













Observe in Figure 8 that 1,883,737 t of cargo were air transported in Brazil in 2018 (CNT, 2020). However, in comparison with the busiest air cargo airport, the Hong Kong International Airport (HKG), the entire Volume of cargo freight transported in Brazil is approximately 2.71 times lesser than one single chine airport (compare Figures 2 and 8). China is Brazil's leading trading partner since 2009. The leading Brazilian air cargo companies, as well as their share participation in the air cargo market, is depicted in the following Figure 9:

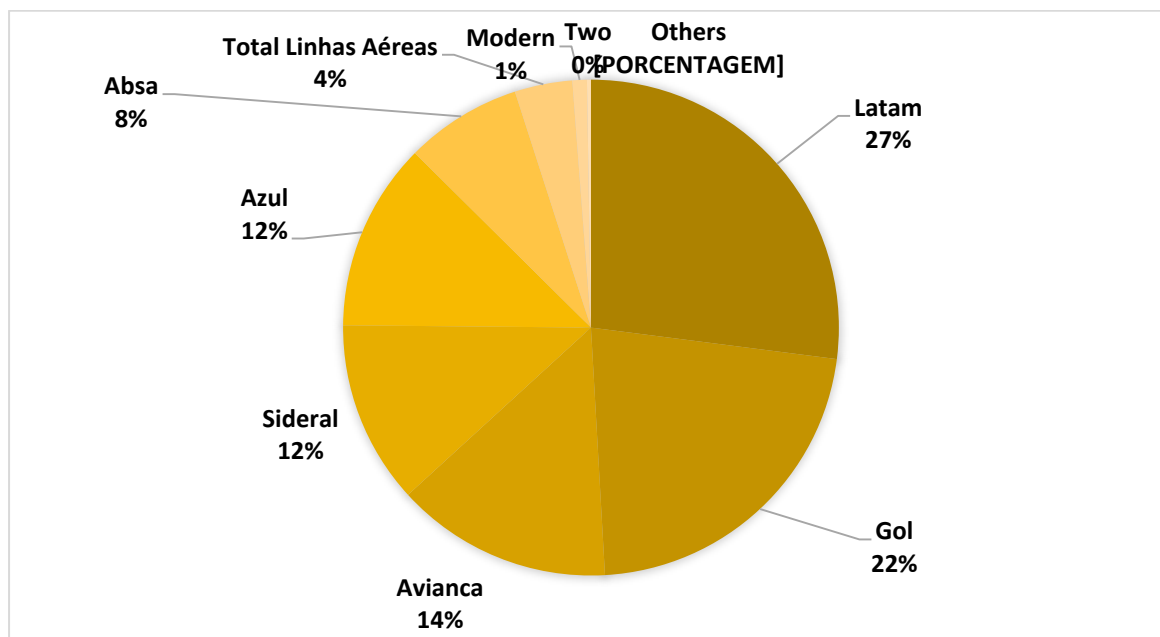


Figure 9: Major companies' participation in terms of air cargo and couriers transported - domestic market, 2018. Source: CNT, 2020

Observe in Figure 9 that Latam has the most substantial participation in the Brazilian air cargo market (27 percent). Note that Avianca Brasil, due to bankruptcy, was prohibited from operating in Brasil, according to the National Civil Aviation Agency (ANAC), in April 2019.

The two main air cargo routes in Brazil are (i) São Paulo GRU to Manaus, Amazonas, a northern state, responsible for 35,434 t of cargo transported in 2018, and (ii) Manaus to São Paulo GRU, responsible for 33,479 t of cargo transported in the same period (CNT, 2020). Figure 10 depicts the main international routes on air cargo freights in 2018 (in both directions):

Continent	Cargo transported in 2018 (t)
North America - Brazil	188.673
Europe - Brazil	164.861
South America - Brazil	56.836
Asia - Brazil	13.831
Africa - Brazil	7.323
Central America - Brazil	758
Brazil - North America	140.822
Brazil - Europe	129.715
Brazil - South America	75.762
Brazil - Asia	9.585
Brazil - Africa	7.295
Brazil - Central America	1.579

