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## Brazilian Regulation Aspects and Their Impact on Costs

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# Brazilian Regulation Aspects and their Impact on Costs

Embry-Riddle Aeronautical University

Aviation Management Program – Class of 2020

# BRAZILIAN REGULATION ASPECTS AND THEIR IMPACT ON COSTS

by

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This Capstone Project was prepared and approved under the direction of the  
Group's Capstone Project Chair, Dr. Leila Halawi  
It was submitted to Embry-Riddle Aeronautical  
University in partial fulfillment of the requirements  
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Dr. Leila Halawi  
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## Abstract

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Title: Brazilian Regulation Aspects And Their Impact On Costs

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Year: 2020

This project analyzes the Brazilian regulation for the airline and the current public data provided by the stakeholders. It intends to scientifically support a possible change in Brazil's existing regulation related to airline responsibilities on passenger accommodation for different types of situations, including ANAC 400 and other ramifications. This project aims to compare the Brazilian law with various regulations adopted in other markets where the rules are created considering different circumstances to define responsibilities for the passenger accommodations. This study will analyze the differences, measuring the impacts that changes could bring in terms of costs for the Airlines. It will evaluate how the current public data and statistics may support the management and decisions for further industry operation development and investments.

To measure the impacts of the Brazilian regulation on the airlines' costs, this study will use historical data on passenger accommodation on Brazilian Airlines. Therefore, this project presents a clear and complete analysis of Brazilian ANAC 400 regulation and

Commercial, ancillary revenue proposals improve it following the best practices of different markets worldwide in terms of airlines' responsibility on canceled, delayed, and diverted flights.

## Chapter I

### Introduction

During commercial aviation history in Brazil, the relationship between customers and airlines has always been turbulent. The most excellent example of this was the Brazilian air blackout event at the end of 2006. During this period, flight disruptions (delays and cancellations) more than doubled, affecting 391.4 thousand flights in 2007 compared with 162.3 thousand early in 2004 (Oliveira, Lohman e Costa, 2015), leaving customers abandoned at the airport without minimal assistance as was widely reported in the press at the time. (Santini, 2006)

The rules and procedures of Airlines ended up being described for their benefit. They did not support customers in the event of a break-in service. This situation generated a relationship of distrust and discontent as a fine imposed on Gol in November 2006 by Anac, due to customer complaints that reported several flight changes due to bad weather and overbooking (Carvalho e Rizzi 2006). In November 2006, Gol passengers invaded and broke the service desk after cancellations and delays without satisfactory compensation. (G1,2006)

Until that time, the regulator for this type of situation was the air transport contract written by the company and accepted by the client. However, in 2016, The Brazilian regulatory agency (ANAC) instituted a resolution to regulate this relationship. And after March 2017, companies should proceed according to Resolution 400, which would be the regulator for this consumer relationship between the customer and the airline. In this study, we will deal with the impact of this legislation on the costs of Airlines.

The research questions are as follows:

- 1) What the effect of this legislation on the price of the air ticket?
- 2) How much are the savings that companies would have with some changes in that legislation?

We will start our study here to answer the proposed questions and definitively clarify the issue.

By showing the financial mismatch in the chain as a whole and its impacts on airline companies' financial health, which are already positively impacted when we talk about Brazil, due to exchange rate variations and oil costs, without mentioning this moment of Pandemic in which we are going through. As an excellent opportunity to resolve this dilemma, by bringing to the debate that worldwide airlines are only punished when in fact, the problem of cancellations and delays were caused by them, and that only in Brazil this rule of the game is changed we can implement the justified factor with responsibility, that is, the person responsible for the Law for Irregular Operations is that each one must bear his share of contribution and punishment, be it financial or other applicable measures.

### **Project Definition**

Aviation is an industry based on many regulations such as international industry associations, mainly ICAO (International Civil Aviation Organization) and IATA (International Air Transport Association), local aviation and transportation regulators like ANAC (*Agência Nacional de Aviação Civil* in Brazil), DOT (Department of Transportation in the USA), EASA (European Union Aviation Safety Agency in Europe) and FAA (Federal Aviation Administration). It's related to its nature since safety and security must

drive aviation and must be improved. The transportation industry is not new worldwide, and many times the legislation attached doesn't grow at the same speed as the society and the industry needs.

The Deregulation Act of 1978, introduced in the U.S., allowed the aviation industry to be more popular since airlines could publish airfares without prior consent. The prices dropped to 50% percent below after 42 years, with adjusted inflation (Johnston, 2020). With the network scheduling deregulation, new players emerged, and supply started to be organically modified. Thanks to this Act, airlines introduced unstandardized services with different attributes and prices so that the transportation service could be less commoditized. Since only afterward, Low-cost carriers and full-service carriers could implement various services that are simpler or complicated pricing structures and attributes (Mattos, 2016).

The commoditization of transportation services affects supply and demand behavior. On the other hand, it implies additional costs to the industry by imposing certain obligations from airlines to the customers since it mitigates different players to provide various services. Prices and services too similar make the passengers' choice limited. The airlines can only add value to their products by more sophisticated services on board, and the massive demand of passengers with a lower willingness to pay had access to air services (Mattos, 2016).

