*IOSR Journal of Research & Method in Education (IOSR-JRME)*
*e-ISSN: 2320–7388, p- ISSN: 2320-737x Volume 16, Issue 2 Ser. 2 (Mar. – Apr. 2026) 38-48*
*www.iosrjournals.org*

# The Airport Infrastructure Of Fortaleza International Airport: A Brief Analysis Of Air Cargo Transport And Its Implications For The Economic Development Of The State Of Ceará

Márcio Carneiro Barbosa

*(Bachelor's Degree In Military Sciences – Academia Militar Das Agulhas Negras (AMAN); Bachelor's Degree In International Relations – Universidade Do Sul De Santa Catarina (UNISUL); Higher Technology Degree In Foreign Trade – Universidade Do Sul De Santa Catarina (UNISUL); MBA In Business Logistics – Fundação Getulio Vargas (FGV); MBA In Renewable Energy Management – Fbuni / Instituto Euvaldo Lodi (IEL); Postgraduate Degree In Higher Education Teaching – Universidade Federal Do Rio De Janeiro (UFRJ); Postgraduate Degree In Public Administration – Universidade Católica De Brasília (UCB); Specialization In National Logistics – Escola Superior De Guerra (ESG); Specialization In Marketing Management – Universidade Veiga De Almeida (UVA); M. Sc. In Military Sciences – Escola De Comando E Estado-Maior Do Exército., Brazil)*

***Abstract:***
***Background:*** *This paper addresses the airport infrastructure of Fortaleza International Airport and air cargo movements to both Brazilian and international markets. It presents the historical development, relevance, and characteristics of air transport, while also examining the physiographic features of Fortaleza and the antecedents that justified the construction of the airport in the capital of Ceará.*
***Materials and Methods:*** *The study adopts a qualitative approach aimed at analyzing the extent to which airport operations may influence the economic indicators of the State of Ceará. The methodological procedure consisted of a literature and documentary review, structured into four categories: (1) sources related to the air transport system; (2) sources addressing the physiography of Fortaleza and the historical context of the airport's construction; (3) sources concerning airport infrastructure; and (4) sources examining the advantages of this infrastructure for the State's economic development.*
***Results:*** *The findings indicate that the expansion of airport operations, particularly in relation to cargo handling, contributes to the strengthening of imports and exports, thereby promoting the integration of Ceará into national and international markets. This dynamic fosters commercial activity and enhances the State's economic performance.*
***Conclusion:*** *It is concluded that the airport infrastructure of Fortaleza plays a significant role in supporting air cargo transport, generating positive impacts on the economic development of Ceará, especially through the expansion of foreign trade.*
***Key Word:*** *Air transport; airport; air cargo; development.*

Date of Submission: 29-03-2026 Date of Acceptance: 09-04-2026

## I. Introduction

With the flight of the 14-Bis, built by the Brazilian Alberto Santos Dumont, on October 23, 1906, at the Campo de Bagatelle in Paris, France, the world witnessed the first heavier-than-air aircraft to gain altitude by its own means. From that moment on, the twentieth century experienced the emergence and rapid development of this mode of transport that would profoundly transform human mobility: the airplane.

Air transport gradually became integrated with other transportation systems, reducing distances, swiftly crossing borders, and reaching locations that were difficult to access by land or sea. With the advent of aviation, the third dimension of transportation came to serve the same purposes as land and maritime modes, namely the movement of people and the transportation of goods.

Year after year, new types and models of aircraft transitioned from design boards to hangars, and from hangars to the skies. Powered by combustion engines, aircraft progressively achieved greater power, higher speeds, extended range, and increased flight capacity.

To support these operations, ground-based structures became indispensable for navigation, landing, takeoff, maintenance, and communication between and with aircraft. The construction of airport complexes thus evolved in direct proportion to the successive technological innovations incorporated into aviation.

The outbreak of World War I, followed by World War II, and later the Cold War, significantly stimulated the aeronautical industry and, consequently, improvements in airport infrastructure. Civil engineering was required to build longer and more resistant runways due to the increasing weight and dimensions of aircraft, as well as larger passenger and cargo terminals to accommodate the growing demand for more frequent and intensive flights.

In Brazil, given its continental dimensions, airports played a central role in enabling aviation to gradually reach the most remote regions from North to South. Institutionally, a defining milestone was the creation of the Ministry of Aeronautics in 1941.

Later, in the second half of the twentieth century, the construction of larger airports, particularly in the Southeast region, provided the structural conditions necessary for Brazil to consolidate its national integration and strengthen its sovereignty through control of its airspace.

In the Northeast region, state capitals began to be equipped with airports featuring adequate infrastructure, capable not only of supporting air navigation and aircraft operations both in flight and on the ground, but also of facilitating the movement of people, goods, and services. This development contributed to the socioeconomic dynamism of these capitals and their surrounding regions.

