the hinterland, as it is in fair condition. For example, in the Tingo Maria and Bellavista corridor, the road networks that connect the production zones with the collection centers are in fair or poor condition.

3.1.4. Wood production value chain

Ucayali is located in the hinterland of the port of Chancay and is the largest timber center in the Peruvian Amazon because of its geographic location in the center of the Peruvian jungle and because it has the Federico Basadre highway, the main road connecting the jungle and the coast. The wood from this region reaches the industrial zones of Lima in charge of the second transformation.

Map 11: Wood production in the hinterland of the Port of Chancay (in tons) [5]



Source: Peruvian Ministry of Agrarian Development and Water Irrigation (2020)

The production chain begins with plantation forest management. The woods can be extracted from forests, concessions, communities, and producers. In the hinterland of the port of Chancay, the principal supplier is the province of Coronel Portillo, which had a production of just over 1 million tons, accounting for 36.7% of total Peruvian output in 2019. Wood is transported by river or road to the main cities where the companies dedicated to the first and second transformations are located. Pucallpa, the departmental capital of Ucayali, stands out as one of the leading wood development hubs in the jungle. For example, wood from Bajo Ucayali is marketed to other intermediaries or transported to their warehouses in Pucallpa and Lima for direct sale to end buyers who manufacture

[5] The analysis of wood production in the hinterland of the port of Chancay was conducted at the district level.

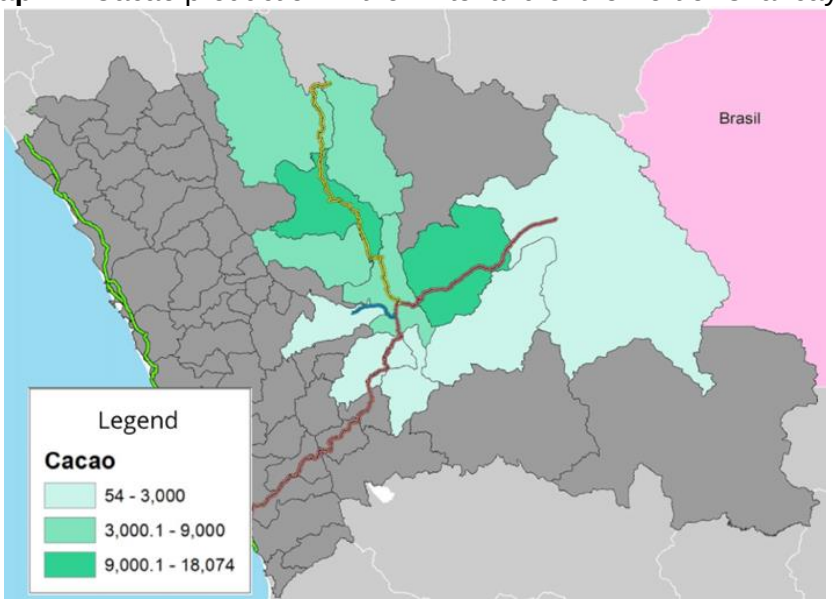
flooring in Pucallpa and directly to external intermediaries. Meanwhile, wood from the Federico Basadre Highway Circuit is sold to Lima to warehouses and stores, not to the primary processing industry. In general terms, the importance of the timber chain in the hinterland lies in the presence of the main stockpiles and primary processing hubs.

3.1.5. Cacao production chain

At the international level, Peru is the eighth largest cocoa producer globally, concentrating 2.4% of production for 2019 (+1% than 2018). Similarly, its yield in the year under study (1.04 tons/ha) has been higher than that of countries with higher production. Likewise, between 2015 and 2019, national production grew by 47% and productivity by 30%.

Similarly, Peruvian exports of this product reached approximately 58 thousand tons in 2019, representing a 3% drop compared to the previous year, and 1.5% of the total exported worldwide in 2019. Of this total, the first two exporting regions - Lima, with 70% of the total national export, and San Martin, with 12.7% - are part of the hinterland. This situation is particular to the production chain, as with coffee, since Lima is not a cocoa producer. However, the collection and export companies are located in the Peruvian capital, which would explain this situation.

Map 12: Cacao production in the hinterland of the Port of Chancay [6]



Source: Peruvian Ministry of Agrarian Development and Water Irrigation (2020)

The principal traders in the hinterland were identified. Amazonas Trading Perú S.A.C. exported US$27 million; Cafetalera Amazónica, US$21 million; Sumaq, US$18 million; and Exportador Romex S.A., US$16 million. These companies are focused on exporting coffee and cocoa as commodity grains. In addition, the emergence of franchises such as Ukaw, an Amazonian fine chocolate brand with coffee shops not only in the capital of Ucayali but also in Lima, is noteworthy. In this sense, the chain has developed the commercial part's links.

[6] The analysis of cocoa production in the hinterland of the port of Chancay was carried out at the district level.

That said, at the national level, the cocoa areas in the area of influence of the port of Chancay focus on a productive sector located in the departments of San Martin, Huanuco, and Ucayali representing 42% of total production in 2019. The region with the highest yield is Tocache-San Martin, followed by Padre Abad and Coronel Portillo. In the hinterland, collection centers guarantee the product's quality and the producer's Social Responsibility practices. There are also processing plants in Tingo María, Pucallpa, and Huánuco that provide added value to the product by ensuring the quality of the processing and transportation following national and international regulations. At this stage, products derived from the product are made, such as roasting, milling, and preparing liquor, butter, chocolate, and other products.

The ports of Callao and Paita are used for exporting bulk products or derivatives. However, the Chancay port is a point with advantages in terms of distance and costs related to the export process.

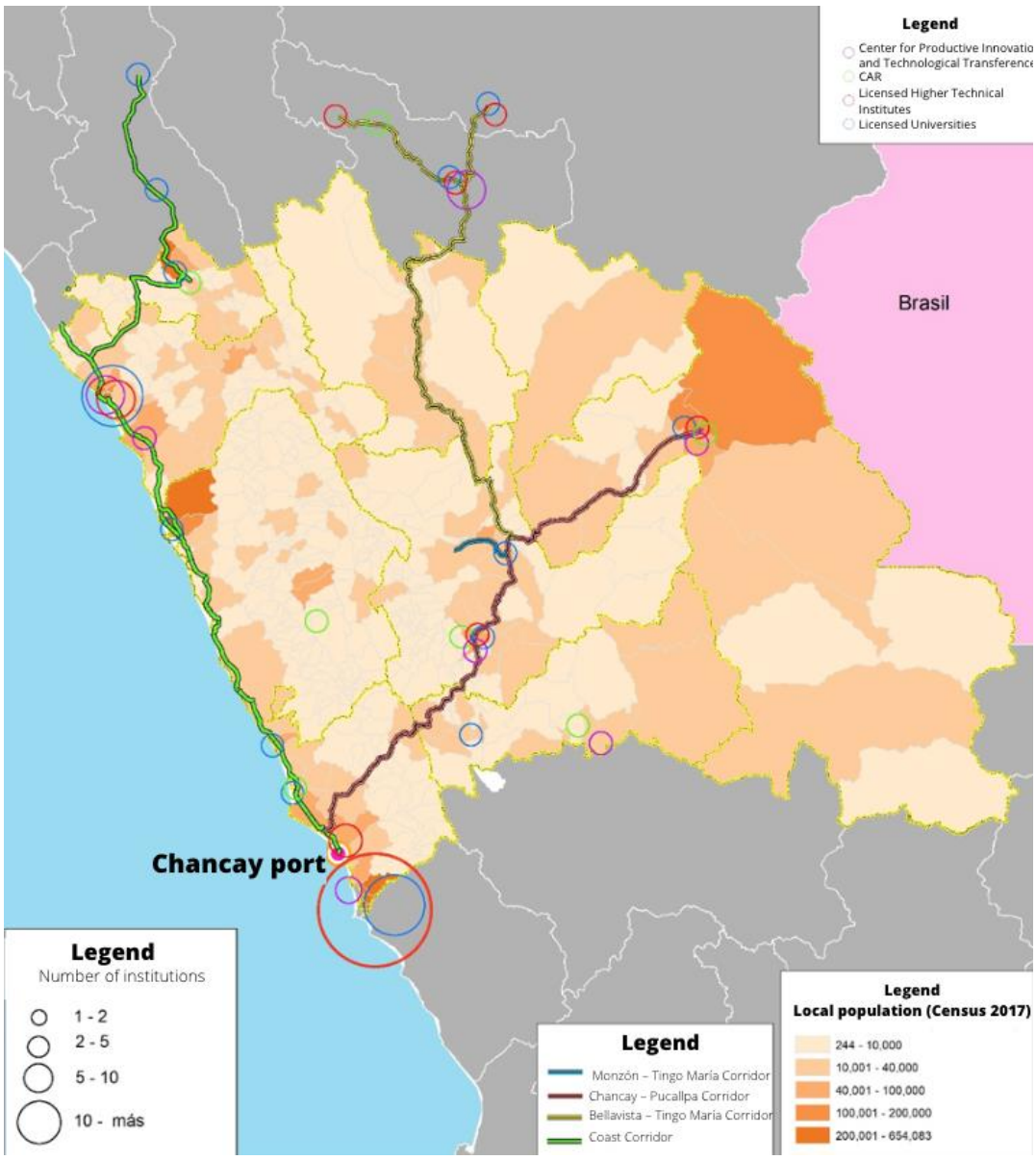
The evaluation of value chains with high potential for exportable supply in the area of influence of the port of Chancay has shown the competitiveness of the economic corridors in the territory. For example, the highest competitive production of Blueberries is near the port. Also, the region has important agro exporters that could drive the entrepreneurial ecosystem to achieve greater competitiveness, diversify into new crops, and strengthen sustainable resource management. Furthermore, there are essential players in the production and marketing of avocados. Therefore, the challenge is to improve agricultural productivity in the coastal zone by including more medium-sized exporters, taking the strength offered by its proximity to consolidated companies as a starting point. Finally, in the case of the coffee and cocoa chains, whose production chain behavior is similar, it is clear that the joint development of this production node is an opportunity for the interregional growth of the product.

3.2. Human capital in the hinterland

The opportunities offered by having competitive production chains in the hinterland translate into prospects for territorial development and a better quality of life. This situation is enhanced if a critical mass of human capital can take advantage of employment opportunities and facilitate the management of companies capable of starting new ventures and investments to increase production and quality of production chains. For this reason, this section explores the supply of training with standards in the hinterland that meet an appropriate level of quality.

In this sense, for the evaluation of the educational presentation, the following map is presented for the four economic corridors of the hinterland: at the university level, the licensed universities; at the technical level, the institutes that have achieved; at the secondary level, the High-Performance Colleges (COAR, by its Spanish acronym) that house students with outstanding performance in their regions; and in terms of training for professionals with short offers and development of product innovations, the Centers for Productive Innovation and Technology Transfer (CITE, by its Spanish acronym). The following training and human capital network map represent each type of educational offer by a specific color circle, so various kinds of training coincide when several rings are found in the same district. In addition, the size of the circles shows that there may be more than one number of services per type of training offered, as in the case of North Lima, where there are more than ten higher education institutes licensed in one area. This is relevant since it has been explained that the development of human capital is the basis of sustainable competitive advantage for the company (Barney, 1991).

Map 13: Training networks and human capital in the hinterland



Source: Peruvian Ministry of Education (2020)
Technical note: each district is colored according to the district population level.

In the coastal corridor, there are several centers with different training centers, with an agglomeration of centers just to the extreme south and extreme north. Thus, there is an agglomeration of other educational offerings (5 universities, three institutes, 1 COAR, and 4 CITE) in the districts of Trujillo, El Porvenir, and Viru in the province of La Libertad, which is the most populated region of the hinterland. Along the same route to the south, in Nuevo Chimbote, there is a relevant training network with two licensed universities like the National University of Santa, which offers a degree in agro-industrial engineering. Also, in the Norte Chico, the district of Barranca stands out with its national university. In the districts of Huacho and Santa Maria, there is the Universidad Nacional Jose Faustino Sanchez Carrion with relevant faculties such as agricultural engineering and fishing engineering, as well as a high-performance school. Also, at the other end of the coastal corridor is the north of metropolitan Lima, where there is a great variety of higher

education centers taking advantage of the large population of the districts. Thus, in this corridor, there are several training centers close to the main products of the territory.

On the other hand, in the Chancay-Pucallpa corridor, there are also several points of agglomeration of educational offerings. The first agglomeration is in the province of Coronel Portillo, where all services, such as universities, productive innovation and technology transfer centers, and higher technical institutes, are located. The second point of agglomeration is between the districts of Huánuco, Conchamarca, and Pilco Marca, which have higher technical institutes, productive innovation and technology transfer centers, high-performance schools, and universities such as the Universidad de Huánuco and the Universidad Nacional Hermilio Valdizán, which offer careers related to agricultural sciences, administrative sciences and veterinary medicine. Finally, due to its fluid connectivity with the city of Tingo Maria, there would also be the option of including the Universidad Nacional Agraria de la Selva with its agronomy, zootechnical, and food industry careers. Thus, there is a training network in the Amazon region with exciting prospects.