The deregulation process didn't happen at the same time worldwide. For example, the airfare deregulation in Brazil was introduced in 2005 through a Federal Law, and baggage deregulation happened in only 2016.

The relation between airlines and customers is more significant than the supply and demand aspects. The regulations define customer and passenger rights and airline obligations. Still,

such relationship is determined by different authorities like international regulation as per ICAO Core Principles on Consumer Protection (International Civil Aviation Organization, 2018) and local or national rules like ANAC Resolução N° 400 (ANAC Agência Nacional de Aviação Civil, 2016). Such regulation sometimes is provided by aviation legislation and complemented by customer protection legislation. For example, in Brazil, customer legislation and aviation regulation overlap with different resolutions to the same situations, making the legal compliance uncertain.

In many places like Brazil, for situations where the passenger is negatively impacted by airline actions such as flight overbooking and flight cancelation due to maintenance issues is pretty straightforward that the airline should somehow indemnify and accommodate the passenger. What could be controversial is the size of indemnity.

On the other hand, regulations like in Brazil (ANAC Agência Nacional de Aviação Civil, 2016) impose that airlines be responsible. The only competent, for irregular operations, happened due to force majorly or a third-party decision. Situations like extreme weather, countries that close their borders, other diplomatic restrictions, short-term notice of airport runway revamping, etc. require airlines to accommodate passengers in hotels, provide meals, and other obligations. Situations like these can bring more comfort to the passenger by giving assistance and amenities. At the same time, these compensations generate additional costs for airlines. Many times, airlines are still sued for other indemnities by passengers and the government.

Since the Brazilian regulation mostly protects the customer, airlines are the only stakeholders with obligations in situations like that. The costs related are their responsibility as well. This project explores how much it impacts airline finances and

compares the Brazilian regulation with others worldwide to identify opportunities to balance the airline obligations, other stakeholders' obligations, and customer and passenger rights.

### **Project Goals and Scope**

This study's project goals and scope are to bring the current regulation to the discussion, its purpose, and show that it would only aim at protecting its purpose, and show that it would only aim to protect its purpose and show that it would only aim to protect passengers detriment of airlines.

We will have to clarify where the costs related to irregular operations resulting from situations in which the airlines would not be the "culprits" would be the main ones affected concerning the pressure of costs arising from such protection.

Such costs involved in these irregular operations will be measured, correlated to Brazilian legislation, through research, studies, and articles, to the sector's global reality and what has worked in the rest of the world.

We will try to measure the financial, social, and political impacts of a possible change in legislation, bringing "responsibility" at each stage of operations, using models involving real sector data, always with a 360 look.

Overall, based on data and studies analyzed, due to the difficulties of the industry and also the political-social moment, we will probably suggest what could be called a balanced model, with the clear objective that the parties involved are represented in a fair environment for all sides, society, airlines, and regulatory bodies.

## **Chapter II**

### **Review of the Relevant Literature**

#### **Introduction**

This study aims to go more in-depth on this topic by analyzing Brazilian regulation's reality and how the airlines are dealing with costs generated by such restricted law.

This study will compare different regulations and provide a clear view of airlines' costs on the markets where the national laws oblige the airlines to provide all the assistance for passengers even when the causes of cancelation or delayed flights are not caused by the airlines. Due to the impact on costs, the airlines need to increase the price of the air ticket. There is a substantial standardization of the assistant services that could be different depending on the ticket price.

#### **Regulation Aspects**

The aviation industry regulation and law can be considered transnational since each airline is submitted to the national laws. Still, international organizations such as ICAO and IATA regulate international transportation (Viglino, 2016). The Brazilian Aviation Regulator (ANAC) establishes a conjunction of laws, regulations, and rules that often mention or reference international legislation published by the United Nations, such as the Montreal Convention of 1999, instead of rewriting every aspect of Aviation regulation.

For U.S. carriers, the regulation is different between domestic and international journeys. For domestic trips, no imposition over the airline applies regardless of the reason for the flight delay or cancelation. Thus, each carrier defines its own delay/cancelation policy. Like much other aviation deregulation, aspects customers may consider a purchase

decision (U.S. Department of Transportation, 2019). For international journeys, carriers operating from/to the U.S. must apply Article 19 of the Montreal Convention and are liable to compensate the passenger since they didn't take all possible measures to avoid any damage (Government of Canada, 2020).

In the case of Canadian law, as follows with a benchmark for this study, the cancellation operations do not impact the airlines in any of the scenarios described below, which are situations beyond the carrier's control:

- (a) war or political instability;
- (b) illegal acts or sabotage;
- (c) meteorological conditions or natural disasters that prevent the safe operation of the aircraft;
- (d) air traffic control instructions;
- (e) a NOTAM, as defined in subsection 101.01 (1) of the Canadian Aviation Regulations;
- (f) a security threat;
- (g) airport operation issues;
- (h) a medical emergency;
- (i) a collision with wild animals;
- (j) an interruption of work within the carrier or an essential service provider, such as an airport or an air navigation service provider;
- (k) a manufacturing defect in an aircraft that reduces passenger safety and has been identified by the manufacturer of the aircraft in question or by a competent authority; and
- (l) an order or instruction from an employee of a state or law enforcement agency or person responsible for airport security.