In the State of Ceará, the city of Fortaleza was endowed with such infrastructure, enabling it to benefit from aviation development for both civil and military purposes, as well as for the broader Brazilian society. Thus emerged the Fortaleza International Airport, which constitutes the focus of this study.

Regarding the methodology, a qualitative approach was adopted. In terms of research procedures, the study was based on bibliographic and documentary analysis, drawing on national and international publications, scientific articles, governmental bodies, multinational institutions, and online sources. Through the consultation and consolidation of these materials, it was possible to identify the most relevant issues addressed in this research.

Accordingly, the general objective of this study is to analyze the airport infrastructure of Fortaleza International Airport and the implications of air cargo transport for the economic development of the State of Ceará. Based on this analysis, the study aims to provide insights for decision-makers, contributing to greater clarity in the formulation of public policies and business strategies that support the State's economic growth.

The specific objectives are as follows: to present the history, importance, and characteristics of air transport; to characterize the physiography and historical antecedents of Fortaleza International Airport; to describe its current airport infrastructure; and to assess the main impacts of cargo movement at the airport on the development of Ceará.

Thus, this article is structured into four sections that provide a comprehensive analysis of the airport infrastructure of Fortaleza International Airport and the implications of air cargo transport for the economic development of Ceará. The first section, Introduction, presents the central theme of the study. The second section, Methodology, describes the research approach, including data collection and analysis strategies. The third section, Theoretical Framework, discusses the history, importance, and characteristics of air transport, characterizes the physiography of Fortaleza and the historical factors that led to the airport's construction, describes the airport infrastructure, and evaluates the implications of air cargo transport for the State's development.

Finally, the Conclusion section synthesizes the main findings of the study, highlighting the extent to which Fortaleza International Airport may serve as a catalyst for the economic progress of the State of Ceará.

## II. Material And Methods

The approach adopted in this research was qualitative in nature, as its main objective was to analyze the airport infrastructure of Fortaleza International Airport and the implications of air cargo transport for the economic development of the State of Ceará. This approach is widely recognized in the scientific field for its ability to provide contextual analyses, enabling a comprehensive understanding, in this case, of the impacts on foreign trade (imports and exports), production centers, consumption hubs, and the overall development of the State of Ceará. Furthermore, qualitative research emphasizes the interpretation and understanding of complex phenomena, which is particularly relevant in areas involving a mode of transport that projects the State of Ceará into both national and international markets.

Regarding methodological procedures, the research was classified as bibliographic. This type of procedure is grounded in the careful analysis of previously published scientific works, constituting one of the fundamental bases for the construction of scientific knowledge. According to Pereira et al. (2018), bibliographic research is capable of consolidating theoretical and methodological frameworks by gathering and interpreting significant contributions on a specific topic. Robert K. Yin (2016) further argues that this method strengthens the analytical rigor of research by grounding discussions in established theories.

For the development of this review, the research sources were selected and organized into four main categories: (1) sources addressing the history, importance, and characteristics of air transport; (2) sources detailing the physiography of Fortaleza and the historical factors that led to the construction of the airport in the capital of

Ceará; (3) sources describing the airport infrastructure of Fortaleza International Airport; and (4) sources evaluating the advantages of air cargo transport for the economic growth of the State of Ceará.

This classification enabled a more comprehensive and contextualized understanding of the gains achieved by Ceará through cargo movement handled by aircraft operating at Fortaleza. The bibliographic and documentary reviews were conducted through consultation of national and international publications, scientific articles, governmental bodies at both national and international levels, the aeronautical industry, multinational companies, and online sources, ensuring a broad scope that reflects the most relevant contributions of the airport to the economic development of the State of Ceará.

## III. Theoretical Framework

This theoretical framework was organized into three subsections. The first presents the historical development, relevance, and characteristics of air transport. The second aims to characterize the physiography of Fortaleza, the antecedents that led to the construction of the airport in the capital of Ceará, as well as a description of the current airport infrastructure. The third subsection provides an evaluation of the advantages of cargo movement at the airport for the economic development of Ceará.

**Historical Development, Importance, and Characteristics of Air Transport**

Even before the advent of airplanes, mail was transported by balloons and airships. The first cargo transported by aircraft took place in 1910, when rolls of silk were moved from Dayton to Columbus, Ohio, in the United States. In the following year, experiments with mail delivery began; by 1914, regular air service had started in the United States, and in 1925, airmail became available in that country (ACI, 2019 apud Chagas, 2022). With the remarkable development of aviation, air transport emerged as a mode capable of significantly increasing the speed of transportation, playing an important role in stimulating economic relations and the exchange of people and goods (Machry, 2011a). Although it is one of the most recent transport modes, it is currently among the most relevant, particularly due to its capacity to establish fast and efficient intercontinental connections (Razzolini Filho, 2009).