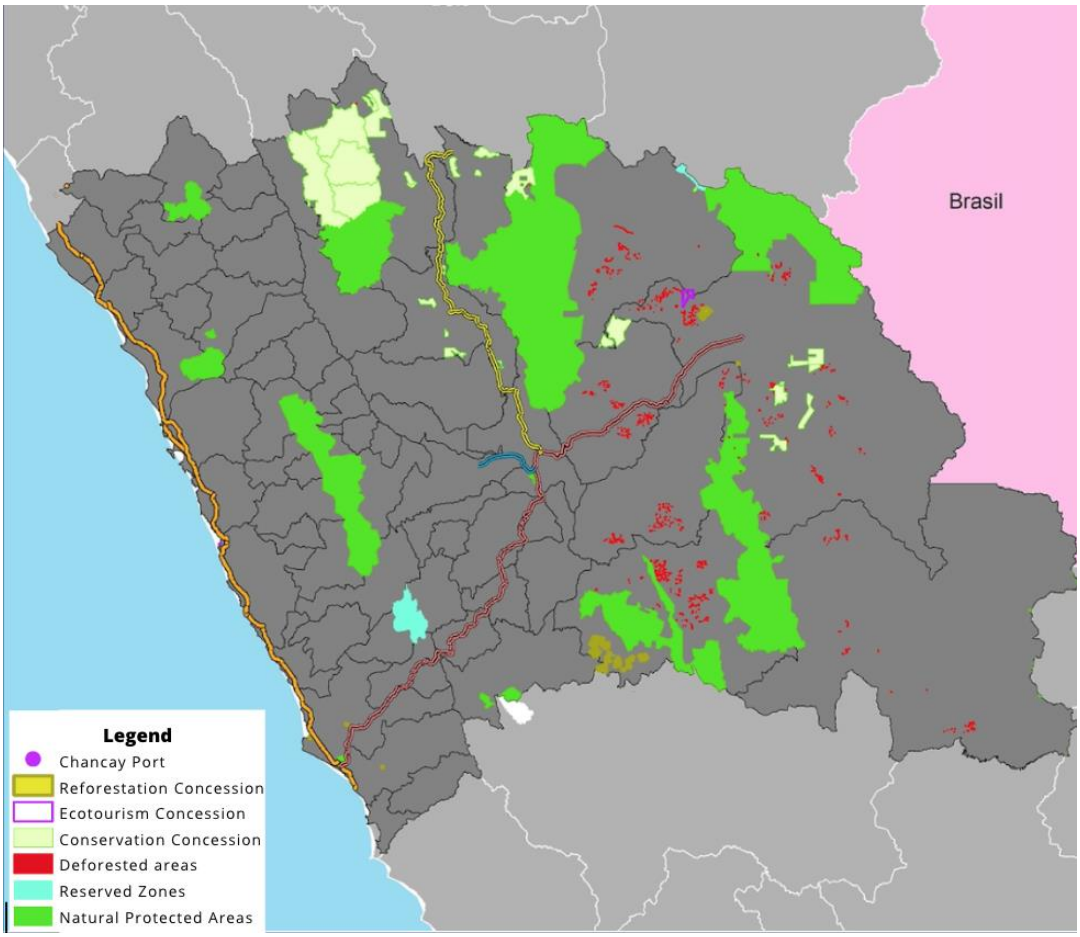
In this sense, it is essential to mention that the presence of higher education offerings shown in this section is relevant for the hinterland since, through the human capital related to these training and technology centers, the production of more excellent added value can be stimulated and is a critical antecedent for the generation of innovation activities. Furthermore, we do not consider these changes as minor since recent studies say that micro and small companies can make rapid leaps toward exports to the extent that they are located in environments that are conducive to innovation Eliasson et al., 2012; Wadho & Chaudhry, 2018). Thus, the hinterland would have corridors with conditions to scale in terms of its human capital and be on a learning curve to take advantage of Chancay's new markets.

3.3. Environmental development in the hinterland

One of the main characteristics of the hinterland is its forest health. The main protected natural areas are in the hinterland. The Sierra del Divisor National Park (1.4 million hectares) is located in Loreto and Ucayali. Similarly, Cordillera Azul National Park (1.4 million hectares) is between San Martin, Loreto, Ucayali, and Huanuco. This contrasts with the tremendous environmental risks faced in these three regions, where people can find large areas of deforestation. In other words, resource management has not been the most appropriate, and therefore economic activity should internalize the environmental costs.

As an approach to sustainable management, there are concessions for conservation that reach 700,000 hectares. Ucayali and San Martin account for 85% of this total, with 83,000 hectares and 544,000 hectares, respectively. Furthermore, to repair the damage already caused, there are concessions for reforestation, where the leading departments are Pasco, with 12,000 hectares for this purpose, followed by Junin, with 5.7 thousand hectares. On the other hand, ecotourism concession areas have not been given much impetus, with concessions only in Ucayali (5,375 hectares) and Junin (10,610 hectares). This shows the environmental state of the hinterland, which is characterized by significant vulnerability, but also where there are territorial management instruments such as the presence of natural protected areas in the jungle zone. This basic situation is essential to ensure the development of productive projects that coexist sustainably with these natural protected areas, conservation, ecotourism, and favor reforestation in the jungle.

Map 14: Environmental situation of the hinterland



Source: Peruvian National Forest and Wildlife Service – SERFOR– (2020)

3.4. Industrial parks in the hinterland

In the hinterland, industrial zones in the most representative cities strengthen the territory's capacity to meet international demand for products. It is also an opportunity to reinforce interconnectivity networks. For example, in the district of Comas, there is a little second processing cluster for timber, while in Pucallpa, there is a first processing cluster for the same product. Similarly, in the city of Tingo María, there are collection centers dedicated to purchasing high-quality coffee beans and cocoa for domestic and international marketing, no longer as a commodity but as a higher-priced by-product. This section analyzes whether projects are being developed in the hinterland to promote the creation of added value in their value chains.

This analysis identified that seven of the 20 industrial parks promoted by the Ministry of Production are located in the hinterland of Chancay port. The most representative of these seven is the Ancon industrial park, which has made the most progress and is the only park that has been called for public bidding for its development. Through the Active Projects modality, the project is in the transaction phase and is in charge of the Ministry of Production. The tender is expected to be awarded in the second quarter of 2022 and will reach an investment of US$ 762 million. According to Proinversion, it has advantages due to its strategic location between the ports of Chancay (40 km) and Callao (39 km),

the Jorge Chávez International Airport (33 km), and its proximity to the Panamericana Norte highway. Finally, it is essential to mention that, according to statements made by the former Minister of Production, José Luis Chicoma, Chinese investors are interested in the project.

Another important park is the Pucallpa Industrial Park, which is expected to boost the wood sector. Given its strategic location near universities, such as the Universidad Nacional de Ucayali, the Universidad Nacional Intercultural de la Selva, and the Center for Productive Innovation and Wood Technology Transfer, it offers an opportunity for synergistic development among the different productive actors and knowledge generators. Mention that this park was created through Law No. 29749 in 2011, indicating that the Regional Government of Ucayali and the Provincial Municipality of Coronel Portillo will execute the basic infrastructure and the necessary actions for the installation and operation of the park. According to Ministry of Production, land has been transferred in favor of the project. It would also have an investment of US$25 million. Also, through Regional Ordinance No. 012-2011, it has been declared that the area where the Pucallpa Industrial Park will be located between kilometers 14 and 17 of the Basadre road, District Boundary with the Campo Verde District, in the jurisdiction of Callería.

On the other hand, Law No. 28264 created the third most important park in the hinterland, the Tingo María industrial park in the Peruvian Amazon. Likewise, its regulations were approved in 2006 through Supreme Decree Nº 006-2006-PRODUCE. According to the former head of Produce, Pedro Olaechea, it is known that the park will be located in the area of La Esperanza. Tingo Maria park will have 48 hectares and is surrounded by a productive area of 200,000 hectares dedicated to coffee and cocoa production. As we saw in the previous section, there is great potential for these value chains because these provinces are leaders in production not only in the hinterland but also at the national level.

Finally, the other four industrial parks relevant to the hinterland are also being developed on the coastal side:

- The Curtiembres y Calzado industrial park (in the district of Porvenir-Trujillo), approved by Law 29513.
- The Huaraz industrial park, approved by Law 29751.
- The Santa industrial park, approved by Law 29612.
- The Pachacutec industrial and services park (in the district of Ventanilla in Callao), supported by Law 29752.

In northern Peru, the La Esperanza Park (Sociedad Nacional de Industrias, 2019) is already operating and currently houses most of Trujillo's manufacturing activity, with 113 medium-sized companies engaged in leather tanning and dressing (20.4% of the total), manufacture of metal structures, bodywork, machinery and accessories (17.7%), feed processing (9.7%), and manufacture of wood furniture, wood agglomerates, and accessories (8.8%).

Thus, the analysis of productive clusters for the transformation of primary products shows that there are projects for developing industrial parks in the hinterland. This would benefit the development of the industry, which would favor the improvement of the quality and added value of the products mentioned in this section. In the case of the Pucallpa industrial park, it is expected to house 160 wood companies from Ucayali, Loreto, and Brazil. It is also likely to implement the Center for Productive Innovation and Forestry Technology Transfer in a four-hectare area, negotiated with the *Technological Institute*

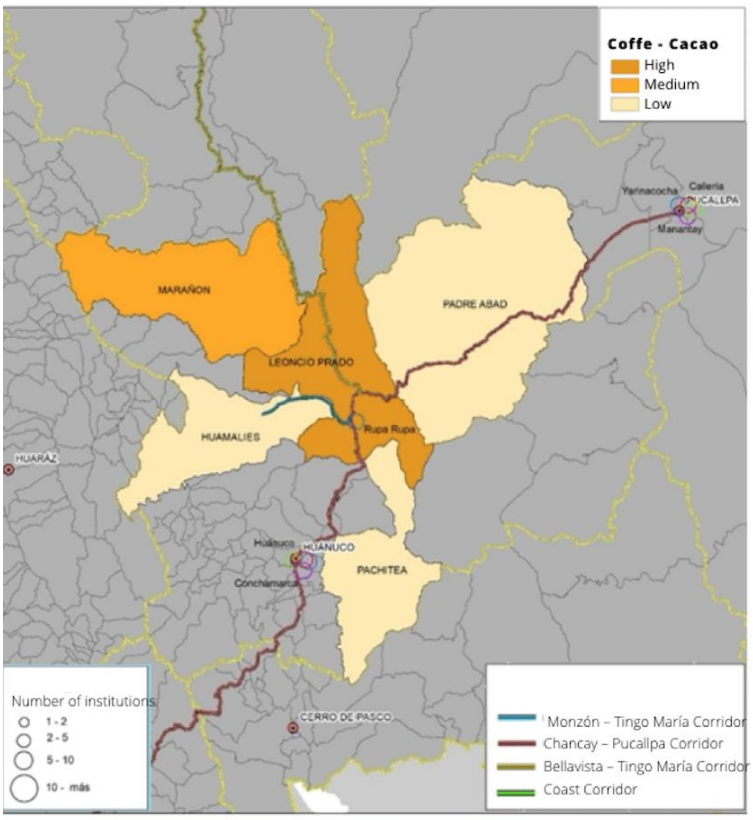
of Production (ITP, by its Spanish acronym). However, one aspect still waiting to be addressed in these parks is their foreign markets.

3.5. Competitive hinterland centers

This section has shown that the hinterland of the Chancay port has the resources and capabilities to undertake the productive development of the territory. It has also been identified that the area has been developing the necessary human capital through universities, effective technical centers, and specialized technical training to improve the quality of final products. In territorial development, we can find the following three competitive centers in the hinterland, given their leadership in the production of some chains and the supply of human capital.

For example, in the Chancay-Pucallpa corridor, where most of the hinterland's coffee, cacao (map 14), and wood products are concentrated (Map 15), higher education is offered in the regional capital cities of Pucallpa and Huánuco. In addition, the Universidad Nacional Agraria de la Selva is located in Tingo Maria, an educational reference in the region, offering degrees in environmental engineering, forestry engineering, zootechnics, and agronomy. It shows that there is the necessary human capital to boost the productivity of the highest-value coffee and cacao links in the territory and to have entrepreneurs sustainably add value to the processing of wood.