[\(https://laws-lois.justice.gc.ca/eng/regulations/SOR-96-433/\)](https://laws-lois.justice.gc.ca/eng/regulations/SOR-96-433/)

Other examples follow, according to Canadian Laws on airlines' obligations and duties in the event of IROPS (irregular operations)

I- Situations within the control of the airline but necessary for safety:

If an airline delays or cancels a flight for reasons under its control but required for safety reasons, it will not have to compensate passengers. However, the airline must comply with the other obligations described in the law, such as informing passengers when they know of future actions.

II- Situations beyond the control of the airline:

If an airline delays or cancels a flight for reasons beyond its control, it will not have to compensate affected passengers, and minimum treatment standards do not apply. However, the airline must follow the communication requirements described in Situations under the airline's control, above. He must also make alternative travel arrangements for passengers as follows.

III- Alternative travel plans due to cancellations:

In situations beyond its control, the airline that operates the flight must ensure that passengers complete their trip but not harnessing extra costs, which the Brazilian Law (ANAC 400) imposes today. If a flight is canceled or a flight delay reaches three hours, the

airline must offer alternative travel arrangements for passengers free of charge. The goal is to get passengers to their destination as quickly as possible.

According to Kiasha Niagah (Niagah, 2019) South African Airlines has no obligation to make refunds or provide facilities for flight cancellations or delays for any reason. There is no aeronautical legislation in South Africa that speaks to legislate about this type of situation; each company works in the way that it deems most appropriate. However, every passenger who is not satisfied with the solution intended by the company can file a complaint with the national consumer commission or assert their rights under the Consumer Protection Act, described in consumer right number 9: "Right to accountability from suppliers " (Departament Trade and Industry , South Africa, 2009)

In Chile, there is legislation governing the country's civil aviation called *Codigo Aeronautico ley 18916* (Ministerio de Justicia, 2015). in 2015 some additions were made, becoming *ley 20831*. This law provides for customers' facilities and in case of irregular operations, including lodging and food in Article 133 and all its sub-articles. Still, there is one caveat in Article 127. The carrier is obliged to carry out the transport on the date, time, and under the conditions stipulated in the contract. Still, it may suspend, delay or cancel the flight for reasons of security and strength greater, such as meteorological phenomena, armed conflicts, civil disturbances, and threats against the aircraft. In such cases, either

contractor may terminate the contract without effect, without prejudice to both parties. (Ministerio de Economía, Fomento y Turismo, 2015)

Even in a country where the legislation was revised in 2015, the article that exempts the airline from liability for situations beyond its responsibility has remained.

### **Brazilian Regulation**

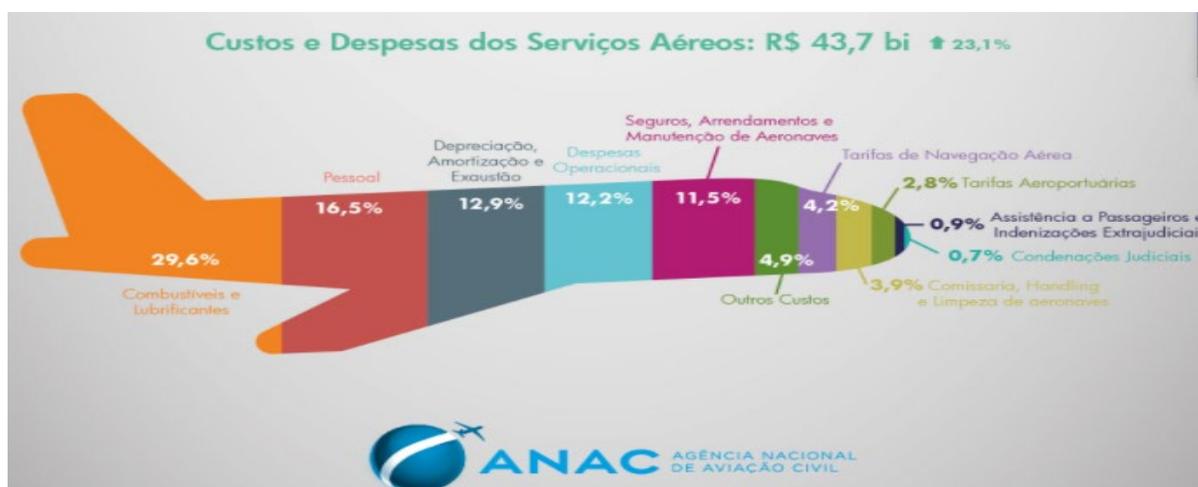
Brazilian regulation covers passenger rights and assistance obligation through a resolution published in 2016 (ANAC Agência Nacional de Aviação Civil, 2016) just as ICAO (International Civil Aviation Organization, 2018). But the main difference is that the Brazilian regulation imposes airline obligations for irregular operations such as flight cancellation, flight delays, and other flight disruptions regardless of the original cause. On the other hand, ICAO limits airline obligations in case of extraordinary circumstances, force majeure, or situations beyond the airlines' control. The Brazilian airport's infrastructure isn't fully prepared to handle situations like extreme weather. Many cases of closed airports as happening in Guarulhos airport and many others in 2018 represent how it can impact the airport departures and the air traffic. (Agência Brasil, 2018)

Such difference imposed additional costs to airlines operating in Brazil domestically or internationally, and there is no literature converting such aspects.