In the second half of the twentieth century, one of the greatest challenges in air cargo transport occurred in 1948 during the Berlin Blockade, when the city of Berlin, Germany, had its land access routes blocked by the Soviet Union, making air transport the only viable means of supply. For a period of 330 days, approximately 6,800 tons of supplies were delivered daily, totaling close to 2.26 million tons transported. This episode remains one of the most illustrative examples of how aviation enables access to isolated regions (Morrell; Klein, 2019).

Another significant milestone arose from the global impact of the COVID-19. Beginning in 2020, the pandemic clearly demonstrated the importance of air cargo transport for markets and for various essential sectors of society. Air routes ensured the rapid distribution of medical supplies, including vaccines, across all continents (Chagas, 2022). Approximately 60% to 70% of global air traffic between 2020 and 2023 was carried out by cargo aircraft, due to the substantial reduction in passenger flights (Boeing, 2024).

**Figure 1: Air cargo transport during the COVID-19 pandemic.**


Source: FedEx

The cases presented above indicate that cargo transport is grounded in the principle of demand at the destination and supply at the point of origin. This implies that the movement of goods between locations tends to increase in response to growing demand (Chagas, 2022). In this context, it can be inferred that raw materials, production, and consumers are not necessarily located in proximity, thereby creating a logistical challenge in which transportation assumes a central role (Machry, 2011b apud Barbosa, 2026).

For this reason, air cargo transport plays a distinct role in global trade due to its reliability, speed, and security. Although less than 1% of total trade volume is transported by air, these shipments typically consist of

perishable, high-value, or time-sensitive goods, which together account for approximately 35% of the total value of global trade (Boeing, 2024), particularly when speed and safety are required conditions (IATA, 2020). In this sense, air transport becomes a key element for logistics to fulfill its function of distributing goods to consumer markets (Razzolini Filho, 2009).

It is also important to note that economic crises tend to negatively affect global cargo traffic, whereas economic growth stimulates the expansion of air transport. Gross Domestic Product (GDP), as a measure of global economic activity, is directly associated with transport demand, since increased economic activity generates greater opportunities for air cargo expansion. This explains the strong relationship between GDP fluctuations and the volume of air cargo transported over time (Matera, 2012).

Thus, industrial production and the trade of goods are closely interconnected, with the former influencing the volume, value, and freight dynamics of the latter. For instance, global industrial production increased by 3.2% between 2024 and 2025, leading to a 6.7% rise in cargo traffic and a 6.5% expansion in trade (IATA, 2025).

Despite the challenges faced in early 2023 due to global economic uncertainty, the market showed a significant recovery in the second half of the same year, indicating a consistent capacity for long-term adjustment (Boeing, 2024).

Within this context, air cargo transport assumes a strategic function in ensuring the circulation of capital, as it is responsible for transporting a relevant share of high value-added goods, time-sensitive products, consumer goods, durable goods, perishable items, and shipments characterized by low weight and volume but high urgency (Razzolini Filho, 2009; Machry, 2011a; Matera, 2012; Silveira; Quintilhano, 2015).

Even amid global volatility, air trade between Latin America and North America remains strong, driven by economic ties and geographic proximity. Mexico and Brazil, the largest economies in Latin America with strong connections to North America, accounted for more than 40% of all Latin American air exports to North America in terms of value (Boeing, 2024).

In addition, the significant growth of e-commerce over the past decade has directly influenced the demand for air cargo, with projections indicating a 20% increase over the next five years. A notable development in this sector is the emergence of Amazon Air, which has challenged established operators such as FedEx and UPS. Its financial capacity and proven ability to innovate have enabled the expansion of an extensive network supported by contracted cargo aircraft, generating direct impacts on global air freight (ACI, 2020). Projections indicate that the global air cargo market will grow at an average annual rate of 4.1% until 2041, largely driven by the expansion of e-commerce.

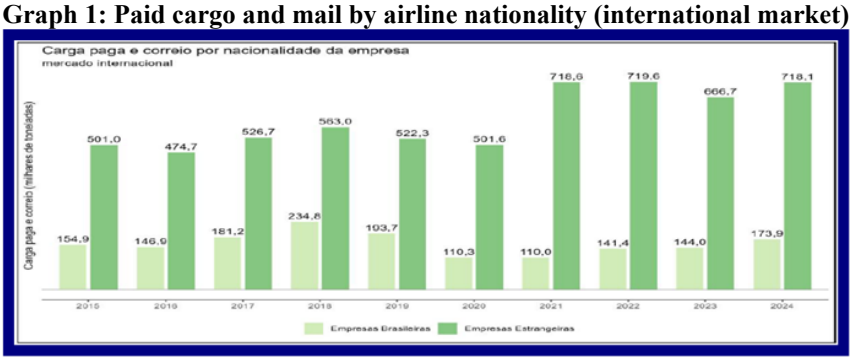
Furthermore, the sales and industrial production sectors are expected to continue expanding in the coming years, which will likely result in increased demand for air transport services (BOEING, 2022 apud Chagas, 2022).