Map 15: Human capital centers and competitive coffee and cocoa provinces

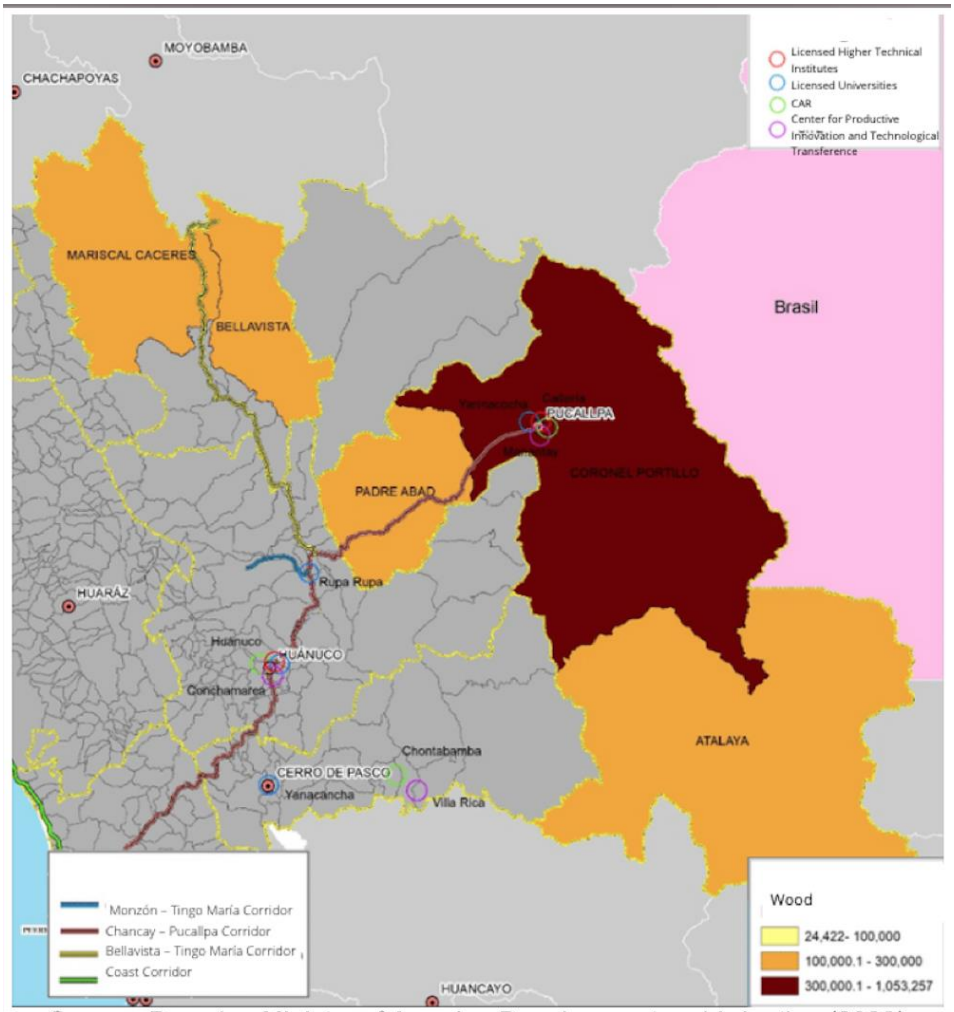


Source: Peruvian Ministry of Agrarian Development and Irrigation (2020), Peruvian Ministry of Education (2020)

On the other hand, in the coastal corridor of the hinterland of the port of Chancay, complementing the productive supply of avocado and blueberries described in the first section, there are important universities located in the departmental and provincial capitals. This aspect has been discussed in the section on human capital in the hinterland. Unlike the situation described in the Chancay-Pucallpa corridor, in this case, the educational offer is more significant, and the agricultural products are internationally competitive. It should be remembered that Peru is in the TOP 5 in avocado and blueberry exports.

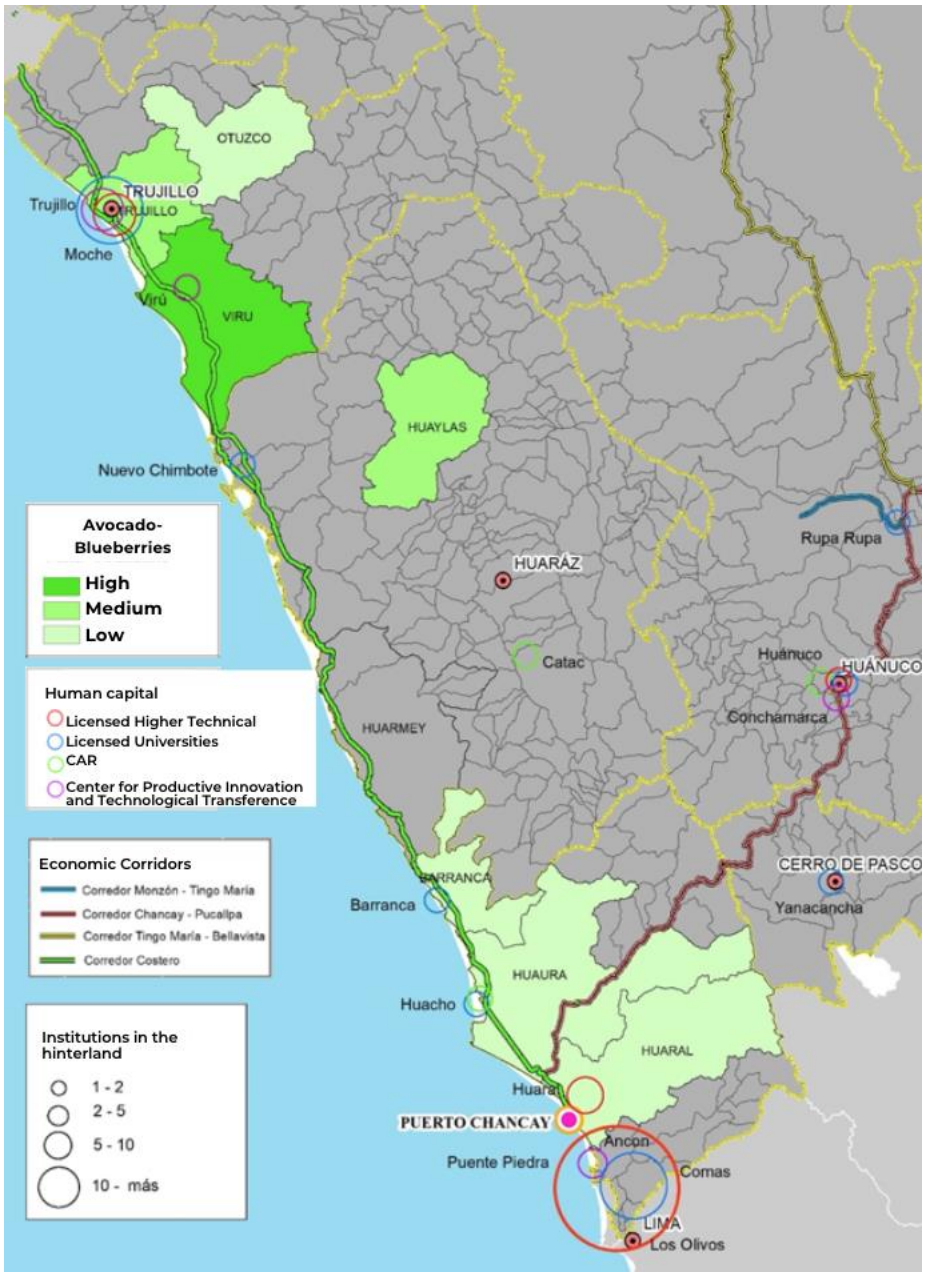
Finally, the analysis of industrial parks in the hinterland shows that current initiatives focus on generating added value in competitive chains. Still, if the level of demand is raised, these instruments do not yet have designs to promote ambitious transformations in the links. In this sense, the challenge is at two levels: to increase the human and productive capacities of the hinterland's stakeholders to create a favorable environment for innovation and productivity gains; and to generate synergies between the initiatives to combine the support of academia, the state and the private sector to achieve a territorial development model in which the agglomeration of productive centers, training offerings, and productive promotion instruments allow productivity leaps towards the opportunities that the port of Chancay will provide.

Map 16: Human capital centers and competitive wood provinces



Source: Peruvian Ministry of Agrarian Development and Irrigation (2020)

Map 17: Human capital centers and competitive provinces in avocado and blueberries



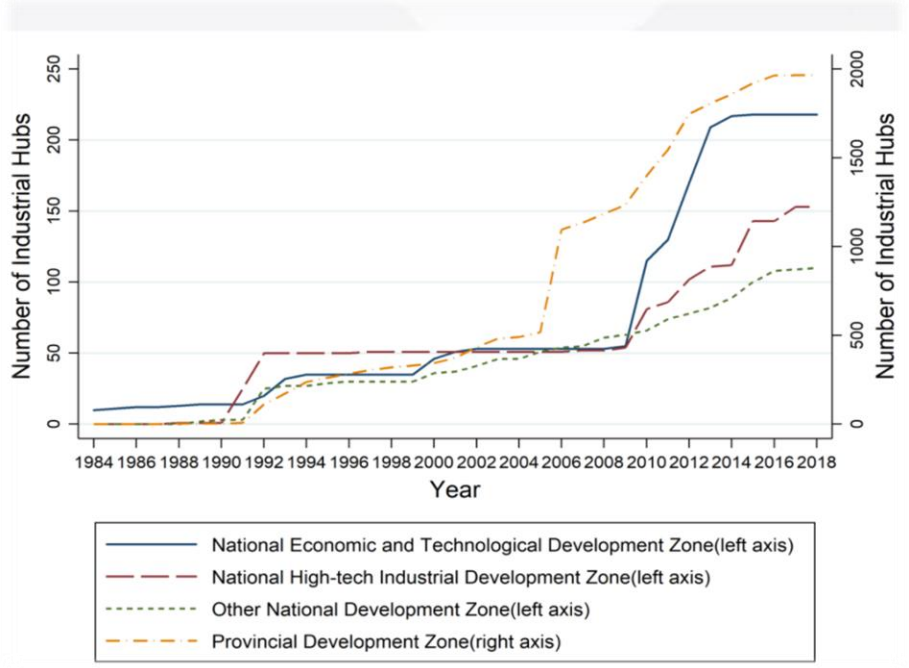
Source: Peruvian Ministry of Agrarian Development and Irrigation (2020), Peruvian Ministry of Education (2020)

4. Territorial development instruments around ports

The in-depth analysis of Chancay's hinterland has led to the identification of 4 competitive corridors capable of taking advantage of the opening of markets thanks to the new port. However, taking advantage of these conditions is not automatic; on the contrary, it depends on strategies and policies to transform productive centers into competitive exports through improvements in the productivity of the effective process and progress in inter-modal logistic advantages. In this sense, from a practical and not theoretical perspective, what models could be applied to the Chancay hinterland,

considering the main elements that make up its advantages, such as access to a regional hub port and transpacific potential, as well as the strength of the links in its productive chains.

Chart 7: Number of industrial hubs in China: 1984-2018



Source: Kou & Zhang (2020)

Asia is an example of territorial development experiences with large-scale instruments such as the "industrial hubs" representing 12% of China's GDP. Also, since the 2000s, they have had a change of orientation towards higher value-added markets with the promotion of technological economic zones and the decentralization of these zones by representing proposals from the regions themselves (Kou & Jun Zhang, 2020). In this direction, Lin, Xu & Xia (2020) highlight that developing these special zones has never been an objective. Also, the territorial processes around them have impacted their transformations, such as the urbanization process, the economic growth of coastal regions, and the national policies of infrastructure networks. The Chinese commitment to developing countries has differed from the Anglo-Saxon and continental European models. They have followed the "Asian doctrine of ports," in which ports are instruments to boost territorial development. This has led to the obligation of the Chinese state to provide infrastructure and customs policies that favor their development (Economic and Social Commission for Asia and the Pacific, 2021).

Our previous analysis has allowed us to review the role played by the main ports in the Latin American region, where it stands out that the port with proximity to the Panama Canal has hub functions (Cartagena, Panama, Kingston, and Freeport). Still, even in the region, there is a prevalence of ports that serve their hinterland to take local production to external markets. Therefore, the territorial development of the industrial sectors near the port has been found in the latter types. In this line, the following points present the most emblematic cases as they contain the same conditions as Chancay. Thus, the development of the Free Trade Zones in the port of Cartagena, which has allowed the development of the region's leading industry, is mentioned. Also mentioned is the Port of Manzanillo case, which, together with the presence of Industrial Zones in the surrounding area, has been able to take advantage of the opportunities offered by the proximity of the North American market.

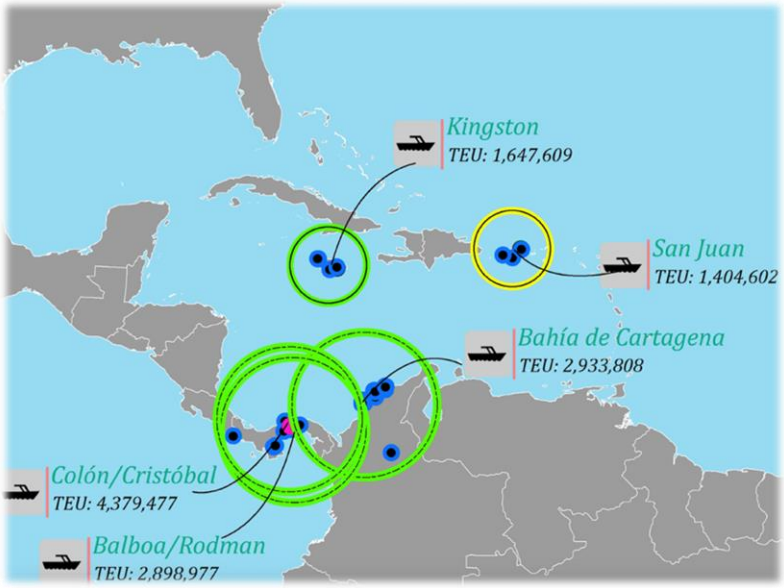
4.1. Especial Economic Zones around the port of Cartagena

Special economic zones (SEZs) have traditionally been geographic areas where companies have benefits related to lower tax and regulatory payments (Farole & Akinci, 2011). Thus, comparative experience is related to integration with local productive clusters and allows the development of value chains (Gómez & Molina, 2018). Therefore, their strategic location in the area of ports facilitates the chaining of production to global value chains. Hence, then, generating incentives for the development of the intermediate goods industry that see these areas as an ideal space for transforming their products due to their strategic location that also has access facilities.

Thus, in the Colombian case, Free Trade Zones have become a space to encourage the export of national products. According to the Colombian Department of Statistics, Free Trade Zones demanded 61% of national goods and services in 2020. Thus, becoming a space to improve the quality of national products with export potential to achieve better international performance.

