THE LAN AND TAM AIRLINES MERGER UNDER A STRATEGIC VARIANCE ANALYSIS APPROACH

LUIZ AUGUSTO DA SILVA ALVES

MASTER'S THESIS IN TRANSPORTATION

FACULTY OF TECHNOLOGY

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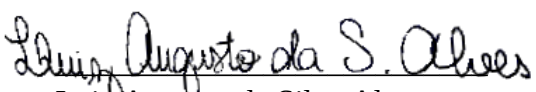

Luiz Augusto da Silva Alves
Brasília/DF - Brazil

"Comprar eu não quero, quero é ficar teu sócio."
"I don't want to buy; I want to become your associate."

Captain Rolim Amaro, former president of TAM,
regarding a business proposal from
Orlando Ometto, former owner of TAM

ISTOÉ, 1991

DEDICATION

To my family: my wife Caroline,
my mother Helena, my father Luiz
and my brother Pedro.

ACKNOWLEDGEMENTS

I am grateful to my wife Caroline Reinozo, for her patience, love and care. Thank you for supporting me when I moved to Brasília to start a new life. My wife, my partner.

I would like to thank my parents Helena Gentilucci and Luiz Alves for dedicating their lives to my education. I could not have reached this position without you.

I need to thank to my supervisor, Professor Carlos Henrique, for his guidance throughout this research. Thank you for inspiring my interest in Economics and Business Administration.

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I thank my pilot friends and other aviation professionals. We are facing the hardest moment of aviation history due to the COVID-19 crisis, even worse than September 11, 2001. Despite the wave of bankruptcies, mergers, unemployment and the health risks, the world really needs aviation professionals. We will come through this together.

ABSTRACT

LAN and TAM used to be the flag carriers of Chile and Brazil, respectively, until late 2000's in the airline industry. The merger of both into LATAM Airlines was part of the strategy to construct a major regional power of air transportation, an evolution from national companies to a Latin America brand. This research analyzes the merger of LAN and TAM, which in the second decade of 21st Century formed one of the largest passenger air transportation groups. The concept of Strategic Variance Analysis (SVA) is used in some academic environments to evaluate a company's operational revenue in two time periods, in this specific case, 2010-2013. The SVA relates the financial statements with businesses strategies approaches. Previous studies in the American airline industry have been conducted with SVA method. This research compares the financial situation of former TAM before the merger (2010), and LATAM (2013), after the merger. The financial, operational, and fuel data are gathered from the National Civil Aviation Agency of Brazil, reclassified, and applied to calculate SVA. Then, as the final conclusion, SVA demonstrates that this merger was good, however it was insufficient to cover the rise in fuel prices during those years.

Keywords: merger, acquisition, incorporation, airlines, aviation

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LIST OF SYMBOLS, ABBREVIATIONS AND ACRONYMS

ABEAR	*Associação Brasileira de Empresas Aéreas* (Brazilian Airlines Association)
ANAC	*Agência Nacional de Aviação Civil* (National Civil Aviation Agency)
ANP	*Agência Nacional do Petróleo* (National Oil Agency)
ASK	Available Seat Kilometers
CADE	*Conselho Administrativo de Defesa Econômica – CADE* (Administrative Council for Economic Defense)
CMV	*Comissão de Valores Mobiliários* (Securities Values Commission)
CORFO	*Corporación de Fomento de la Producción de Chile* (Chilean Production Development Corporation).
DAC	*Departamento de Aviação Civ*il (Civil Aviation Department)
DRO	*Demonstrativos de Resultado Operacional* (Operational Statement)
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
LAN	*Línea Aérea Nacional* (National Airline)
RPK	Revenue Passenger Kilometers
SEC	Securities and Exchange Commission – SEC
SITAR	*Sistema Integrado de Transporte Aéreo Regional* (Integrated Regional Air Transportation System)
SVA	Strategic Variance Analysis
TAM	*Táxi Aéreo Marília* (Marília Air Taxi)
TLDC	*Tribunal de Defensa de la Libre Conpetencia – TDLC* (Court of Free Competition Defense)

1 INTRODUCTION

Civil aviation faced hard financial moments around the world after the September 11, 2001 terrorist attacks. The demand for air transport decreased significantly in the following months due to the fear and uncertainties that surrounded flight security. That event struck a blow to air transportation's reputation and passengers' perceptions of aviation security. While new measures were taken by the civil aviation authorities worldwide, aerial activity gradually regrew from the panic.