In Brazil, air transport has played a fundamental role in connecting distant regions, particularly linking major urban centers with coastal areas, given the country's continental scale and socioeconomic diversity. In this regard, air cargo transport represents a fast and secure alternative for delivering goods and services where and when they are needed, functioning as an intermediary between the dispatch of finished products and their final consumers (Razzolini Filho, 2009).

It is also noteworthy that, in Brazil, the international air cargo market, which recovered rapidly and surpassed pre-pandemic levels as early as 2021, recorded further growth of 10% in 2024. Meanwhile, domestic cargo transport exceeded, for the first time, the levels observed in the pre-pandemic period (2019), with an increase of 8% (ANAC, 2025).

According to the Air Transport Yearbook (ANAC, 2024), data for the international market demonstrate a consistent increase in cargo transport in Brazil, particularly from 2021 onward, as illustrated in Quadro 1. Given that air transport is generally associated with higher operational costs, these figures directly reflect the capacity of the productive sector, indicating a strengthening of economic activity.

**Graph 1: Paid cargo and mail by airline nationality (international market)**




Source: ANAC (2025).

Thus, it can be partially concluded that air cargo transport emerged, from its earliest stages, to support the movement of goods from production areas to consumer regions, directly influencing the process of commercial exchange. This activity, whether at the domestic level or within the global context, has a direct impact on the flow of production and stimulates the circulation of capital, reflecting a strategy that contributes to the economic development of countries that make use of it.

**General Considerations of Fortaleza International Airport**

From a simple military runway built in the 1940s, Pinto Martins International Airport has become the main airport infrastructure in the State, reaching both Brazilian and international markets in cargo handling and passenger transport. From this location, imported and exported goods arrive and depart, establishing the airport as a relevant driver of socioeconomic development in the State. This raises the question of which physiographic and historical factors have contributed to its current strategic importance for Ceará.

Physiography of the City of Fortaleza and Historical Aspects of Pinto Martins International Airport

Understanding the reasons behind the construction of Fortaleza International Airport (Pinto Martins) and its economic contributions to the State of Ceará requires an analysis grounded in two interconnected dimensions: a geopolitical, or physiographic, perspective and a historical perspective derived from it. Regarding the first dimension, one of the key physiographic factors in the analysis of a given region is its geographical position. Such studies examine relationships with neighboring countries, trade routes, distances to overseas markets, sources of raw materials, industrial and consumption centers, as well as the potential for integration with economic blocs (Castro, 1994). In turn, according to Mattos (1975), the position of a country is analyzed based on latitude, proximity or distance from the sea, altitude, and its relative situation in relation to neighboring countries. In the specific case of Fortaleza, the city is located in the Northeast portion of Brazil, at a latitude of 3°43'02" South and longitude 38°32'35" West, with a relief characterized by a coastal plain (IPECE, 2018). This location, due to its proximity to the Equator and its position within the region known as the Northeastern Salient, provides a strategic advantage by shortening distances to the European, African, and North American continents, placing it close to important consumer markets and facilitating access to major international trade flows of goods and services (ADECE, 2019).

**Figure 2: U.S. Cocorote Air Base (Alto da Balança neighborhood)**


Source: Fortaleza em Fotos (2017).

Based on the aforementioned natural conditions, the United States, during World War II, and through a political-diplomatic agreement with Brazil under the Vargas Government, established as a strategic initiative the implementation of North American military support bases in the Northern and Northeastern regions of Brazil, given their proximity to Europe. As a result, air bases were established in Amapá, São Luís, Belém, Salvador, Natal, Recife, Fernando de Noronha, Maceió, and Fortaleza. At that time, in the capital of Ceará, the Cocorote Air Base (Figure 2) was built in 1943, in the vicinity of the present-day neighborhoods of Serrinha, Montese, Dias Macedo, Alto da Balança, and Vila União (Maciel, 2006 apud Andrade; Neto Cisne, 2024). From 1943 to the present day, Fortaleza International Airport has undergone changes in its designation, a privatization process, expansion works, and several other improvements in its airport infrastructure (Table 1), making it more efficient in fulfilling its primary functions.