Besides the Brazilian, other national regulations may impose similar obligations to the airline, but there is no literature for other countries.

This generates a considerable operating cost as confirmed in the information panel provided by ANAC, which shows that 0.9% of the prices of airlines in 2019 were with customer assistance and extra-judicial indemnities. This totals a value of 393,300 Million

Reais that could have been used in technology development to avoid such cancellations or delays, for example.



(ANAC Agência nacional De Aviação Civil)

As analyzed in the Scholarly Journal "Economic and Legal Aspects of Air Transport in Turkey," "The aviation sector regulations directly or indirectly affect the airline operators, which is critical due to its effects on the countries' economic systems. Legal responsibilities in terms of influencing passenger rights and competition law issues; have a natural impact on shaping aviation regulations, sector dynamics, and competitive conditions which is affecting the dynamic structure of the sector".

This regulation scenario, combined with an inconstant judiciary in Brazil, generates many additional costs for the airlines, generating a paralegal business where Layers Offices are specialized in getting money from the airlines even when the regulation is fully attended. Some examples of web sites like those are <https://www.airhelp.com/en/flight-compensation-in-brazil/>, <https://www.blatt.adv.br>, <https://tinyurl.com/y446v5k2>.

In several scenarios, legal instability is detrimental to the aviation market. And in Brazil, we have several examples of lawsuits that have impacted airlines and shaped the world

scenario. In 2017, for example, we had some legal fights and decisions contrary to the resolution of the National Civil Aviation Agency (ANAC) that ended the baggage allowance and allowed the collection of extra volume (Jornal Nacional, 2017). Brazilian political instability is also a factor of concern. According to (Pablo Leuriquin, 2020), The Government tried to help the growth of regional routes in 2016 with provisional measure 652. Still, the text did not become law, and the incentives are only for projects that are not approved.

International literature that studies the airline markets and the impacts of liberation in terms of legislation shows several benefits not only for the airlines, as accordingly. (Peoples, 2014)

Pricing strategies for airlines and regulations are directly related to each other. Airlines define their pricing strategies based on core elements of pricing but always limited by law (McCormick, 2017).

The core elements of an airline's pricing strategies are market demand (customer volume, characteristics, and price elasticity), market supply (not only the number of flights but the

quality of the service and brand perception), profitability target that is driven by how much revenue the airline can generate and the total cost of the operation (Lohmeier, 2009).

The aviation regulation establishes the airline's boundaries, and the customer can impose limits on all core elements of the airline's pricing strategies.

When the regulator imposes flight frequencies and blocks new airlines to debut, the airlines will suffer from empty flights due to the lack of demand. It will generate passenger surplus in other flights since new flight frequencies will be approved or even denied.

Market demand requires airlines to analyze passengers' behaviors to understand why and when they intend to fly and their willingness to pay. Airlines access different types of passenger demands and the market segmentation allows airlines to create other products and price mixes that intend to charge the right customer's right price. Another important aspect is the analysis of what the passenger adds value in terms of services and defines prices. It is commonly named ancillary revenue.

Free markets require airlines to understand the relative value of their services compared to other airlines as well. With more than one airline operating in a specific market, the passenger chooses one based on its market segmentation. Airlines must track and review their price strategies; otherwise, the demand will be captured by a different airline.

Those aspects of supply and demand will define revenue generation's capacity, but it can hardly be impacted by a regulation that inhibits the usage of certain pricing products. A

few country regulators ask airlines to submit airfare changes with long prior notices to approve Brazil's new price until 2006 (ANAC Agência nacional De Aviação Civil, 2016). It inhibits an airline's ability to react promptly to a competitor's airfare, and frequently prices are denied due to a too high or too low value.

Another important aspect is the profitability target of each airline. Since the capacity of revenue generation is limited, the cost of operation will influence the profit results. The regulation that imposed rules, such as passenger handling in case of irregular operation regardless of whether the airline caused it or not, increases airlines' costs in a given market and will influence the supply and the airfares. The higher cost will require airfare increases that will generate a customer demand decline and, as a consequence, fly frequency reduction.

According to the Brazilian website "naovoei.com," Brazil is one of the countries with the most flight cancellations and delays in the world. However, they do not mention the meteorological issue; for example, they only encourage the consumer to sue airlines in search of financial reward, based of course on the ANAC 400 law, this aspect of consumer law being a parallel industry better known as a machine to punish airlines and generate profit for law firms. This example causes airlines' costs to be overcharged and later passed on for tickets, perhaps punishing other passengers who may pay more to fly. (<https://naovoei.com/voo-cancelado-o-que-fazer> )

Recently in Brazil, even as an example of how our air sector is politically unstable, the Brazilian Senate had approved in 2019, Provisional Measure 863/18, which included in one of the texts the ban on airlines collecting baggage on national flights, for aircraft with more than 31 seats. In practice, it would allow passengers to check up to 23 kg of luggage

on the vast majority of flights free of charge, going the opposite way from all countries in the world. After many discussions and the intervention of specialists in the sector, Brazil's president was advised to veto such a law, giving airlines back the right to charge for checked baggage. (<https://www.congressonacional.leg.br/materias/medidas-provisorias/-/mpv/134935>)

### **Summary**

Regulations aspects in Brazil imposes the obligation of paying the costs for food, hotel, and internet access for all the passengers who have their flights delayed or canceled, even when the cause of this change of the scheduled flight is not due to the airline's responsibilities. This study brings a clear view on the impact that the resolution 400 brings on the airlines' costs, comparing the impact that the resolution 400 brings on the airlines' costs compared to other countries regulation. By mapping all the available data found to understand how these costs affects the airlines results, this study also proposes a new format of public data that could be implemented by the Brazilian government.