Even so, traditional airlines that had been in the market for many years, saw their (already harassed) profit margins reducing a lot, while new players arose at that time proposing new business models. Between 2000 and 2019, several of those traditional airlines, in pursuit of survival, merged to form stronger companies, such as Air France and KLM in 2004; Continental and United Airlines in 2010; British Airways and Iberia in 2011; Gol and Webjet in 2011; American Airlines and US Airways in 2013; and Alaska Airlines and Virgin America in 2016.

Another important factor was the popularization of the low-cost/low-fare airlines model, with an aggressive proposal of low operational costs and offering reduced fare air services, forcing not only competition with the traditional companies but also with other means of transportation. The older airlines were pressured by the market itself to operate in an even more efficient way, and to offer more competitive fares to face the new age, otherwise their market share would tend to decrease due to the low-cost competition.

Oil price fluctuations directly influence airlines' operating results. In Brazil alone, ABEAR (the Brazilian Airlines Association) estimated that in 2012, 37.8% of national companies' operating costs were related to fuel, which was at its highest historically registered value (ABEAR, 2019). That demonstrates the weight this input represents for their balance sheets. The scenario for Brazilian airlines, most of whose revenue is in Brazilian Reals (BRL) whereas the costs are in United States Dollars (USD), is even worse; it means that the exchange rate component implies higher costs and lower profit margins for airlines.

The year 2020 has established a new era in aviation worldwide. The COVID-19 Pandemic, also known as Coronavirus Pandemic, has triggered the worst possible unforeseen scenario for aviation; even worse than the September 11, 2001 attacks. The air transportation market worldwide has been affected by COVID-19.

Among the options to survive this hard moment are mergers and acquisitions. In the first semester of 2020, market rumors said that coming examples may be Azul and LATAM, Air Canada and Air Transat, Air Asia and Malaysia Air. Others have filed for Chapter 11 (United States), *Recuperação Judicial* (Legal Recovery – Brazil), Insolvency Law (United Kingdom), or Voluntary Administration (Australia), or the least undesirable option, bankruptcy. Some 2020 airlines with financial issues are LATAM, LATAM Argentina, Avianca, South Africa Airways, Flybe and Virgin Australia.

Thus, a severe pandemic that causes financial losses in the air transportation market is also a good reason to trigger mergers and acquisition processes.

1.1 RESEARCH PROBLEM

The main problem of this research is to respond to the following question: how to identify, in an objective way, the causes of LAN (Chile) and TAM (Brazil) merger's synergy (or lack of). Thus, the investigation is into whether this merger was financially successful, and what the causes of success or failure were.

The word synergy is suggestive of an abstract concept; in the merger and acquisitions world however, this terminology has a more specific meaning. Rocha & Britto (2018) say that there is synergy when two companies are worth more combined, than separately. The Corporate Finance Institute (2020) defines synergy as "*the concept that the whole of an entity is worth more than the sum of the parts*". Other financial dictionaries use the same approach. In other words, a merger and acquisition synergy means that the deal between two companies resulted in enhanced value and other advantages.

1.2 OBJECTIVES

The main objective is to evaluate the merger between LAN and TAM in 2010 using the Strategic Variance Analysis (SVA) method, developed by Horngren *et al.* (2000) and extended by Sopariwala (2003).

A secondary objective is to identify the business strategy adopted between the period before and after the merger of the new company.