Figure 10: main destinations for air cargo transportations in 2018. Source: CNT, 2020

Observe in Figure 10 that North America - Brazil is the main international destination for air cargo transportation in Brazil. Finally, the air cargo companies in Brazil employed 44,970 workers, including aircraft pilots, co-pilots, and crewmen, according to the CNT (CNT, 2020). Figure 11 illustrates the aircraft operating in Brazil and their respective manufacturers:

<b>Manufacturer</b>	<b>Aircrafts operating in Brazil (2018)</b>
Airbus	193
Boeing	186
Embraer	63
ATR	47
Fokker	-
LET	-
Cessna	-
McDonell	-

Figure 10: aircrafts operating in Brazil. Source: CNT, 2020; ANAC, 2020.

Finally, 815,862 domestic flights and 151,197 international flights were registered in Brazil, totaling 967,059 flights in Brazil, in 2018 (CNT, 2020).

#### 4. Discussion

Air cargo transportation in Brazil has been influenced by the economic crisis, facing the slow recovery process, since 2016, however, still 2019 without reaching the highest air cargo performance achieved in 2011 (See Figure 8).

Despite Chinese airports (HKG and PVT) are amongst the busiest world's air cargo hubs, the recent outbreak of Coronavirus (Covid-19). The first case was detected in the province of Wuhan, China, on December 2019, and subsequent suspension of flights from and to China, due to the quarantine imposed by the Chinese government and other countries, as preventive measures to avoid a pandemic, reflects in the 2020 statistics. On February 16, 2020 the Japanese Government announced that the economy shrank 1.6 percent in the fourth quarter of 2019, and might face recession, due to the Coronavirus effects on the economy (CNN, 2020). Until this article is written, there is no cure for Covid-19, neither the real dimension of the impact on the global economy. Further studies are necessary to investigate the impact of Covid-19 in air cargo transport worldwide, as well as the economic impact on the Brazilian Transport GDP.

Regarding the Brazilian air cargo market, the major change occurred in 2019, when the Avianca airline company was prohibited by ANAC (2020) to operate in Brazil, due to bankruptcy, as a preventive measure.

This case analysis evidenced implications observed in other fields of research, such as (i) aircraft manufacturer industry (Cruz, B.S. & Dias, M.O., 2020; Dias, M.O., Teles, and Duzert, 2018; Dias, M.O. and Duzert, 2018), (ii) mining industry (Dias, M.O., & Davila, 2018); (iii) e-business negotiation (Dias, M.O. & Duzert, 2017); (iv) automobile industry (Dias, M.O., Navarro and Valle, 2013, Dias, M.O., et al., 2014; Dias, M.O., et al., 2013); (v) non-market forces (Dias, M.O. & Navarro, 2018); craft beer industry (Dias, M.O. & Falconi, 2018; Dias, M.O., 2018); (vi) public administration (Dias, M.O., 2018); (vi) Non-governmental organizations (Paradela, Dias, M.O.; Assis; O., J.; Fonseca, R. (2019); (vii) governmental negotiations (Dias, M.O. & Navarro, 2017); (viii) copier manufacturer industry (Dias, M.O., 2012); (ix) streaming film industry (Dias, M. O.,



& Navarro, 2018), (x) craft beer industry (Dias, M.O., 2020; Dias, M.O. & Falconi, 2018), among others.

The analysis suggested further process and cargo transport technologies in Brazilian airports. For instance, the construction of larger and longer runways should be improved, to four out of ten busiest Brazilian airports, which are equipped only with one runway. All processes involved in air cargo operation should also be improved.

Finally, this investigation, in comparison to the previous body of research, has the merit of compiling sparse data regarding air cargo in Brazil, providing a comprehensive overview on the present economic sector, useful to students, academics, decision-makers in the air cargo sector, managers, and other practitioners.

## 5. Future Research

Future research is encouraged regarding the investigation of the impact of the Coronavirus outbreak, affecting the route China-Brazil-China directly in the first place, and the impact on the Brazilian economy in general, once China is the most important Brazilian trade partner. Performance analysis on air cargo transportation in Brazil are also recommended, regarding the government Jair Bolsonaro.

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