**Table 1: Main developments of Fortaleza Airport**

| Year | Relevant Events | Remarks |
|---|---|---|
| 1943 | Construction of the Cocorote Air Base | - Strategic point in Fortaleza for the U.S. war effort |
| 1952 | Transformation of the Air Base into Pinto Martins Airport | - Federal Law No. 1,602;- Location of the current “Old Airport”. |
| 1966 | Construction of the first passenger terminal | - Location of the current “Old Airport” and current site of the General Aviation Terminal (TAG) for air taxi operations. |

| Year | Relevant Events | Remarks |
|---|---|---|
| 1974 | Beginning of several expansion and revitalization works at the airport site | - Under the responsibility of INFRAERO. |
| 1989 | Internationalization of Pinto Martins Airport | - Flight originating from Paris (France). |
| 1998 | Construction of the new passenger terminal (opposite side of the 1952 terminal) | - Under the responsibility of INFRAERO;- Construction of Avenida Senador Carlos Jereissati. |
| 2017 | Concession Contract No. 4 (National Privatization Program) | - Fourth round of airport concessions in Brazil (Decree No. 8,517 of 2015);- Concession to Fraport AG Frankfurt Airport Services Worldwide (Germany);- Transition from INFRAERO to Fraport Brasil – Fortaleza. |
| 2018 | Construction of the new passenger terminal, runway, and taxiway | - New domestic boarding area and new security inspection area. |
| 2019 | Construction of new road access and expansion of the international boarding area | - Opening of international and domestic check-in;- Taxiway reform;- Installation of Bar Coded Boarding Pass;- Installation of X-ray equipment. |
| 2020 | Phase I-B works | - Improvements to the sound system based on IoT (Internet of Things);- Runway expansion works;- New taxiway;- Construction of energy substations;- Paving of service roads. |
| 2021 | Certification of the airport runway | - For takeoff and landing use. |

Source: Maciel (2006) apud Andrade and Neto Cisne (2024), Fraport (2026).

The Phase I-B mentioned in Table 2 refers to the expansion of the existing infrastructure, particularly the Passenger Terminal facilities, with the objective of improving the level of services provided to users (Andrade; Cisne Neto, 2024). As observed, throughout its history, the airport has undergone numerous engineering interventions, which have directly influenced its competitiveness and operational capacity. This trajectory is closely associated with its location on the coastal plain of Ceará and its strategic geographic position, often referred to as the "Atlantic Corner," in proximity to major global markets, thereby establishing it as a gateway for the flow of products, goods, and services to and from the Northeast region, Brazil, and international destinations.

Air Cargo Airport Infrastructure of Fortaleza International Airport

As an initial consideration, the air cargo transport sector encompasses all activities related to the provision of cargo transportation by aircraft, including the circulation and operation of machinery and equipment within the airport and its surrounding areas (Cubas Jr, 2004 apud Souza, 2022). In this context, airport infrastructure plays a determining role in the competitiveness of an airport, as it ensures appropriate conditions for the loading and unloading of goods, air traffic control, and a range of other operational functions (Silva, 2020).

In the specific case of Pinto Martins International Airport, the complex comprises a total area of 5.3 km², including a runway measuring 2,525 meters in length and 45 meters in width, with a projected extension of 210 meters, reaching a total length of 2,755 meters. The airport infrastructure also includes a passenger terminal, a cargo terminal, and a general aviation terminal (Silva, 2020), in addition to the capacities presented in Table 2.

**Table 2: Technical information of the International Airport Cargo Terminal**

| Infrastructure | Quantity |
|---|---|
| Import warehouse | 2,300 m² |
| Export warehouse | 3,077 m² |
| Dangerous goods warehouse | 127 m² |
| Cargo handling and unloading yard | 2,600 m² |
| Refrigerated storage complex | 420 m² |
| X-ray with capacity of | 180 x 180 smiths |
| Number of docks | 9 |

Source: Fortaleza Airport (2026).

The Domestic Cargo Terminal is managed by Azul Cargo, GOLLOG, and LATAM Cargo. In turn, the international terminal is equipped with infrastructure designed to support import and export operations, ensuring efficient processing for foreign trade users (Fraport, 2026). Not surprisingly, the airport achieved notable performance indicators at the national level in 2025 (Table 3.

**Table 3: Statistics of Fortaleza International Airport (2024/2025)**

| Ranking in Brazil | General Cargo Movement | Remarks |
|---|---|---|
| 8th position nationally in cargo movement | 49,400 tons | - Domestic and international volumes; - Best historical result of the terminal. |
| 5th position nationally in international cargo volume | 11,520 tons | - Exclusively international cargo (to/from abroad); - 8,394 tons (exports); - 3,133 tons (imports); - Increase of 13.54% compared to 2024. |
| 4th position nationally | 10,210 tons | - Cargo processed to/from Europe. |

Source: Pires (2026)

The indicators presented above are expected to improve, as Amazon and the logistics company of the German group DHL are set to establish operations within the logistics complex of Fortaleza International Airport. LATAM Airlines, for instance, is expected to develop e-commerce delivery partnerships with Amazon, similarly to the arrangements already established by GOL Linhas Aéreas and Mercado Livre, whose aircraft operate in Fortaleza (Pires, 2025).