In particular, the Free Trade Zones located in the area of influence of the port of the Bay of Cartagena –which is an area with resources such as human capital and technological capacity (Arévalo & Arévalo, 2019)– have allowed consolidation of the existing regional growth poles by generating incentives for industrial development. Thus, it is observed that the 34 Free Trade Zones in the hinterland area of the Port of Cartagena have focused on value-added production related to chemicals, plastics, and rubber and are also related to the production of food and non-metallic mineral products. The Free Trade Zone administrators recognize this strategic location as an advantage. For example, the same page of the La Candelaria Free Trade Zone (n.d.) mentions that it is located in the heart of the largest Colombian petrochemical complex and allows related companies to be linked to this cluster or petrochemical production chain.

Map 18: Port - SEZ Relationship in the Caribbean and Central America

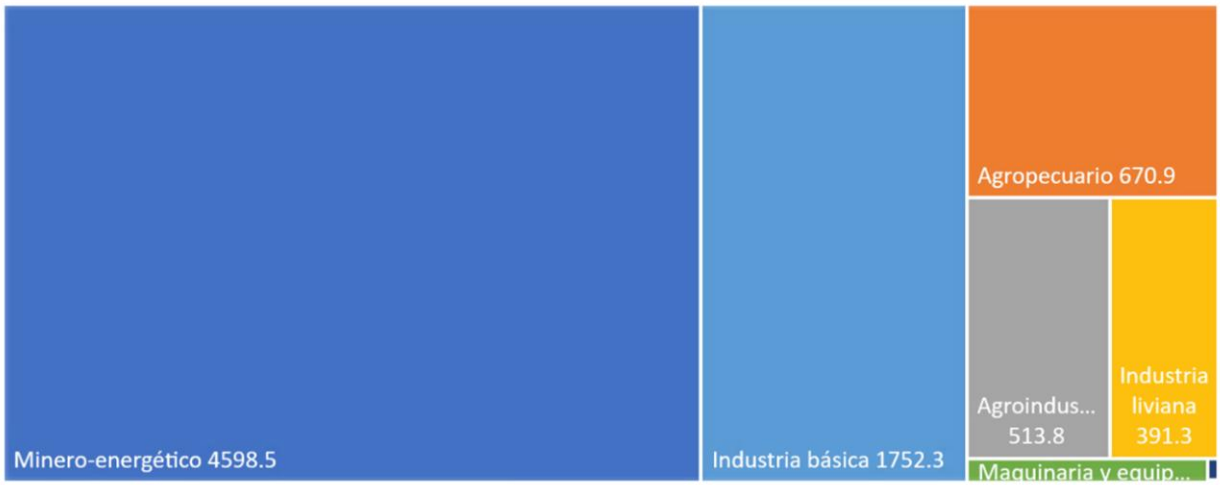


Source: Own elaboration based on ECLAC (2019)

It is recognized that the FTZs in the Caribbean region have supported regional development by showing that 57% of the value added was contributed by the 14

municipalities with at least one FTZ. In particular, the Free Trade Zones that have had the largest surplus in the trade balance in 2018 have been those located in the hinterland: the Cartagena Free Trade Zone recorded the largest surplus in the trade balance in 2018 with a value of 34.5 million USD; followed by the ZF Barranquilla, ZF Candelaria, and ZF La Cayena (National Industrial Association of Colombia, 2019)

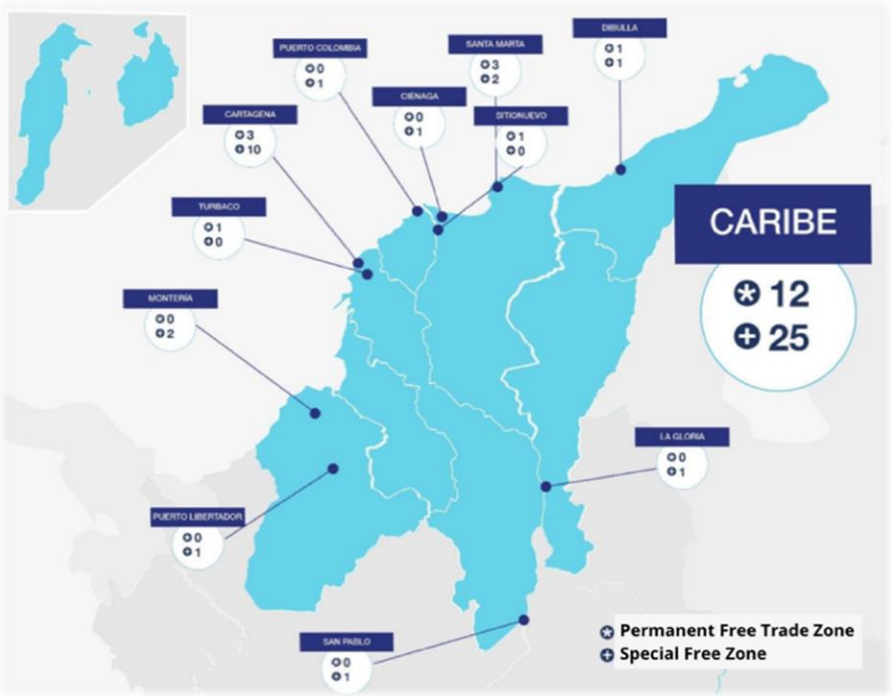
Chart 8: Exports by sector in Colombia's Caribbean region in 2020



Source: Colombian Ministry of Commerce, Industry and Tourism (2020)

Likewise, the average distance between the port and the main free zones in the Caribbean region is 300 kilometers, representing a journey that would take approximately 7 hours. This shows how Free Trade Zones in Colombia are an instrument to promote the development of the territory, even more so when they are related to ports that allow the territory's industry to be inserted into global value chains.

Illustration 6: Free Trade Zones in the Caribbean Region by department and municipality



Source: National Industrial Association of Colombia (2019)

4.2. Industrial parks around the Manzanillo port

The productive linkage of the Zone of Influence of the Port of Manzanillo is evaluated through the main results of the industrial parks (IP) in states such as those located in Jalisco (30 IP) and Guanajuato (47 IP). These states are located around 300 and 400 km near the Port of Manzanillo. These parks are spaces for attracting Foreign Direct Investment and productive development in the Mexican states. According to the Mexican Ministry of Economy (2010a): "Industrial parks are a delimited area specially designed for the settlement of an industrial plant in adequate conditions of location, infrastructure, equipment, and services, with a permanent administration for its operation."

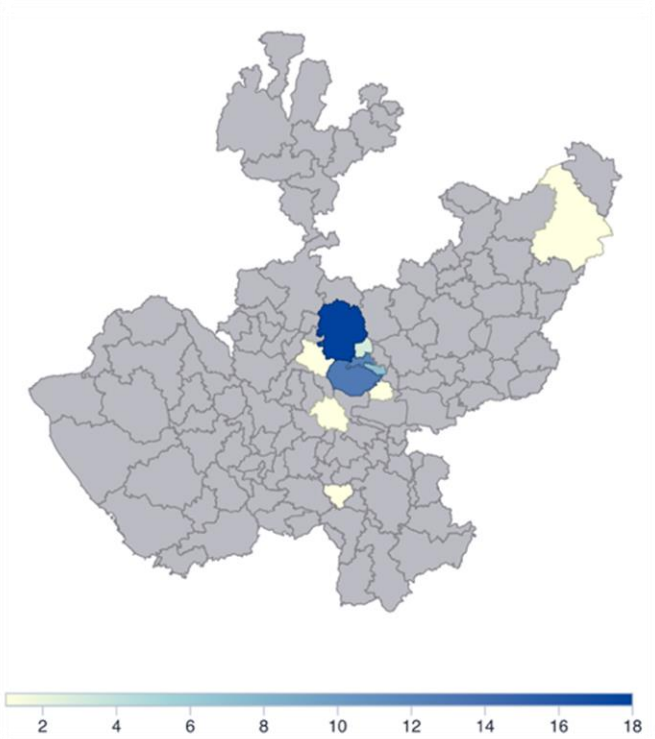
Likewise, it has a fundamental characteristic in its strategic location near a vital way of communication, such as air or seaports, highways, or railroads. Since their conception, industrial parks have been seen as a tool that works if there is proper connectivity.

The state of Jalisco, adjacent to the port of Manzanillo, has been characterized by its high level of development. Guadalajara, the state capital, has been recognized as a center of innovation and high technology due to many enterprises and companies related to the technology industry. The state is home to automotive, high-tech, and information technology clusters. Likewise, 15 universities and 16 technological institutes are located in the state, a relevant aspect for industry development. Its competitiveness is also due to its connectivity network, which includes its proximity to the port of Manzanillo, 296 kilometers away. According to the Association of Industrial Parks of the State of Jalisco (n.d.), the state has a preferred location for distribution centers, fulfillment, and last miles, its network with the center and north of the country, as well as its close connection to the Port of Manzanillo, which is the gateway for Asian products. Its competitiveness is also since the state of Jalisco has 30 industrial parks (IP) strategically distributed. Researcher Juan Demerutis indicated that the workforce and strategic location, connectivity with the Pacific, the port of Manzanillo, and the rest of the country are strengths of the territory of Jalisco (El Informador, 2017).

Illustration 7: Proximity of the States of Guanajuato and Jalisco to the port of Manzanillo

Source: Martner & García (2015)

Map 19: Industrial parks in Jalisco

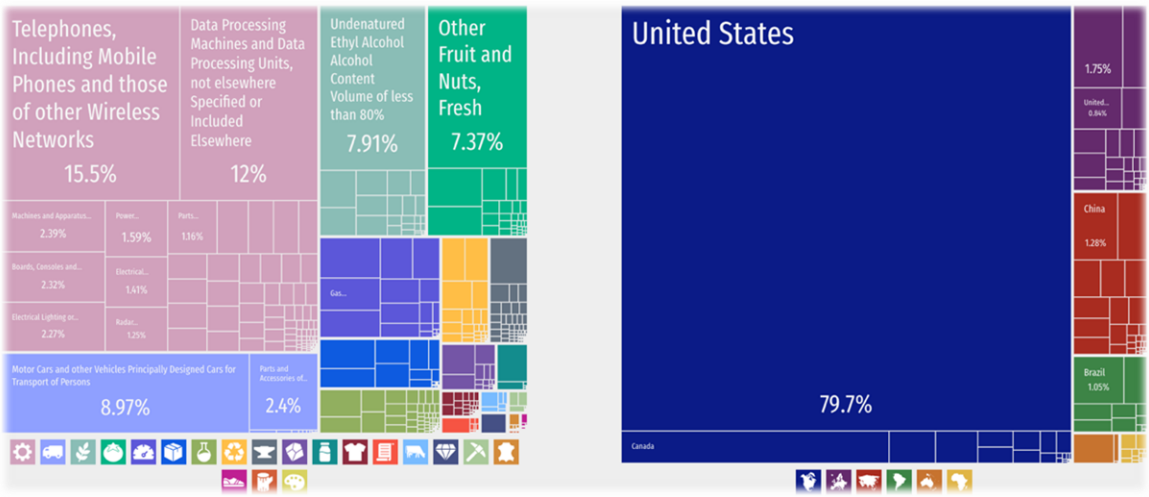


Source: Mexican Association of Industrial Parks (2020)

Likewise, the state has achieved the development of its technological industry. This has allowed it to develop its industry, whose main export products are telephones and automobiles for the U.S. market, reaching export values of 4.4 billion dollars. Its destination has been the U.S. (Secretaría de Relaciones Exteriores, n.d.).

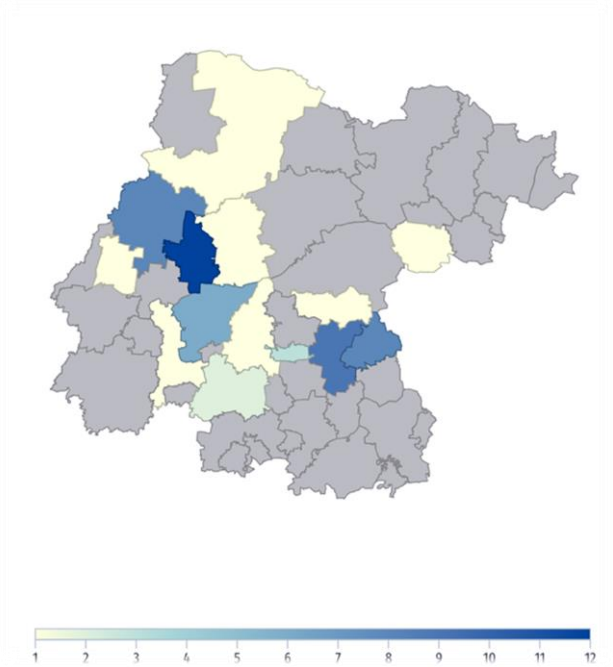
Similarly, the state of Guanajuato has a total of 47 industrial parks. The state has bet on a state strategy to increase the presence of industrial parks in the territory to attract more foreign investment (El Economista, 2017).