## **Chapter III**

### **Methodology**

We currently have an existing problem with ANAC Regulation and the laws of customers' rights in Brazil. Airlines are wholly liable and punished financially when cancellations or delays occur and are not caused by the companies. That is, it is as if you were penalized without having no-fault; in a case like this, how would you react?

In this sense, one of the biggest challenges is to prove that these financial penalties (food, internet, accommodation, etc.) impact the cash flow of airlines and, consequently, these costs can be passed on to the total price of tickets or assumed the loss in fact by the companies.

Having achieved this correction, this research seeks to answer the following questions:

1. Would airlines not have relief in their cash flow and better financial health?
2. Wouldn't customers as a whole benefit from a fairer ticket fare as the costs of these IROPS would no longer be passed on to all tickets?
3. Would this measure ANAC Resolution 400 be purely populist, since nowhere in the world is an airline punished when, for example, a hailstorm causes its flights to be canceled?
4. How much the irregular operations caused by the non-airline reasons represent the total irregular operations in Brazil?

5. Which are the leading non-airline causes for irregular operations in Brazil?  
Which are the main cost elements for non-airline causes for irregular operations in Brazil?
6. How can the current public sources help airlines operating in Brazil forecast and mitigate irregular operations caused by non-airline reasons?
7. Which sources and information are used by the stakeholders such as airlines, airports administrator, and air space controllers to identify the causes and gaps that result in operations that result in irregular operations and how much it costs to them?

Our mission will be to answer these questions and bring the theoretical foundation and support by analyzing numbers.

### **Details and Variables**

To analyze all the aspects and variables regarding the airlines' costs, we will use a different source of information and combine them to guarantee that we will cover all the cost impact details. For this study, we intend to use the following data:

- History of irregular operations in Brazil
- History of extreme weather occurrences that impacts operations in Brazil
- History of air traffic control occurrences that impacts operations in Brazil
- History of airports occurrences that impacts operations in Brazil
- Insights from different stakeholders about the consequences of irregular operations caused by the non-airline reasons in Brazil. Airlines operational employees, regulators employees.

- Forecast airlines network growth in Brazil
- Forecast of extreme weather conditions that may impacts operations in Brazil
- Forecast of air traffic control infrastructure investments in Brazil
- Forecast of airports infrastructure investments in Brazil

### **Data Source(s), Collection, and Analysis**

This study intends to explore several different data sources to guarantee that the analysis considerer all the possible variables. The data collection is composed of public data, such as ANAC, Infraero, and IATA reports that are extracted directly from the entity's websites, as described below:

- ANAC airline operations statistics
- Infraero airport operations statistics
- ANAC airlines accounting data and balance sheet
- IATA forecasts and studies

Another type of database provided by the airports and ANAC with relevant weather, aviation forecasts, and studies will be considered to compose this study results. Surveys and interviews Experimental Design could be used.

To guarantee that these study results are consistent and reliable, we will only consider data sources validated during this project by comparing the analysis results from different perspectives. All the validated data will be organized and submitted to different methods to identify erratic behaviors and correlations. Forecasts will be applied to identify tendencies to medium and long periods considering 3 to 5 five years range.

Suppose the currently available data sources above don't provide the variables and details required to fulfill this study's objective. In that case, it will be recommended to applicable entities additional reports that can allow other management tools to analyze better analyze Brazil's airline industry's results better.