**Figure 3: Strategic partnership in cargo transport between GOL and Mercado Livre**


Source: Pires (2026). Photo by Renato Bezerra.

Thus, the expansion of major logistics operators within the Pinto Martins International Airport complex helps explain the significant increase in cargo movement. Mercado Livre, Magazine Luiza, and Amazon already maintain substantial cargo operations. GOL Linhas Aéreas operates aircraft branded with Mercado Livre's livery (Figure 3). There are also numerous operations involving Boeing 737 freighters operated by Sideral Linhas Aéreas, and, in the near future, flights by Air France, scheduled for 2026, are expected to further stimulate air cargo transport in the capital (Pires, 2026).

These favorable logistical conditions have led to projections for the construction of a logistics complex in the vicinity of Fortaleza International Airport, considered the first development under the "Airport City" concept. The planned facilities would occupy underutilized land surrounding Pinto Martins, totaling 370,000 square meters of built area, including yards, storage infrastructure, facilities for handling various types of products, distribution channels, a truck center for vehicle maintenance and repair, among other improvements (Rodrigues, 2025).

A distinctive feature of the Pinto Martins airport complex is its multimodal integration with other transport systems. The selection of transport modes plays a central role in planning and managing the supply chain, from production sites to consumption areas. In this context, multimodal transport emerges as a relevant alternative for ensuring the effective and efficient execution of logistics operations (Matera, 2012).

Located within the Metropolitan Region of Fortaleza, Pinto Martins International Airport has the capacity to integrate with major federal highways departing from Fortaleza, such as BR-020, BR-116, BR-122, BR-222, BR-343 (towards Teresina, Piauí), and BR-304 (towards Natal, Rio Grande do Norte), in addition to state highways within Ceará. This network enables the circulation, distribution, and access of goods to and from the airport. Consequently, the possibility of distributing goods through multiple transport modes provides greater flexibility, ensuring connections between raw material areas and industrial centers, as well as between production and consumption hubs and the airport (Castro, 1994 apud Barbosa, 2026).

Therefore, it can be partially concluded that the continuous improvements in airport infrastructure, aimed at enhancing efficiency in cargo handling, the strategic partnerships between major logistics operators such as Mercado Livre, DHL, and Amazon, and airlines such as LATAM Airlines, GOL, and Azul Linhas Aéreas, combined with cargo movement indicators and the planned development of a logistics complex under the "Airport City" concept, demonstrate the airport's capacity to function as a logistics hub in the Northeast of Brazil, enabling more efficient management of import and export activities.

**Air Cargo Transport at Fortaleza International Airport: Implications for the Economic Development of Ceará**

Transport systems are designed to achieve economic objectives, such as the distribution of industrialized products (Caixeta-Filho; Martins, 2009 apud Barbosa, 2026). On the other hand, certain regional characteristics may influence the choice of transport mode due to infrastructure limitations (ACI, 2020). Based on these considerations and the information previously examined, it can be inferred that Pinto Martins International Airport currently possesses an airport infrastructure that enables it to serve as a regional and international reference, generating significant gains and benefits for the State of Ceará through the movement of air cargo.

**Figure 4: Fortaleza International Airport (Pinto Martins)**

Source: Basseto (2025)

In 2018, one year after the concession to Fraport AG Frankfurt Airport Services Worldwide, Pinto Martins International Airport recorded a 24% increase in cargo handling. At that time, exported goods included fruits, leather, footwear, and fish, which were shipped to the United States, Portugal, China, Netherlands, and Germany. Regarding imports, the main products consisted of machinery, machinery parts, equipment, and inputs originating from Portugal, France, China, Argentina, and the United States, which were utilized by various industries established in the region (Basseto, 2017; SETCARCE, 2018).

Fruits accounted for the leading segment of exports, with emphasis on mangoes produced in Casa Nova and papayas produced in Baraúna and Mamanguape (Basseto, 2017).

As a result of investments made by Fraport Brasil in airport infrastructure, the airport now demonstrates recognized logistical efficiency, generating value for the production chain and strengthening connections within international air networks (Fraport, 2025). Consequently, foreign trade associated with air cargo transport has shown positive prospects. Between 2024 and 2025, exports recorded an annual increase of 23.2%, surpassing 38,000 tons of cargo and corresponding to more than eighty million dollars in exported goods (Table 4).