Chart 9: Main products produced in Jalisco



Source: Mexican Ministry of Economy (2020)

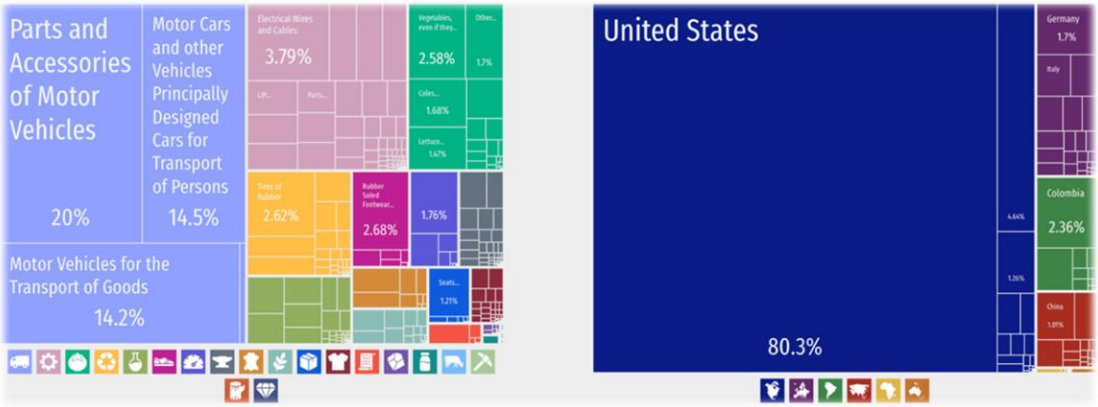
Map 20: Industrial parks in Guanajuato



Source: Mexican Association of Industrial Parks (2020)

Its competitiveness is based on the presence of universities and institutes and the development of its cluster. Thus, according to local media, automotive development has attracted companies due to its strategic location that has allowed Guanajuato to be one of the fastest-growing states, also explained by the push for the development of industrial parks that have grown from 8 to 43 in 17 years (Juárez, 2021). Oropeza (2021) shows the Chinese interest in entering these industrial parks since they see it as a platform to enter the U.S., considering the climate related to skilled labor and the automotive cluster.

Chart 10: Main products produced in Guanajuato destined for international trade



Source: Mexican Ministry of Economy (2020)

In this way, the territories participate in the final part of the automotive and telecommunication value chains. This allowed it to develop its industry, whose main export products are automotive vehicle parts and accessories for the U.S. market, reaching export values of 2.7 billion dollars. Its main destination has been the U.S. (Mexican Ministry of Economy, 2020). This situation is also due to clusters related to the

automotive industry, enhanced by multinational companies such as General Motors, Mazda, Honda, Volkswagen, General Motors, Hino, and Toyota. Also, the Polytechnic University of Guanajuato offers related careers such as Automotive Engineering.

Illustration 8: Light vehicle manufacturing facilities

Source: Vision Automotriz (2020)

Thus, in the Mexican case, industrial parks have served as a tool that has allowed the attraction of foreign direct investment. In addition, it has boosted the development of the territory, even more so when they are related to ports that allow the territory's industry to be inserted into global value chains. In this case, their strategic location allows them to be close enough to the supply points of raw material inputs through the port of Manzanillo for export to the North American market through the border with Latin America (Oropeza, 2021).

5. Boosting Chancay Port with the Belt and Road Initiative

Having reviewed two key factors, the advantages of the design of the port infrastructure of Chancay and the opportunities of Peruvian ports in global logistics networks, it is crucial to add the perspective of the geopolitical geography of the 21st century. As a premise, the role of the port operator of the port of Chancay is recognized as part of COSCO Shipping Group with a business model of horizontal integration by belonging to the "Ocean Alliance," which, in 2021, together with CMA CGM, Evergreen and OOCL operated 352 containers and 42 route services. Then, COSCO Shipping Ports is one of the Chinese companies with the most significant global perspective. The following is the context of the Belt and Road Initiative that makes the Chancay port project different from any other regional port.

5.1. The Belt and Road Initiative in the 21st Century and global logistics networks

From the perspective of global logistics networks, the 21st Century Silk Road Economic Belt and Maritime Silk Road (summarized as the "Belt and Road Initiative") is divided into the Silk Road Economic Belt and the Maritime Silk Road, where the former uses land connectivity and the latter via shipping. While the former consolidates geographical links through trains, roads, dry ports, and energy networks, the latter aggregates port networks, and shipping fleets. The BRI has witnessed the rapid and extensive addition of countries. In fact, in 2017, there were 65 countries, and in 2020, Santa Gadea (2020) points out that 144 countries have signed cooperation agreements, and 19 belong to Latin America.

Implementing BRI through port projects is a central point of attention since the transport cost depends on the integration of shipping networks rather than on "geographical distance" (Wilmsmeier & Martinez-Zarzoso, 2010). In this regard, China's aspirations go beyond private initiatives such as those of COSCO Shipping, which in the Asian region outside China already has a terminal in the Port of Singapore Authority (PSA) port with a capacity of 4.8 million TEUs and a terminal in the port of Busan with a capacity of 4 million TEUs. Therefore, the Maritime Silk Road seeks to amplify private initiatives and thereby consolidate China's naval integration with Europe, Africa, and Asia through investments in a network of projects in 15 strategic Chinese ports that have taken as a starting point the port of Fuzhou in Fujian province. Although BRI is an ambitious step forward for leading global trade, BRI is also part of a strategy to bring connectivity to the Chinese provinces that are less economically and social developed than the eastern and coastal ones (Santa Gadea, 2018).

Table 6: Countries that have signed cooperation agreements in the framework of the Belt and Road Initiative (by continents)

Europe		Asia		Oceania	Africa		America
Albania	Poland	Afghanistan	Oman	Cook Island	Algeria	Mali	Antigua and Barbuda
Armenia	Portugal	Bahrain	Pakistan	Fiji	Angola	Mauritania	Barbados
Austria	Romania	Bangladesh	Palestine	Kiribati	Benin	Morocco	Bolivia
Azerbaijan	Russia	Bhutan	Philippines	Micronesia	Burundi	Mozambique	Chile
Belarus	Serbia	Brunei	Qatar	New Zealand	Cameroon	Namibia	Costa Rica
Bosnia and Herzegovina	Slovakia	Cambodia	Republic of Korea	Niue	Cape Verde	Niger	Cuba
Bulgaria	Slovenia	East Timor	Saudi Arabia	Papua New Guinea	Chad	Nigeria	Dominica
Croatia	Turkey	Indonesia	Singapore	Samoa	Comoros	Republic of Congo	Dominican Republic
Cyprus	Ukraine	Iran	Sri Lanka	Solomon Islands	Djibouti	Rwanda	Ecuador
Czech Republic		Iraq	Syria	Tonga	Egypt	Senegal	El Salvador
Estonia		Israel	Tajikistan	Vanuatu	Equatorial Guinea	Seychelles	Grenada
Georgia		Jordan	Thailand		Ethiopia	Sierra Leone	Guyana
Greece		Kazakhstan	Turkmenistan		Gabon	Somalia	Jamaica
Hungary		Kuwait	United Arab Emirates		Gambia	South Africa	Panama
Italy		Kyrgyzstan	Uzbekistan		Ghana	South Sudan	Peru
Latvia		Laos	Vietnam		Guinea	Sudan	Suriname
Lithuania		Lebanon	Yemen		Ivory Coast	Tanzania	Trinidad and Tobago
Luxembourg		Malaysia			Kenya	Togo	Uruguay
Macedonia		Maldives			Lesotho	Tunisia	Venezuela
Malta		Mongolia			Liberia	Uganda	
Moldova		Myanmar			Libya	Zambia	
Montenegro		Nepal			Madagascar	Zimbabwe	
Total: 31		**Total: 39**		**Total: 11**	**Total: 44**		**Total: 19**

Source: Santa Gadea (2020).

Haralambides & Merk (2020) point out that the BRI-driven logistics networks explicitly seek to modify naval geography. Thus, in China's quest to gain control over the strategic Strait of Malacca, BRI member countries have allowed it to propose port projects, such as Malaysia with a new super port and the expansion of three ports already in operation (Kuantan port, Penang port, and Kuala Linggi Port), in Myanmar with a new port in Kyaukpyu port and Sri Lanka with two ports (Hambantota and Colombo). Even the BRI's

ambition may be as high as seeking an alternate path to the Strait of Malacca with the Carat Canal project that would cross southern Thailand and be a new central transshipment point. However, this initiative has failed to advance in the project cycle due to a lack of support from the Thai authorities (Zeng et al., 2018).

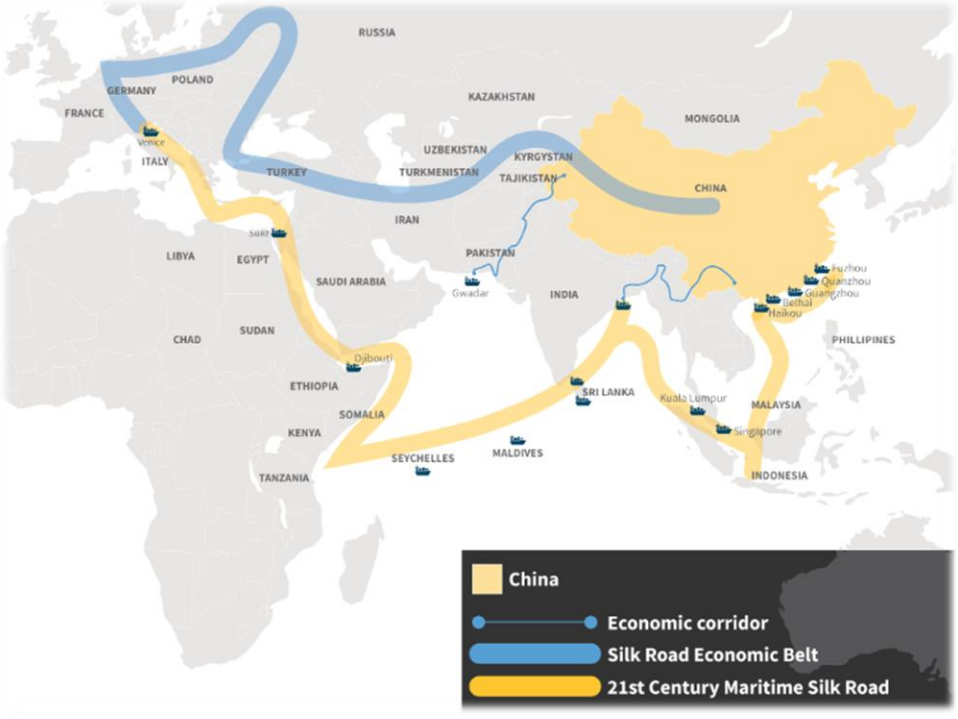
Table 7: Land and maritime components of the Belt and Road Initiative

Silk Road Economic Belt	Maritime Silk Road	New Maritime Silk Road
• China-Pakistan Economic Corridor • New Eurasian Land Bridge Economic Corridor • China-Central Asia-West Asia Economic Corridor • China-Mongolia-Russia Economic Corridor • China-Indochina Peninsula Economic Corridor • Bangladesh-China-India-India-Myanmar Economic Corridor	• South China Sea • Strait of Malacca • Bay of Bengal • Indian Ocean • Arabian Sea • Persian Gulf • Mediterranean Sea • Red Sea	In addition to the maritime silk route extends to: • Oceania and the Pacific • South Africa • South America

Source: Lee et al (2018).

The Economic and Social Commission for Asia and the Pacific (2021) highlights the impact of the global container "gigantization" process that allows ships to reach farther geographies than their predecessors and thereby modify the global maritime geography through a network arrangement with new hub ports, feeder shipping services, and transshipment ports. Precisely, this concept helps the researchers of the Belt and Road Initiative (BRI) to understand the 21st Century Maritime Silk Road beyond its standard configuration and to propose a "New Maritime Silk Road" based on global shipping routes that would lead to considering port nodes in Oceania and the Pacific, South Africa and South America.

Map 21: Integration between China-Asia-Africa-Europe with the Silk Road Economic Belt and the Maritime Silk Road

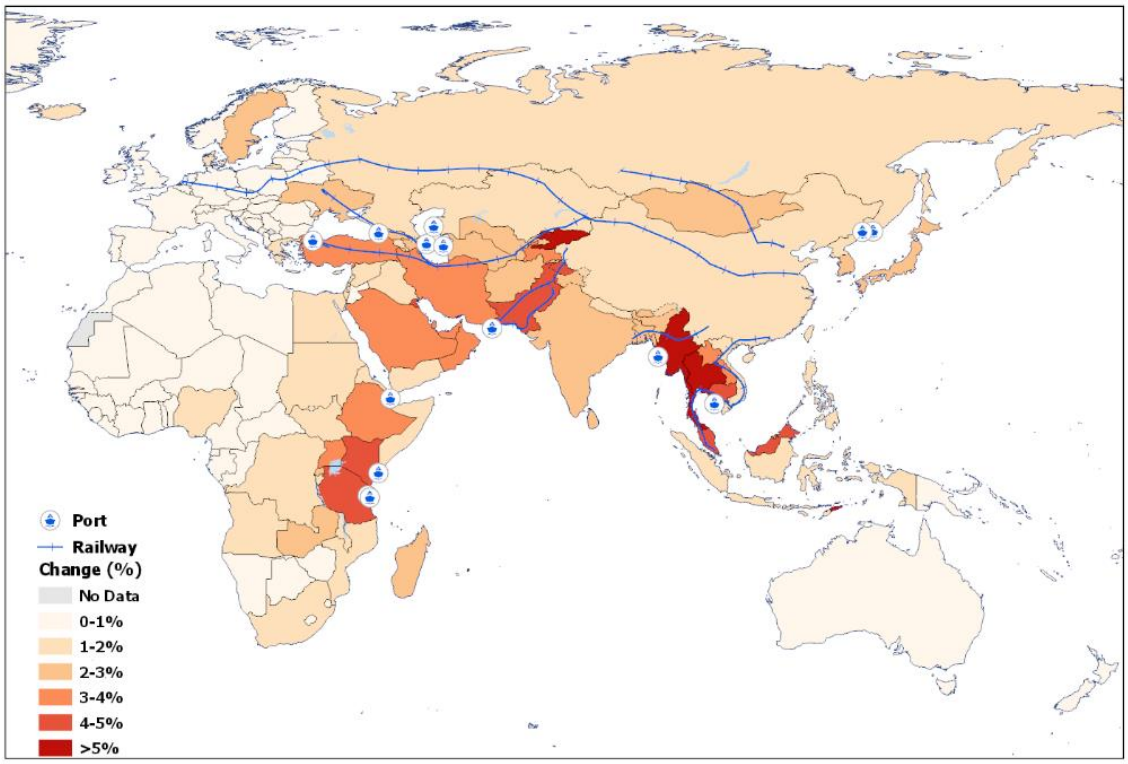


Source: Cai (2017)

Map 22: 21th Century Maritime Silk Road and the New Maritime Silk Road

Source: Lee et al (2018).
Note: Lines in blue for the Maritime Silk Road and lines in red and yellow for the proposed New Maritime Silk Road.