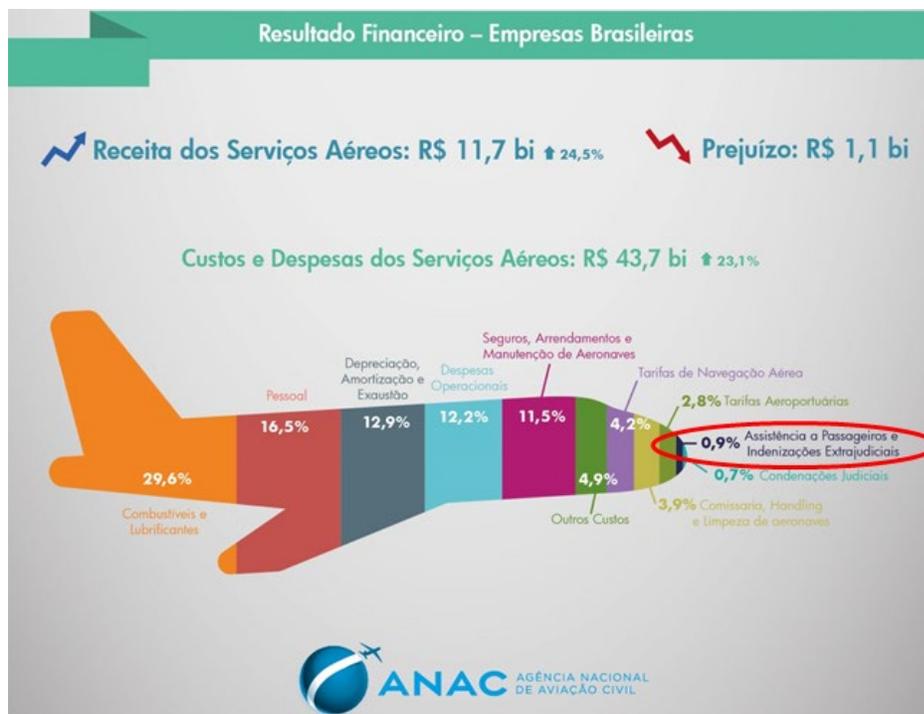
## **Chapter IV**

### **Outcomes**

The research for public data related to this study covers the main regulators and stakeholders. Only ANAC provided meaningful data usable in this study. Brazilian airports, Civil Aviation Secretary (SAC), Air Traffic Controllers (Air Force) don't provide statistics about operations at a detailed level to bring insights.

ANAC requires that Brazilian airlines register specific reports, such as accounting data, that aren't required for foreign airlines. This study focused on Brazilian airlines only operating domestic and international markets. The Brazilian airlines that reported all data used are Azul, Gol, and Latam, and together they represent 84,4% of the total flights operated in Brazil considering domestic and international flights.

To determine the total amount spent by airlines related to canceled and delayed flights, 2 different ANAC reports were used. We established that the data used consider the full year of 2019. The Air Transportation Indicator Panel of 2019 shows that Brazilian airlines' total cost and expenses were BRL 43.7 billion. The expenses related to passenger assistance and accommodation represent 0.9% of the total amount (BRL 393.3 million).



(ANAC Agência nacional De Aviação Civil)

The second report used to determine the total amount spent on passenger assistance and accommodation was the accounting report. It registers one account related (item 6.1.5 "Assistência a Passageiros"), and its amount totalizes BRL 349.5 million.

<b>Airline</b>	<b>Account BRL</b>	<b>Panel BRL</b>
Azul	75.648.545,86	85.119.123,71
Gol	174.411.504,09	196.246.394,75
Latam	99.480.356,36	111.934.481,54
<b>Total</b>	<b>349.540.406,31</b>	<b>393.300.000,00</b>

Table 1: Comparison of Total amount spent by airlines with passenger assistance between ANAC panel and ANAC accounting report.

To determine the cost with assistance per passenger unit, we had to use two different reports from ANAC (Supply and Demand statistics and Flight History), since the Flight History report contains the information about the flight delays and cancellations and the Supply and Demand statistics contains the transported amount of revenue passengers (PAX) in each flight. Canceled flights don't have passenger information, and we determine this amount through the average of revenue passengers transported in the same flight number along 2019. Since the amount shown in the ANAC panel is higher, we considered it to calculate the cost per passenger.

<b>Flight Status</b>	<b>Number of Flights</b>	<b>Number of PAX</b>	<b>Cost (BRL)</b>	<b>Cost per PAX (BRL)</b>
Cancelled	12.233	1.274.032	43.685.187,18	34,29
Delayed	81.043	10.196.144	349.614.812,82	34,29
<b>Total</b>	<b>93.276</b>	<b>11.470.176</b>	<b>393.300.000,00</b>	<b>34,29</b>

Table 2: The total amount of flights and passengers impacted by cancelation and delay and their cost.

The Bureau of Transportation Statistics (BTS) provided by the U.S. Department of Transportation publishes data related to airline operations, and the online performance reports contain details related to the reason for delays and cancellations of flights operated in the U.S. and due to this level of information was chosen as the benchmark in this study. The BTS report distinguishes the reasons for delays and cancellations: carrier, NSA, weather, security, and late aircraft delay so that we can split the reason between carrier reasons and others.

To improve the comparison between ANAC and BTS data, we chose two Brazilian airports, Galeão Airport (GIG) and Santos Dumont Airport (SDU), both placed in Rio de

Janeiro city, and 3 airports in U.S., Jacksonville International Airport (JAX), John Wayne Airport (SNA), and Sacramento International airport (SMF). All of those airports have 2 runways and low height above sea level. GIG and SDU represent 14.7% of the total occurrences of delays and cancellations in Brazil in 2019.

<b>Flight Status</b>	<b>GIG</b>	<b>SDU</b>	<b>JAX</b>	<b>SNA</b>	<b>SMF</b>
Canceled	275	1.061	557	484	722
Delayed	2.927	9.428	3.568	3.770	4.358
<b>Total</b>	<b>3.202</b>	<b>10.489</b>	<b>4.125</b>	<b>4.254</b>	<b>5.080</b>

Table 3: Comparison of cancelation and delay per airport.

The U.S. airports used in the study distribute the reason for delays and cancellation that shows more than the half causes of those IROPs doesn't happen due to airlines.