**Table 4: Exports from Ceará by Mode of Transport**

| Vias | 2025 | | 2024 | | Variação Anual (FOB) | |
|---|---|---|---|---|---|---|
| | US$ FOB | Kg | US$ FOB | Kg | | |
| MARITIMA | 2.140.960.124 | 2.742.443.515 | 1.349.253.728 | 1.269.336.637 | 58,7% | ▲ |
| AEREA | 80.653.451 | 38.776.844 | 65.452.393 | 36.443.708 | 23,2% | ▲ |
| RODOVIARIA | 53.477.961 | 12.891.448 | 53.771.767 | 11.362.001 | -0,5% | ▼ |
| LACUSTRE | 8.736.249 | 2.853.179 | - | - | * | |
| VIA NAO DECLARADA | 720.584 | 144.971 | 144.247 | 24.543 | 399,5% | ▲ |
| MEIOS PROPRIOS | 130.143 | 31.189 | 3.000 | 4 | 4238,1% | ▲ |
| **Total** | **2.284.710.177** | **2.797.146.518** | **1.468.655.979** | **1.317.179.696** | **55,6%** | ▲ |

Fonte: Ministério do Desenvolvimento, Indústria, Comércio e Serviços - MDIC. Dados: Comex Stat. Elaboração: CIN/FIEC.
Referência: (-) Não houve registro. (*) Não se aplica.

Source: International Business Center of Ceará (FIEC, 2026).

The data presented above characterize the airport as the largest exporter in the North and Northeast regions and the fourth in Brazil, confirming its position as one of the main cargo airports in the country. This growth has been driven by the expansion of international routes, particularly through cargo flights operated by LATAM Cargo to Lisbon, the use of higher-capacity aircraft by Air France, and the route operated by LATAM Cargo connecting Guarulhos, Fortaleza, and Manaus, which has enabled the transport of larger volumes of international cargo (Fraport, 2025).

During the same period under analysis, imports recorded an annual increase of 120.3%, exceeding 653 thousand tons of cargo, with values surpassing 198 million dollars (Table 5).

**Table 5: Imports from Ceará by Mode of Transport**

| Vias | 2025 | | 2024 | | Variação Anual |
|---|---|---|---|---|---|
| | US$ FOB | Kg | US$ FOB | Kg | |
| MARITIMA | 2.528.208.964 | 5.844.201.674 | 2.915.692.460 | 5.466.579.118 | -13,3% ▼ |
| AEREA | 198.236.035 | 653.300.105 | 89.971.115 | 1.129.069 | 120,3% ▲ |
| RODOVIARIA | 6.615.412 | 4.798.213 | 4.658.389 | 3.389.951 | 42% ▲ |
| MEIOS PROPRIOS | 674.169 | 490.920 | 17.829.874 | 10.447 | -96,2% ▼ |
| **Total** | **2.733.734.580** | **6.502.790.912** | **3.028.151.838** | **5.471.108.585** | **-9,7%** ▼ |

Fonte: Ministério do Desenvolvimento, Indústria, Comércio e Serviços - MDIC. Dados: Comex Stat. Elaboração: CIN/FIEC.

Source: International Business Center of Ceará (FIEC, 2026).

In the short and medium term, economic indicators are expected to improve as a result of air cargo movement associated with foreign trade. In this context, the information presented in Table 6 anticipates the benefits and advantages of this infrastructure for the economic development of the State of Ceará.

**Table 6: Economic benefits and advantages of Pinto Martins Airport for Ceará**

| Activity | Benefits and Advantages |
|---|---|
| **Economic Nature** | - Economic dynamization and promotion of entrepreneurship in Ceará; - Access to new markets for producers and consumers, as well as for merchants and entrepreneurs in the State; - Development of the productive chain in Ceará; - Strengthening of Ceará's industrial activity; - Improvement in transportation infrastructure (various modes) within the State; and - Greater attraction of national and foreign investments. |
| **Exports** | - Generation of foreign exchange, increasing GDP and strengthening Ceará's economy; - Increase in the trade balance surplus of Ceará; - Improvement of processes and products, enhancing quality and technological standards; - Increased competitiveness of Ceará's industry; - Reduction of the State's trade deficit; and - Tax incentives (exemption and/or reduction of IPI, ICMS, PIS, COFINS). |
| **Imports** | - Access to goods and inputs not produced in Ceará and/or in Brazil; - Promotion of innovation and technological development in the region; - Market diversification (greater variety of products); - Encouragement for Ceará's industries to become more efficient, innovative, and to improve the quality of their own products; and - Strengthening of the State of Ceará's productive chains. |
| **Logistics** | - Integration of air and road transport modes; - Increase in the flow of goods and products within the State; - Improvement of the logistics chain in Ceará; - Greater logistical efficiency in cargo transportation; and - Access to new markets and distribution channels (national and regional). |

Source: Bueno (2026), Brasil (2026) and researcher data.

Finally, it should be noted that the free trade agreement between Mercosur and the European Union (EU) was formally signed in January 2026, encompassing 31 countries, more than 700 million consumers, and nearly 25% of global GDP. The principal benefit of the agreement lies in the reciprocal expansion of market access. Within a period of up to 15 years, Mercosur is expected to eliminate import tariffs on approximately 91% of products originating from the EU, while the European bloc would reduce tariffs to zero on about 95% of goods imported from Mercosur (RUCR, 2026).