Map 23: Reducing logistics costs in the Silk Road Economic Belt countries



Source: De Soyres et al. (2018)
Technical note: In red, the percentage reduction in ocean freight costs.

As the map by Lee et al. (2018) shows, the impact of the BRI would have a presence on several continents. Thus, the scale of the "New Maritime Silk Road" networks not only

includes the search for efficiency in logistics networks in Asian countries in the area close to China in Asia, Africa, or Europe (Haralambides & Merk, 2020) but also recognizes the need to improve global logistics routes to the extent that these transformations optimize maritime movements by creating greater capacity in connecting nodes for shipping network traffic that have been transforming with a global containerization process that seeks real-time deliveries and up to the last miles (Huang, 2016).

Regarding the investments in the logistics network to establish the BRI, there is no consensus on the total cost of the initiative. However, there is agreement on the benefits in terms of two factors: i) There would be time reductions both between countries that are formally members of the BRI and those that are not, which would translate into between 1. 1% to 1.2% less in overall transportation costs; and ii) Investments should not be made in isolation as logistical efficiencies are achieved when the BRI logistics network improves as a whole (Reed & Trubetskoy, 2019). Thus, financial motivations would lead one to expect investments in terms of the "New Maritime Silk Road" vision to be strategically possible.

Thus, an enhancement of the "New Maritime Silk Road" is unthinkable without transforming major global shipping routes, such as the Circum-Equatorial route, with the Panama Canal as a pivotal axis to link the Pacific and the Atlantic Oceans. Saeed, Cullinane, Gekara & Chhetri (2021) formalize the impacts of the BRI beyond its formal partners by estimating positive changes in bilateral trade with the bilateral shipping connectivity index and where the reduction of maritime distances between BRI partners such as Egypt, Saudi Arabia, Singapore, Malaysia, and Indonesia, but also countries formally outside the initiative such as Panama, Colombia, and Costa Rica.

Map 24: China's global investments in ports and wharfs

Source and Elaboration: Watanabe (2020)
Technical note: The concession for the Panama Terminal has been canceled to the Chinese investors.

International reports remark already been a decade of Chinese investments in port infrastructure in global strategic maritime hubs, mainly by two state-owned port companies, COSCO Shipping and China Merchants. Indeed, investments have reached Europe, Asia, Africa, and North, Central, and South America. When the Chinese

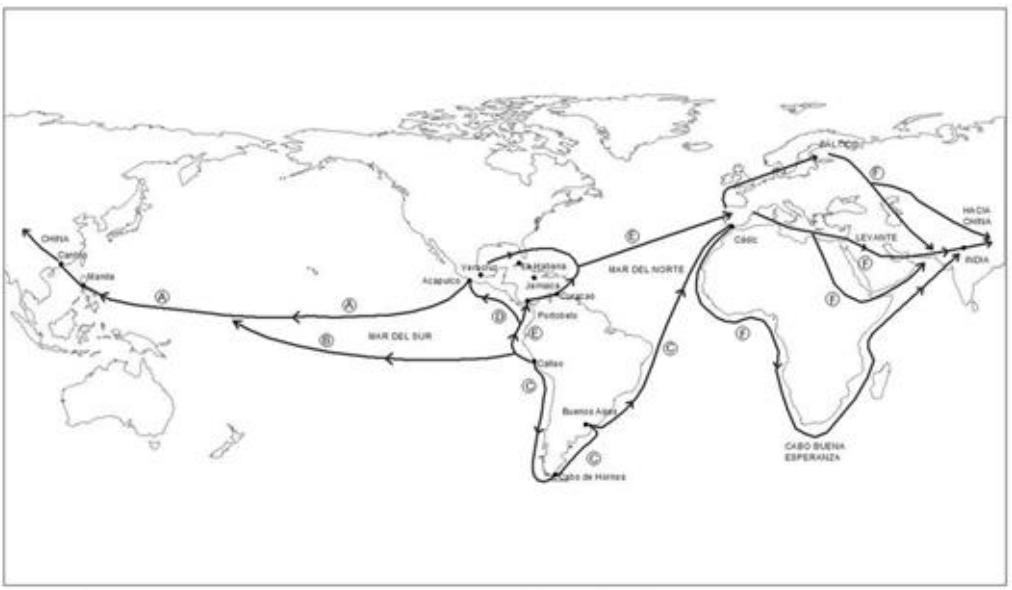
investments arrived in Peru (Chancay port by COSCO Shipping), Brasil (TCP Participações by China Merchants), and Panamá (Panama Canal Container Port by Landbridge Group), the companies' statements always mentioned the importance of these projects to the Belt and Road Initiative. Assuming that the New Maritime Silk Route opens new pathways to strategic investments in port infrastructure in the Latin American Region, it is, therefore, relevant to explore the transpacific route that link south American countries with the Asian Continent. Thus, in the following section, we will describe some of the main features of this connection where the Callao port is playing as a regional hub.

5.2. The transpacific corridor and Peruvian ports

5.2.1. The beginnings of the transpacific corridor and Peruvian ports

In the virtual forum "Scope of the Belt and Road Initiative for Peru" organized by The Exporters Association (2021), the Chinese Ambassador to Peru, Liang Yu, highlighted that between 1573 and 1815, there was a ship known as the "Manila Galleon" that linked the Asian continent with the Americas to transport silk and furniture to Mexico, Panama, Peru and Chile in exchange mainly for the silver mineral from the Hispanic colonies. Thus, the transpacific corridor dates back to the colonial years, and even some historians have recognized the Manila-Acapulco route as one of the first global trade corridors by allowing the exchange of Asian spices with silver from Upper Peru and manufactured goods from the Seville fairs.

Map 25: First Transpacific Routes in the XVII-SXVIII Centuries



Pacific Flows

A. Manila Galleon (1597-1815)
B. French-Peruvian trade (1697-1720)
C. French Trade (1690-1725) Spanish Register Vessel (from 1740)
D. Traffic from El Callao (1675-1740)
E. Southern Navy

Atlantic flows

C. French Trade (1690-1725) Spanish registry vessel (from 1740)
E. Spanish fleets and galleons. Foreign direct smuggling.

Eurasian flows

F. From Europe to China and India through the European Oriental Companies

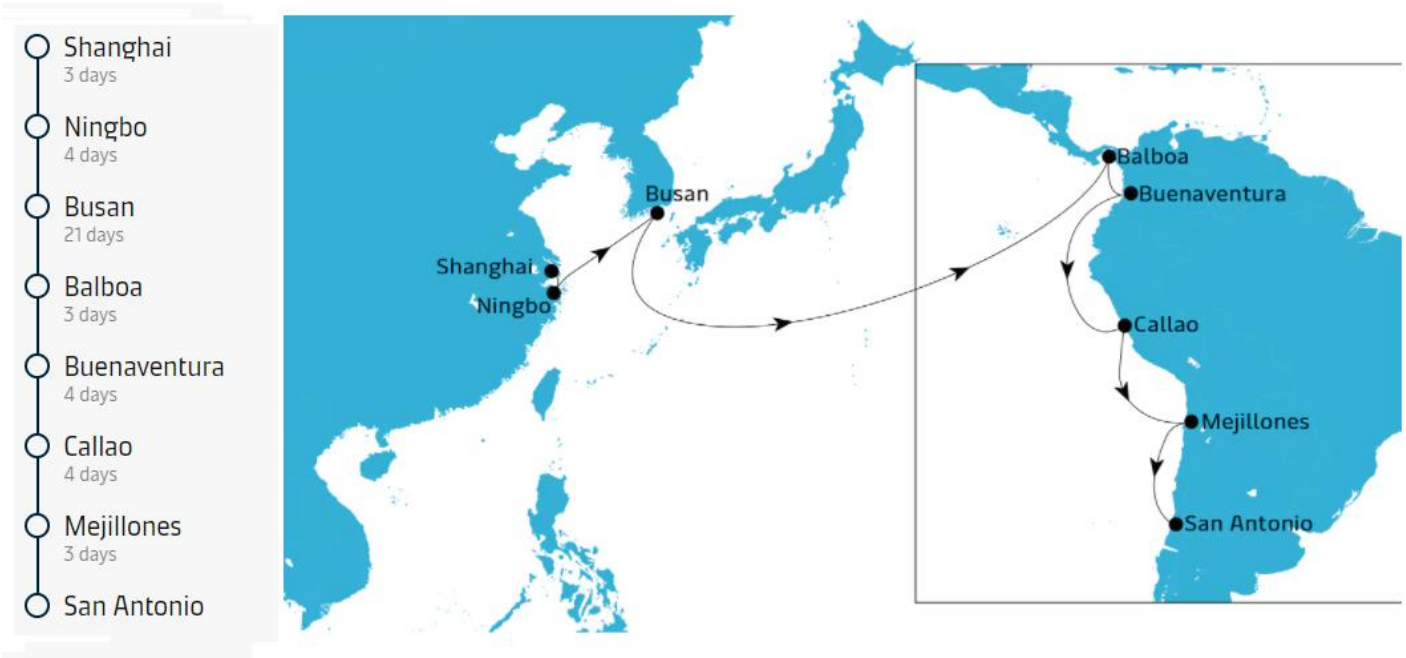
Source: Bonialian (2021)

Regarding the first years of the Asian and American exchange, historian Mariano Bonialian (2021) indicates that there is evidence to affirm that in the 1580s and the following decade, there was a Callao-Manila route, given that in those years, silver from Cerro Rico de Potosí represented 96% of the Viceroyalty's production. In any case, it is proven that the route covered Callao-Acapulco-Manila for the exchange of silver. However, around 1591, the Spanish crown prohibited direct trade from Asia with the Peruvian Vice-Royalty to create a monopoly on Asian trade through the Mexican port of Acapulco. Nevertheless, due to the importance of trade between Peru and Asia, this exchange did not stop. During the two centuries that the Manila Galleon traveled through transpacific routes, the figure of the *Perulero*, a colonial character who used his commercial skills to continue the trade with Asia, was consolidated. With the strengthening of the United States economy over those years, Mexico's ports were strengthened by their proximity to the North American market and the route to Asia.

5.2.2. The transpacific corridor in the 21st Century

The New Maritime Silk Road can be a catalyst for the transpacific corridor where currently, Asian countries have entrance gates in Mexico and Panama as hubs to extend their reach on the South West Pacific coast. According to Gómez Paz & Sánchez (2021), there are 14 routes between Asia and Latin America, where four ship routes link the Asian continent with the east coast of South America while the remaining ten routes link the west coast of South America with Asia. Due to the location of the port of Chancay on the west coast, nine of ten ship routes pass through the port of Manzanillo, 8 through the port of Callao, 6 through the port of Buenaventura (Colombia), 4 through the port of Guayaquil and 4 through the port of San Antonio (Chile). Furthermore, from Callao, the number of shipping services available in China, Korea, Hong Kong, and Japan are 8, 7, 6, and 4, respectively. Thus, on the South American Pacific coast, Peru maintains greater integration with Asia as in the time of Manila Galleon.