<b>IROP Reason</b>	<b>Delayed</b>	<b>Canceled</b>
Carrier	22%	46%
Other	78%	54%
<b>Total</b>	<b>100%</b>	<b>100%</b>

Table 4: IROP reason distribution.

Considering the same delayed distribution, GIG and SDU delays will cost BRL 41.2 million due to reasons other than an airline.

<b>Delayed Flights</b>	<b>Distribution</b>	<b>Number of Flights</b>	<b>Number of PAX</b>	<b>Cost (BRL)</b>	<b>Cost per PAX (BRL)</b>
Carrier	22%	2.715	338.779	11.616.375,11	34,29
Other	78%	9.640	1.202.996	41.249.431,61	34,29
<b>Total</b>	<b>100%</b>	<b>12.355</b>	<b>1.541.775</b>	<b>52.865.806,72</b>	<b>34,29</b>

Table 5: Delay reason distribution in GIG and SDU.

Considering the same cancellation distribution, GIG and SDU delays will cost BRL 2.6 million due to reasons other than the airline.

<b>Canceled Flights</b>	<b>Canceled Flights</b>	<b>Number of Flights</b>	<b>Number of PAX</b>	<b>Cost (BRL)</b>	<b>Cost per PAX (BRL)</b>
Carrier	46%	615	65.012	2.229.208,14	34,29
Other	54%	721	76.316	2.616.777,00	34,29
<b>Total Geral</b>	<b>100%</b>	<b>1.336</b>	<b>141.328</b>	<b>4.845.985,14</b>	<b>34,29</b>

Table 6: Cost distribution per IROP reason.

Within this account, we have Values Spent on irregular operations caused by the company's fault. It is essential to understand what type of expenses airlines in Brazil are obliged to provide customers with.

According to resolution 400:

"Material assistance is offered free of charge by the airline, according to the waiting time, counted from the moment when there was a delay, cancellation, or disqualification from boarding, as shown below:

From 1 hour: communication (internet, phone, etc.).

From 2 hours: food (voucher, meal, snack, etc.).

From 4 hours: accommodation (only in the case of an overnight stay at the airport) and round-trip transportation. If you are at your place of residence, the company may only offer transportation to your home and from there to the airport.

The right to material assistance cannot be suspended in the event of unforeseen circumstances or force majeure (such as bad weather leading to the airport closing).

In the case of delays of more than 4 hours, flight cancellations or interruptions, and passenger disqualification, the airline must offer the passenger the option of re-accommodating on its flight or another airline, full refund performance the service by another means of transport. The choice is up to the passenger. Also, the company must provide material assistance, when appropriate ". (ANAC Agência Nacional de Aviação Civil, 2016)

It is noticed that, unlike the other examples mentioned in the course of our study, the Brazilian legislation clearly states in its text that reasons of force majeure do not exempt the airline from providing the facilities described in resolution 400.

We will now parallel the legislation of other countries to compare and understand how Brazilian airlines' performance would be if they had their operations in countries that do not consider facilities for passengers affected by force majeure.

We will start with Chile, where, through Ley 20831, companies are authorized to terminate the air transport contract for reasons of force majeure as follows:

"Article 127.- The carrier is obliged to carry out the transport at the close, schedule, and other conditions stipulated.

However, it can suspend, delay, and cancel the modification of its conditions for reasons of security or more remarkable survival, such as meteorological phenomena, armed conflicts, civil disturbances, or threats against the aircraft. In these

In any case, any contractor may leave the contract without effect, supporting each one of its losses. " (Ministerio de Economía, Fomento y Turismo, 2015)

As you can see, a huge difference in the text of the law.

It is interesting to note that Chilean Legislation provides the same facilities as the Brazilian legislation for flights with delays or cancellations (with a small difference in delay time, compensation starts with 3 hours, while Brazilian compensation starts with 2 hours) as follows:

a) Communications that the customer needs to make, whether they are telephone, electronic, or of a similar nature, if they have a difference in the estimated time of departure for the initially booked flight exceeding three hours.

b) Food and refrigeration required until boarding in the other car if there is a difference between the scheduled departure time for the initially booked car exceeding three hours.

c) Accommodation for passengers with a return ticket and passengers with a one-way ticket that denies boarding at a connection point, not resident in the city, location of the airport departure area, if the flight is offered. As a minimum, the next day of the scheduled exit in the ticket, and the passenger must stay one night and take the time to board the other ticket as required. By "night" it will be understood from the medianoche has until 6 hours

d) Moving from the airport to the place of residence of the city in the city, the area of the airport of departure, the place of accommodation, and vice versa, in case it is applicable.

e) Arrangements and services necessary to continue the journey if the passenger has a confirmed reservation connection. " (Ministerio de Economía, Fomento y Turismo, 2015)

However, as stated above, the law's text clarifies that the facilities will be provided in the airline's fault.