In the current context, the agreement assumes significant relevance for energy development strategies in Ceará. This importance is further reinforced by the expansion of infrastructure supporting the transition toward renewable energy sources (Barbosa; Gomes et al., 2025).

As elucidated by Barbosa and Gomes et al. (2025), the intensification of economic cooperation between Mercosur and the European Union may act as a powerful driver for the mobilization of financial capital, technological innovation, and knowledge aimed at modernizing existing energy infrastructures.

Such dynamics enable not only greater interaction among participating countries but also the establishment of a more favorable institutional environment for the implementation of initiatives focused on the generation of clean and sustainable energy. This is particularly relevant in regions seeking deeper integration into global energy transition networks (Barbosa; Gomes et al., 2025).

Ceará represents a clear example, given its strategic location, significant renewable energy potential, and ongoing initiatives related to the production of low-carbon hydrogen. These initiatives are progressively being incorporated into international cooperation efforts, signaling the State's growing relevance within this context (Barbosa; Gomes et al., 2025).

In this regard, air cargo transportation between Fortaleza and Europe is expected to intensify, thereby strengthening the airport as a logistics and aviation hub. This prospective outlook is further supported by the shorter flight distance between Fortaleza and Europe, which enables reduced aviation fuel consumption, lower logistical costs, and increased competitiveness of Ceará's productive chain.

Thus, it can be partially concluded that Pinto Martins International Airport, recognized as a logistics and aviation hub, has the capacity to stimulate the State's economy, optimize Ceará's foreign trade, strengthen local productive chains, attract national and foreign investments, facilitate strategic partnerships between logistics

operators and airlines, and foster regional development for the benefit of the productive sector and the population of Ceará.

## IV. Final Considerations

Air transport, due to its specific characteristics, is regarded as one of the most effective means of fostering economic growth and development in a given region or country. With the capacity to move cargo over long distances with speed and reliability, air transportation enables access to a wide range of markets, thereby stimulating the productive chain of high value-added goods, consumer and durable goods, perishable items, and time-sensitive shipments, among other categories. It proved indispensable, for instance, in the transportation of vaccines and medical supplies during the COVID-19 pandemic.

Since the early days of aviation in the early twentieth century, air cargo transport has constituted a fundamental pillar in the circulation of capital, directly influencing supply chain management. Consequently, as aircraft evolved in terms of range, flight autonomy, cargo capacity, and technological innovation, the need to provide adequate ground infrastructure to support air navigation and transportation also increased, requiring the construction of airports with higher operational efficiency.

In alignment with these considerations, and as the focus of this study, the Fortaleza International Airport (Pinto Martins) stands out. Originally constructed to serve the interests of the United States military during World War II, it has since evolved into an airport complex whose infrastructure is nationally and internationally recognized for its capacity to handle extracontinental air cargo. This development was significantly influenced by its concession, beginning in 2017, to the German multinational Fraport AG Frankfurt Airport Services Worldwide.

Thus, the present study aimed to analyze the airport infrastructure of Fortaleza International Airport and the implications of air cargo transportation for the economic development of the State of Ceará. The findings of this analysis are intended to provide support for decision-makers, offering greater clarity in the formulation of public policies and business strategies aimed at promoting the State's economic growth.

The research achieved its objectives by providing a comprehensive understanding of the logistical and economic advantages associated with the airport, demonstrating its contribution to various productive chains within Ceará. Its privileged strategic location in the Northeast region, often referred to as the "Atlantic Corner," enables access to key European and North American markets with reduced flight time and lower fuel consumption, thereby decreasing costs and enhancing its competitive advantage in air cargo operations.

The study further demonstrated the interrelationship between air cargo movement, airport infrastructure, and the productive and economic conditions of the region, showing that the strengthening of one dimension depends on and influences the others, ultimately resulting in overall local development.

Within these scenarios, the population of Ceará stands to benefit from the consolidation of the airport as an international logistics and aviation hub, contributing to the dynamization of the State's economy, the strengthening of productive chains, and the promotion of investments and strategic partnerships between logistics operators and airlines under the "Airport City" concept.

The qualitative approach, based on literature review and document analysis, proved essential in understanding the extent to which Fortaleza International Airport has the potential to reshape the logistics (supply) chain of various productive activities in the State, particularly in light of economic relations driven by e-commerce.

Finally, it is recommended that future research consider analyzing the extent to which commercial, agricultural, and industrial sectors may increase productivity through air cargo operations following the expansion of the logistics complex under the "Airport City" concept. Additionally, future studies could assess the volume of cargo (in tons) handled by Pinto Martins during the first five years after the full implementation of the MERCOSUR–European Union agreement. Lastly, it would be pertinent to identify the key economic indicators that improved in the State as a result of the airport's performance, driven by national and foreign investments and trade, during the period from 2020 to 2030.

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