Map 26: AC3 -Shanghai-Callao: 35 days - Operator Maersk to the West



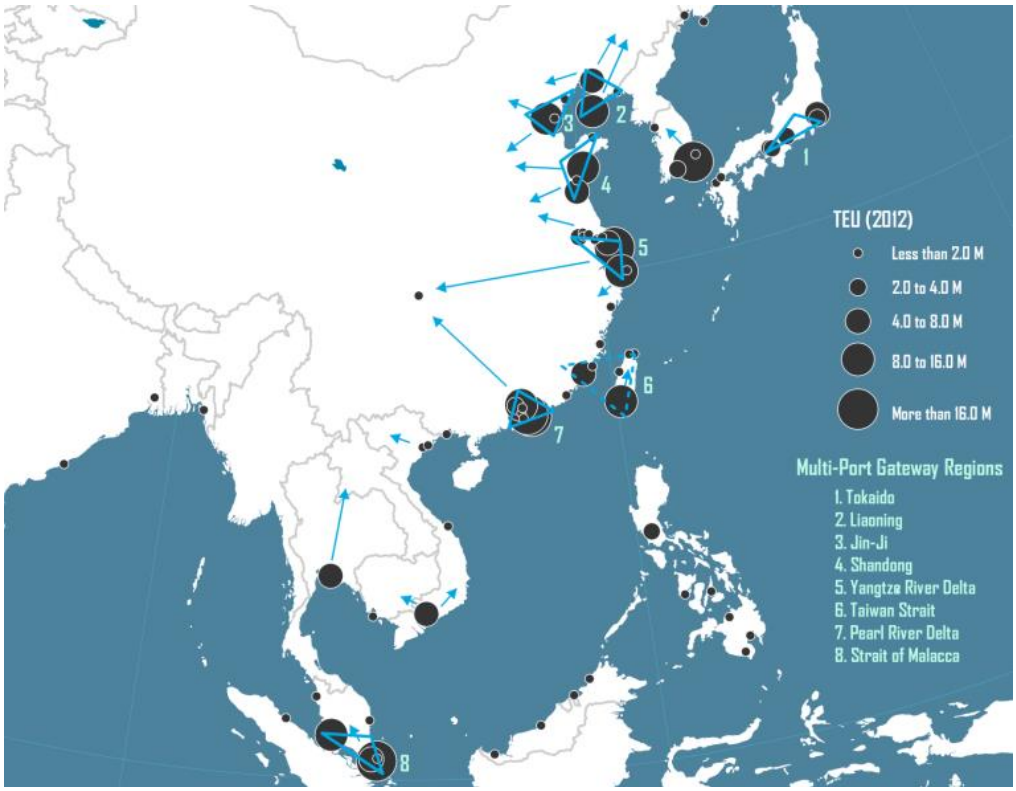
Source: Maersk (2021)

The increase in Asian trade has allowed container routes for Latin America to transport a total freight of 5.6 million TEUs estimated by The Economic and Social Commission for Asia and the Pacific (2021). Moreover, the use of the port networks of Asian countries can teach Latin America some practices of the new logistic dynamics, such as:

- Ports in northern China do not operate individually but operate as multi-ports. Notteboom, Pallis, & Rodrigue (2022) found eight Far East regions linked to global logistics networks by multi-ports. For example, two ports (Tiajjin for containers and Qinhuangdao for mineral bulk) work as entrance doors to the Jing-Jin-Ji region, where a population of 112 million occupies Beijing, Tianjin, and Hebei. The map below shows the dot five, where some of the world's major ports provide access to the Yangtze River Delta region, where cities such as Shanghai, Nanjing, and Hangzhou represent 222 million people. Indeed, connectivity with the other side of the transpacific allows learning from a multi-port model as access to large economic regions.

- In Chinese ports, global integration is more advanced than national integration. Ducruet & Wang (2018) find that the size of the economy and population of Chinese regions determine a level of productive scale that fragments China's east and southwest coast provinces. While the southern regions find the port of Hong Kong as their doorway for global trade, the northern regions do not have a global Chinese port and opt for the ports of Korea or Japan as the gateway for shipping routes. This dynamic is seen with the port of Shanghai, the world's leading port for moving cargo, but it needs another gateway port to reach the shipping lanes that take its products out to the world.

Map 27: Multi-port models for entry to economic regions in the Far East



Source: Notteboom, Pallis & Rodrigue (2022).

The above dynamics are relevant to the current transpacific relationship between Asia and South America. From the Asian side, East Chinese production seeks a port of exit in Korea or Japan to find a transpacific route. From the South American west coast, a port in Mexico is

required to reach the Far East port of entry, mainly in Busan or Yokohama. Shipping services arriving at these ports of entry will continue to some Chinese ports, which would be the point of entry for a significant economic region. Revisiting the map “Main transshipment zones in the global logistics network,” ports of entry account for the largest share of world transshipment (29.2% between the Korean and Hong Kong hubs) and will therefore not only allow entry to Chinese ports but also to other Asian countries.

The radical increase in the capacity of container ships has led to a reduction in the frequency of services. As evidenced by Notteboom et al. (2017) for the Northern Europe-Far East shipping route, the increase in cargo volume has been accompanied by a steady reduction in the number of weekly shipping services as this dropped from 35% to 26% and 17% between 2006, 2012 to 2017, respectively. Under this transformation of global logistics services and complimentary access to a well-developed net of gateway ports, it is convenient for the western and east Chinese provinces and Asian countries to seek to expand their markets in the transpacific corridor. In this line, it is crucial to note that BRI is also part of a strategy to bring connectivity to the Chinese provinces that are less economically and socially developed than the eastern and coastal ones (Santa Gadea, 2018b).

Thus, the last generation of container ships will allow less developed Chinese provinces to save on logistics costs but require ports of arrival with specific capacities to handle ships of such magnitude. Precisely, the future port of Chancay fits this purpose. With COSCO Shipping as the leader in shipping services in the transpacific route, we found practical advantages to becoming the hub port of the South Pacific West coast. While BRI is an ambitious step forward for leading global trade also should be understood as a framework to renew patterns of the economic relationship between transpacific partners to unleash driver forces to overcome the middle-income trap (Zhang & Santa Gadea, 2021). The New Maritime Silk Route opens new pathways to strategic investments in port infrastructure in the Latin American region, and Chancay Port is a solid step in this direction.

6. Towards an agenda for a port model with hinterland functions within the framework of the Belt and Road Initiative

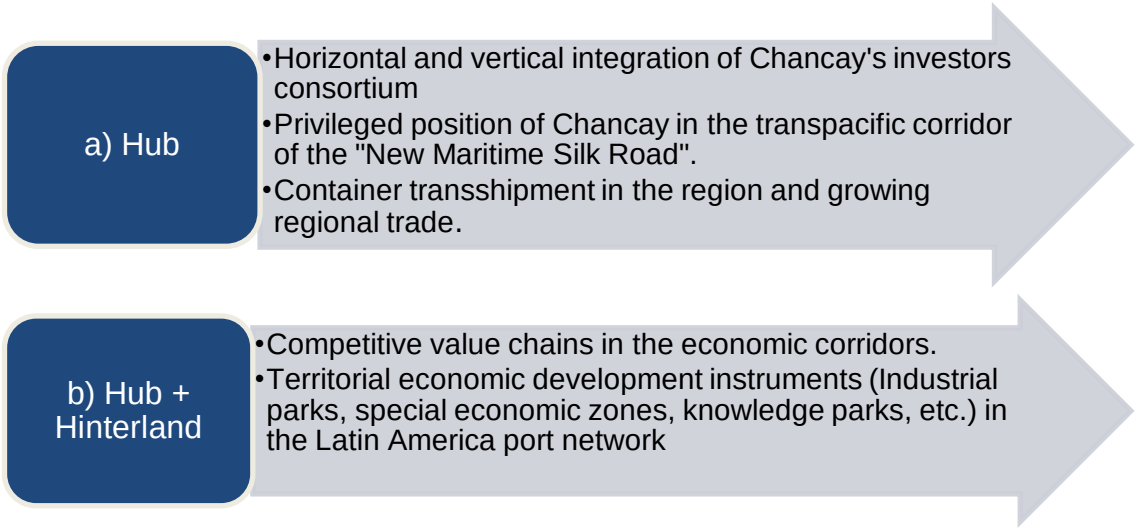
In our study on the potential of the Chancay port, we recovered a transpacific heritage of at least five centuries where Peru played an essential role because of the silver that came out of Altiplano’s Peru and was in great demand by Chinese traders who came to the fairs in Manila. In the 21st century, with the Belt and Road Initiative, there are at least three elements to support the positioning of the port of Chancay to consolidate itself as a regional hub that would receive ultimate generations of container ships with exports from Asia to distribute them to our regional neighbors. Also, this transformation offers a strategic opportunity for the Chancay hinterland to trade with Asian markets since this hub port will reduce freight costs and delay time via the Chancay-Manzanillo-Busan-Shanghai shipping service. In the following lines, we will discuss how to build an agenda toward a port model with hinterland functions.

6.1. From Chancay port with a hub role to a hinterland port model

As summarized in the following figure, this session summarizes in point A the three main strengths that give an advantage to the port of Chancay to be a hub in the transpacific corridor. Also point B shows a pending agenda that would allow the development of Chancay's functions as a hinterland port.

a) The strengths of becoming the West Coast hub are linked to factors associated with the transformations in shipping services and the take-off of containerized trade from South American countries. In addition, the port operator's business model promotes this vision, which can be summarized in the following three strengths:

Illustration 9: Model with Hub and Hinterland functions for the Chancay Port



Source: Own elaboration

- **The business model of horizontal and vertical integration in the consortium of the Chancay port:** In the Callao port, the shipping company Maersk owns the port company APM Terminals, which is the operator of the Multipurpose North Terminal of the Port of Callao. In addition, Maersk forms the global shipping alliance 2M Alliance with Mediterranean Shipping Company S.A. This figure is repeated in the case of the consortium operating the port of Chancay as COSCO Shipping Ports (CSP) is a company with a global network (Europe, Asia, and America) of 12 ports (13 million TEU) and in China of 23 ports (48 million TEU), making it the third-largest port in the world. CSP belongs to COSCO Shipping Group, a shipping conglomerate belonging to the "Ocean Alliance," which, in 2021, and CMA CGM, Evergreen, and OOCL, operated 352 container ships and 42 route services and ranked second among global alliances in mobilizing 29% of total cargo. Given the experience of the North Multipurpose Terminal of the Port of Callao, it is expected that the business model of the Chancay port consortium will also gain advantages for its services in terms of price and time.

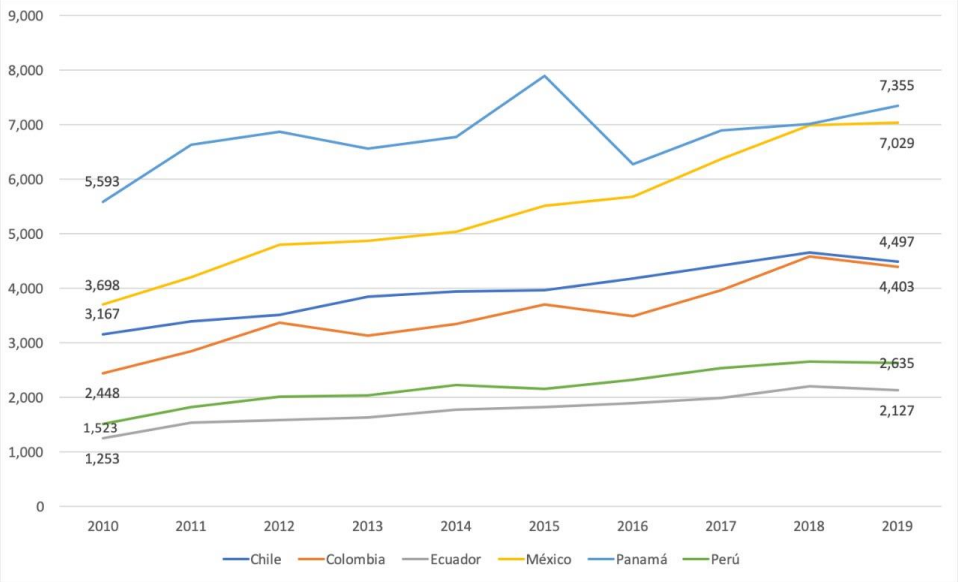
- **The geographical position of Chancay in the transpacific corridor of the "New Maritime Silk Road."** With the "New Maritime Silk Road," we have gathered arguments that the global port networks promoted by the BRI would extend their reach beyond Asia, Africa, and Europe to include the transpacific corridor. Driven by global trade, container shipping cargo tripled between 2000 and 2018, going from 225 to 793 billion TEU, for which the logistics system had to go through significant transformations such as increasing the capacity of container ships which grew from 6,000 TEU in 2006 to 14,000 TEU in 2017. On the west coast, there are no ports with capacities to serve these latest-generation ships, and precisely the port of Chancay has been designed to meet the increase in transshipment cargo coming from long distances taking advantage of the natural potential of a draft more significant than 16 meters and its infrastructures greater than 400 meters in length.

- **Container transshipment in the region and growing regional trade.** In Latin America, container cargo increased from 10 to 25 billion TEUs between 2000 and 2019. Also, four ports on the west coast move significant amounts of transshipment such as Manzanillo (1.1 million TEU), Callao (477 thousand TEU), Lazaro Cardenas (397 thousand TEU), and Buenaventura (370 thousand TEU). In all South American countries on the west coast, exports excluding minerals have grown steadily in recent years, which would keep demand for container shipping routes booming. The multi-port model could consolidate Chancay with the port of Callao in a strategic geographical area to establish consolidation centers for cargo from Ecuador, Colombia, Bolivia, and Chile to Asian markets. This way, the number of direct routes and their frequency could be increased, thus reducing freight costs and waiting time for direct ships linking the transpacific corridor.

b) Chancay as a port that enhances its hinterland can learn from the Chinese experience of developing a territorial development strategy.

For example, the ports of Tianjin and Qinhuangdao serve as gateways to the Jing-Jin-Ji region, where Beijing, Tianjin, and Hebei, with a population of 112 million, are located. These multi-ports are part of a broader strategy that seeks to develop the entire Jing-Ji-Ji hinterland, so the economy does not depend only on Beijing. China diversifies the productive nuclei in such a way as to take advantage of the logistical opportunities of the port of Tianjin, transform the polluting industries of Beijing and integrate Hebei into global value chains. This model could be the one that guides the territorial development of the hinterland of Chancay since there is progress in some of the conditions presented below.