Considering African Legislation, or the lack of legislation, each company compensates passengers according to its internal rules. Follows South Africa Airways standards:

"FLIGHT DELAY If your flight is delayed before boarding, SAA will assist in getting you to your final, ticketed destination as quickly as possible. SAA shall notify you every 30 minutes of the status and reason for the flight delay if known. Suppose your flight is delayed more than 2 hours (domestic flight) or 4 hours (regional or international flight) beyond its scheduled time of departure. In that case, SAA will provide you with refreshments, meals, and accommodation, where applicable. If you are delayed more than 12 hours, SAA will compensate you with a discount on two future travel sectors on SAA operated flights. SAA will rebook you on the next available flight or reroute you to your final destination in the same cabin class at no additional cost. We will also assist you with rebooking any onward connections that are shown on your SAA ticket. Should you choose not to continue with your SAA flight and make alternative travel arrangements, you may elect to receive a full refund. FLIGHT CANCELLATIONS In the event of a flight cancellation, we will re-accommodate you on the next available SAA flight or reroute you

to your final destination in the same cabin class at no additional charge. If the alternate travel options provided do not meet your requirements, you may elect to receive a full refund for the value of the unused portion of your SAA ticket. If you have already commenced with your journey and are then subjected to flight cancellation, SAA will cover all reasonable accommodation, meals, and transportation costs for the first 24 hours. We are unable to offer compensation for delays or cancellations caused by factors outside SAA's control, such as; inclement weather and air traffic delays." (South Africa Airlines)

It is clear that ANAC resolution 400 is the exception to the rule and does not follow what is practiced in other countries.

It is important to note that the costs per passenger for Brazil's irregular operations are affected by several factors. The total spent is divided by the total number of customers boarding flights canceled or delayed for more than 2 hours.

However, flights that delay more than two hours after boarding the aircraft hardly have expenses with recorded compensation. Customers were already inside the plane, and the onboard service replaces the snack or meal facility.

These embedded customers count as an impacted customer, but without compensation expenses, which dilutes the final number of personal expenses.

Many passengers do not wait or do not seek the airline to receive the facilities and do not generate expenses, further diluting the final number.

## Chapter V

### Conclusions and Recommendations

Distinctive operation aspects are critical elements in the aviation industry. Their details shared with all stakeholders and society may provide ways to study the aviation processes and infrastructures' inefficiencies. The only stakeholder in Brazil that already provides meaningful data about airline operations is ANAC. ANAC's data source covers accounting, supply, demand, and IROP data, but two aspects made this study harder.

Each report and statistic database does not provide primary keys (a common identification element for register such as flight I.D.s) that allow the reports' combination without mismatch register.

The current data level for flight history and IROP details provided by ANAC is insufficient to determine causes and consequently take precise conclusions. The details on each flight phase (gate time, departure taxi time, inflight time, arrival taxi time, for example) and the delay time of each delay cause aren't available.

### Conclusions

After analysis and studies and reviews on the topic, we concluded that the Brazilian legislation that governs civil aviation (resolution 400, Anac) is different from all other countries surveyed. Several reasons influence this differentiation, such as, for example, legal instability in Brazil. This fact generates mistrust and less investment in the aviation area. In addition to generating a "process industry" against airlines. This legal instability sets precedents for people to access justice for futile reasons, even if companies have fulfilled their obligations.

Stricter legislation would theoretically decrease the number of lawsuits.

Another critical fact to note is the protectionism of the legislation. The airline is to blame for everything and must reimburse the customer regardless of the odd operation reasons.

This generates a very high additional cost that only happens in Brazil. Several laws around the world research in these studies make it very clear that for reasons of force majeure, the contract is terminated without prejudice to both parties.

As this does not happen in Brazil, we have a big increase in costs, preventing greater airline industry investments.

Consequently, the ticket is more expensive, as everyone must pay this extra cost in the airfare, regardless of whether they went through irregular operations or not.

Considering the analysis of different regulations and the results produced during this study, there is an important opportunity to improve the Brazilian regulation. The results of these adjustments can create the conditions to reduce costs from the airlines and benefit customers once that the airlines will compete by providing different services for the customers.

A good example of the benefits that this kind of change is the Brazilian regulation by the ANAC 400, when allowed the airlines to improve their strategies on services and pricing, creating different fares that could include the right to have baggage dispatched or not. This was an important step in Brazilian regulation. This study shows a good opportunity to improve the Brazilian regulation and bring even more benefits for the customers and the airlines that operate in Brazil.

An additional and important effect of the change on the Brazilian regulation regarding the costs of canceled or diverted flights would be the investment on several infrastructure

aspects, from airport to air control technologies. Once that, when the airlines would not be the only ones to have spends on this matter, other participants of the process such as airports and air-control would take their responsibilities on the eventual delays or flight cancelations caused by them.

### **Recommendations**

The Bureau of Transportation Statistics (BTS) provided by the U.S. Department of Transportation already provide more details about irregular operations for canceled and delayed flights. Besides, BST includes data related to deviated flights and standard reports and provides a web page that permits a user-defined report layout download builder. Using BST statistics and reports as a benchmark, ANAC can improve the current data's transparency and improve ed at a's detailed level, allowing better accuracy and analysis for further studies.

### **Key Lesson Learned**

The researchers of this study consider a lack of data available on the flights with irregular operations that required a robust capacity to combine different reports and the usage of assumptions supported by a benchmark with Bureau of Transportation Statistics (BTS). Combined with the results of the analysis done during this study suggests an important opportunity to improve ANAC 400 regulation in terms of airline responsibilities and share the responsibility of the irregular operations with all the entities that make part of the flight operations.

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