Chart 11: Maritime container traffic in West Pacific countries (TEU: 20-foot equivalent units)



Source: United Nations Conference on Trade and Development (n.d.)

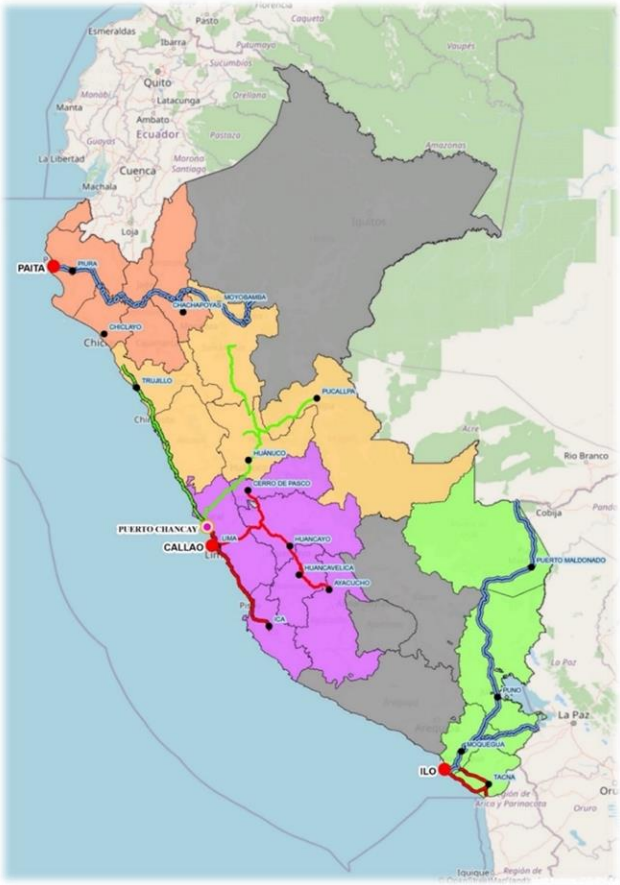
6.1.1. Competitive value chains in economic corridors

China teaches us that its economic growth depends on its territorial development, and ports are a way to strengthen access to markets in its hinterlands. An initial condition for this territorial development is that local production is competitive, which is precisely what this study

finds in the hinterland of Chancay. As the following map shows, after the hinterland of the port of Callao and the port of Paita, Chancay has the economic corridors with the most significant economic potential. While Callao is close to the agriculture of the Amazon and the central highlands and mining production, the port of Paita is the doorway for agribusiness (coffee, cacao, pineapples) and fishing production from various regions that are integrated by the excellent condition of the northern inter-oceanic highway. In contrast, despite having the southern Inter-Oceanic corridor that even allows the arrival of goods from Bolivia, Ilo still does not have production centers with sufficient value added to have a significant container cargo volume.

This contrasts with the potential of Chancay's hinterland, as this study has found four economic corridors such as the Coastal, Chancay - Pucallpa, Monzon - Tingo Maria, and Bellavista - Tingo Maria that concentrate high production volumes of very competitive production chains in external markets such as avocado, timber, coffee, cocoa, and avocado. In addition, this study finds that three of these corridors have human capital formation networks that would facilitate scaling up their links to take advantage of the increased productivity generated by entrepreneurs and innovations. Thus, the hinterland of Chancay could take advantage of chains where Peru is among the top exporters, such as avocado and coffee, to develop volume that would increase the demand for shipping services and eventually lower prices and thus make its other competitive products, such as cacao and aguaymanto, more competitive. The agenda includes facilitating the infrastructure that will allow the arrival of these four corridors to the port of Chancay, as well as promoting improvements in the links of the aforementioned productive chains.

Map 28: Major container ports and their hinterlands

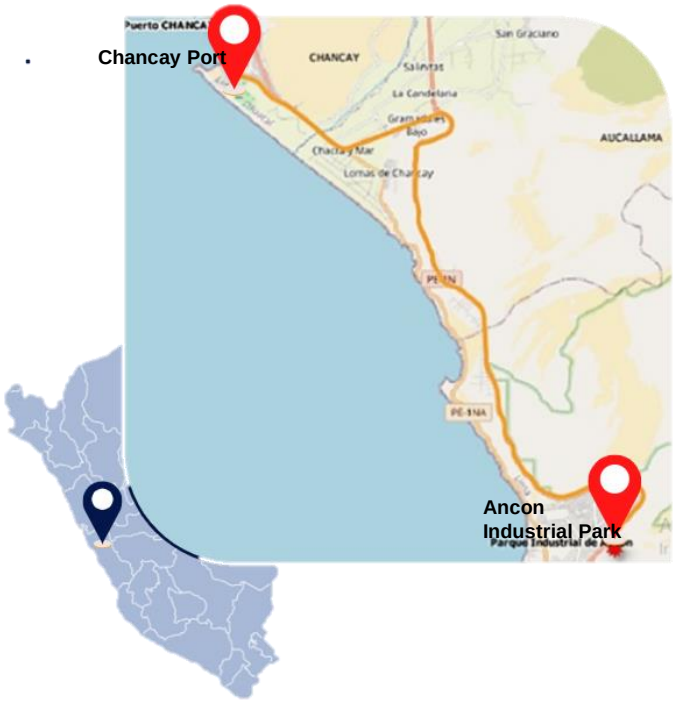


Source: Own elaboration based on Ministry of Transportation and Communications of Peru data (n.d.)

6.1.2. Territorial economic development instruments

As exemplified by the Jing-Jin-Ji economic corridor, China's territorial development model adds instruments such as industrial parks and special economic zones to its strategy of enhancing an area that accounts for 10% of China's GDP. The Jing-Jin-Ji development strategy does not depend on the individual implementation of these instruments but rather on a plan that seeks to enhance the strengths of these three regions or compensate for their weaknesses. Thus, the "Beijing-Tianjin-Hebei Integration Plan" takes advantage of Tianjin's leadership as a global port and creates the "Tianjin Free Trade Zone." Likewise, due to Hebei's backwardness, those industries in which Beijing is not competitive are relocated, which could reduce its industrial density and even urban pollution. In order to level out the three provinces, priority is being given to addressing the problems of pollution and inequality, and Hebei plans to develop an "ecological protection area," a "new financial district in Xiongan" and to transform the Qinhuangdao port from a coal terminal to a container and cruise ship port.

Illustration 10: Ancon Industrial Park and Port of Chancay



Source: Own elaboration

In Latin America, we have identified regional development strategies that may be less ambitious but can guide Chancay's short-term steps. For example, in the Caribbean region, no more than 200 kilometers from the port of Cartagena, seven free trade zones have boosted the food and agribusiness industries by taking advantage of the ports opened up. Thus, this region accounts for 40% of banana exports, the second largest Colombian agricultural product in the last ten years, which grew from U$800 million to U$1,284 million. Unfortunately, in the hinterland of Chancay, we have not identified an articulation between the instruments of productive promotion and territorial development. Despite having favorable conditions to physically integrate the Ancon Industrial Park project with the port of Chancay, these initiatives do not share a framework that generates synergies in the territory.

6.2. Towards an agenda to promote the competitiveness of the hinterland

Thus, the agenda includes defining a plan for the hinterland of Chancay that identifies the projects required by the four identified economic corridors and looks for complementarities and challenges that must be faced together. For example, knowing that the hinterland is very close to the Amazon, the industrial parks in Huánuco or Pucallpa should be very intensive in using renewable energies, and the timber processing should be around the forestry centers to avoid a high volume of cargo that generates extensive use of highways. Taking as a guide the experience of Jing-Jin-Ji and its "Beijing-Tianjin-Hebei Integration Plan," it would be possible to identify territorial objectives, favorable resources, and a list of projects and policies to enhance the hinterland of the future port of Chancay. As we have shown, human capital formation networks in the four economic corridors should be strengthened to accelerate innovation and entrepreneurship in the hinterland.

Another relevant point is how to add value to the existing competitive chains in the hinterland and promote the arrival of new chains. The strategy adopted by Asian countries to maintain and improve their competitiveness has been through their participation in global value chains (GVCs), which has allowed them to link up with geographically dispersed activities through the specialization of companies and industries in specific tasks related to the links of a global service or product (Hernández, Martínez & Mulder, 2014). In this sense, the next step to explore in the agenda is the extent to which the port of Chancay and a territorial development strategy can favor participation in GVCs for both new and Peruvian companies that evolve towards them.

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Annex 1: Photos

Photo 1. Project presentation with the Deputy General Manager of COSCO SHIPPING Ports Chancay

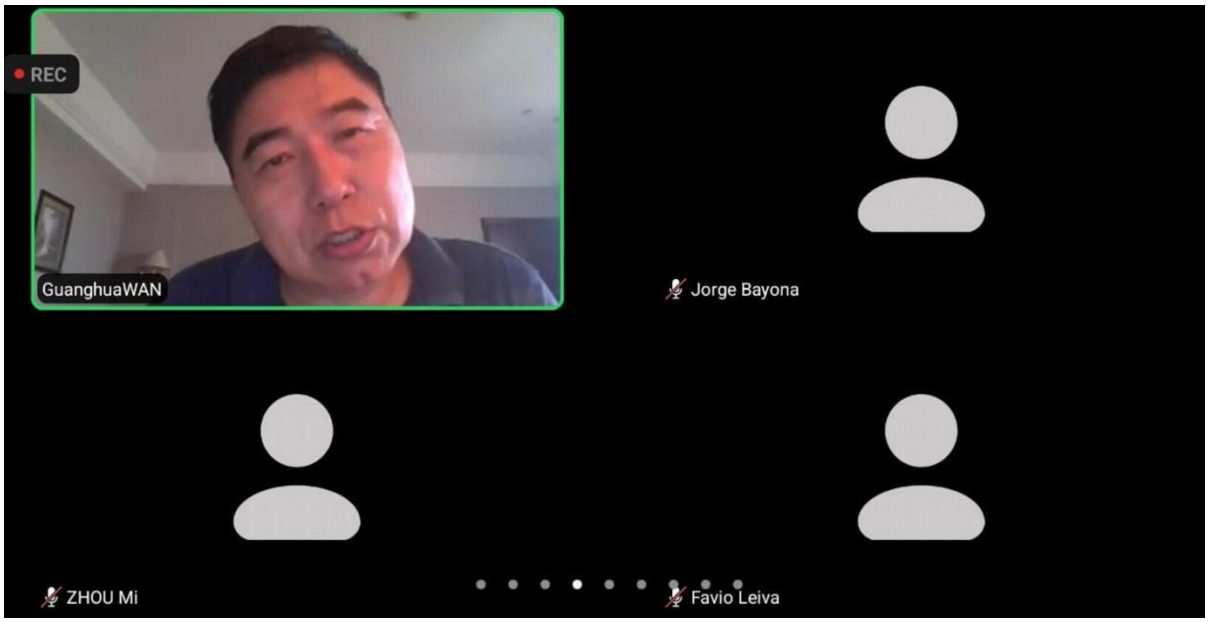
Photo 2. Project presentation with the Deputy General Manager of COSCO SHIPPING Ports Chancay

Photo 3. Project presentation with the professors of the Universidad Nacional José Faustino Sánchez Carrión.

Photo 4. Participation in the most important food and beverage tradeshow in Latin America, Expoalimentaria 2022, to identify and describe the hinterland agro-companies.

Photo 5. Project Presentation at APEC Study Centre Consortium Conference 2022

Photo 6. Remarks by Dr. WAN Guanghua, Director of the Institute of World Economy of Fudan University and Former Director of the Research Department of the Asian Development Bank (ADB) to the project in the framework of the "Research Project Workshop Series", a set of academic meetings where the results of the research carried out by our affiliated researchers during 2021-2022 were presented.



Annex 2: Interview list

Name	Job title	Date
Mario de las Casas	Public Affairs Manager, COSCO SHIPPING PORT CHANCAY	15/03/2022
Gonzalo Rios Polastri	Deputy General Manager of COSCO SHIPPING Ports Chancay	15/03/2022
Patricia Benavente	Former Head of the Superintendence of Land Transportation of People, Cargo and Goods (SUTRAN in Spanish)	25/10/2021
Irina Patricia Calvo Rivera	Professor of the Universidad Nacional José Faustino Sánchez Carrión	15/03/2022
Jesús Gustavo Barreto Meza	Professor of the Universidad Nacional José Faustino Sánchez Carrión	15/03/2022
Xavier Montes	ComexPeru Trade Facilitation Manager	16/02/2022

About the Author

Omar Narrea is a Peruvian economist with post graduate studies at the London School of Economics and the University College London. After working for seven years at the Ministry of Economy, he joined the School of Public Management of Universidad del Pacífico as post-grad Lecturer and researcher associate.

His research topics focused on the impact of large productive and infrastructure projects on local development and national competitiveness. In 2019, he received a grant by The Economic and Social Research Consortium (CIES) to study the territorial potential of the first Chinese port in Latin America: the Chancay Port. In July 2018, he attended the Seminar on China's Development Experiences and Cases-Center for International Knowledge on Development (CIKD) in Beijing. In the same year, he was invited to Manaus city (Brazil) to the VII High Level China – Latin America Academic Forum. Currently he is research associate in the Center for China and Asia-Pacific Studies where he is exploring how economic corridors under the Belt and Road Initiative can provide lessons about strategies to develop the hinterland of the future Chancay port towards global value chains.