1.3 JUSTIFICATION

There are some reasons for specifically choosing the LAN–TAM case.

a) To understand the causes of the merger failure or success, in order to serve as an example for other companies.

b) TAM was the largest Brazilian airline in 2010, not only in respect of revenue, but also in transported passengers, which demonstrates the importance of the subject (ANAC, 2010).

c) LAN was the largest Chilean airline in 2010, for the same reasons, which demonstrates the importance of the companies for the air transportation market in Latin America.

d) Two years after the 2008 Economic Depression, some airlines triggered a movement of mergers and acquisitions to survive the following years, particularly in the United States and South America.

e) The merger of LAN and TAM is well documented with several open files and high coverage by the press.

f) The ANAC's (Brazil National Agency of Civil Aviation) Air Transportation Annuals published every year are of easy access and provide a reliable source of data (financial, operational and fuel), which makes the data analysis feasible.

g) The applied research method, SVA, has been successfully used in other airlines cases by other authors along the 2000-2020 decades. Even ICAO – the International Civil Aviation Organization – takes advantage of SVA for some studies, for example, the Presentation of its 2018 Air Transportation Statistical Results (ICAO, 2018).

1.4 DISSERTATION STRUCTURE

Chapter 1 introduces the scenario of mergers and acquisitions in the airline market, in which LAN and TAM were major South American players at that time. Some traditional research issues are highlighted such as the research problem, objectives, and justification.

Chapter 2 is a short history of TAM, LAN, and their merger. Throughout their histories, both companies created new ones, merged, acquired, incorporated, and sold, not only other airlines, but also travel agencies, information technology companies, logistics companies to support cargo operations, maintenance workshops, training academies, and other kinds of businesses. The focus of this chapter is the operational history and the two airlines are discussed separately. As the merger has been widely documented in recent years, and both airlines are public companies, there is plenty of good material available for discussion.

Chapter 3 is a literature review and goes into greater detail as to how SVA works. The main components are described in 14 equations, and their meaning in the context of operational revenue analysis is explained.

Chapter 4 is a theoretical framework constructed to support the research. The start point is the search in the most important scientific repositories such as Web of Science and Scopus. Then, some analysis is applied to demonstrate the relevance of this subject. The following subsections summarize the difference between mergers and acquisitions and summarize the major mergers and acquisitions since 2000. Finally, a basic introduction is presented to methods applied to investigate airline mergers in the literature, other than SVA.

Chapter 5 This chapter gathers the necessary data to apply SVA to the LAN-TAM merger according to the concepts learned from the previous chapter. The years compared are 2010 and 2013.

Chapter 6 is the final analysis of the operational results of the merger, and what those financial numbers can reveal about what happened during those 3 years.

Chapter 7 is the conclusion and final remarks of the research. Some suggestions are made to apply the same study to other scenarios of recent aviation moments.

Finally, the Appendixes support the research base with documents, tables, and figures.

2 HISTORICAL ANALYSIS

2.1 TAM – FROM MARÍLIA AIR TAXI TO THE MAGIC RED CARPET

Whenever the history of TAM's foundation is mentioned, the name that always springs to mind is that of Captain Rolim Amaro. That, however, is a misunderstanding because he was not the founder of TAM. Captain Rolim Amaro was fundamental to the development of TAM, but his role only gained importance some years after the company's foundation.

Before going further, a disclaimer. This chapter about the historical context gathered documental information from the early moments of TAM, and it is widely based on the detailed testimony provided by Captain Rolim Amaro to Teixeira (2006), for the latter's master's dissertation about the formation of the TAM identity. Other sources that support this part (mainly with old photos) are the websites of aviation enthusiasts such as *aviacaocomercial.net* (Aviação Comercial, 2020), Cultura Aeronáutica (Liasc Filho, 2016) and *airliners.net* (one of the oldest and probably the largest source of aviation photos in the Internet). A Facebook group named *Memória da Aviação no Brasil. Fotos antigas de aviões e aeroportos* (Memories of Aviation in Brazil. Old photos of planes and airports.) contributed with rare photos of early TAM planes and a heated debate about the facts related to TAM's history.

Even though the official webpage 'History' of the LATAM Airlines Group (LATAM, 2020) considers the start of the company only to have been in 1976 (Figure 2.1), TAM was initially created in 1961 by a group of 10 pilots from the city of Marília, in the State of São Paulo. At that time (and up until today), Marília was a middle-sized city focused on agribusiness activities. The pilots named the new company *Táxi Aéreo Marília* (Marília Air Taxi) – TAM – and organized it as a cooperative business structure to transport not only passengers but mainly cargo between the States of São Paulo, Paraná and Mato Grosso. In 1961 Captain Rolim Amaro was only 18 years old and had just got his pilot's license.

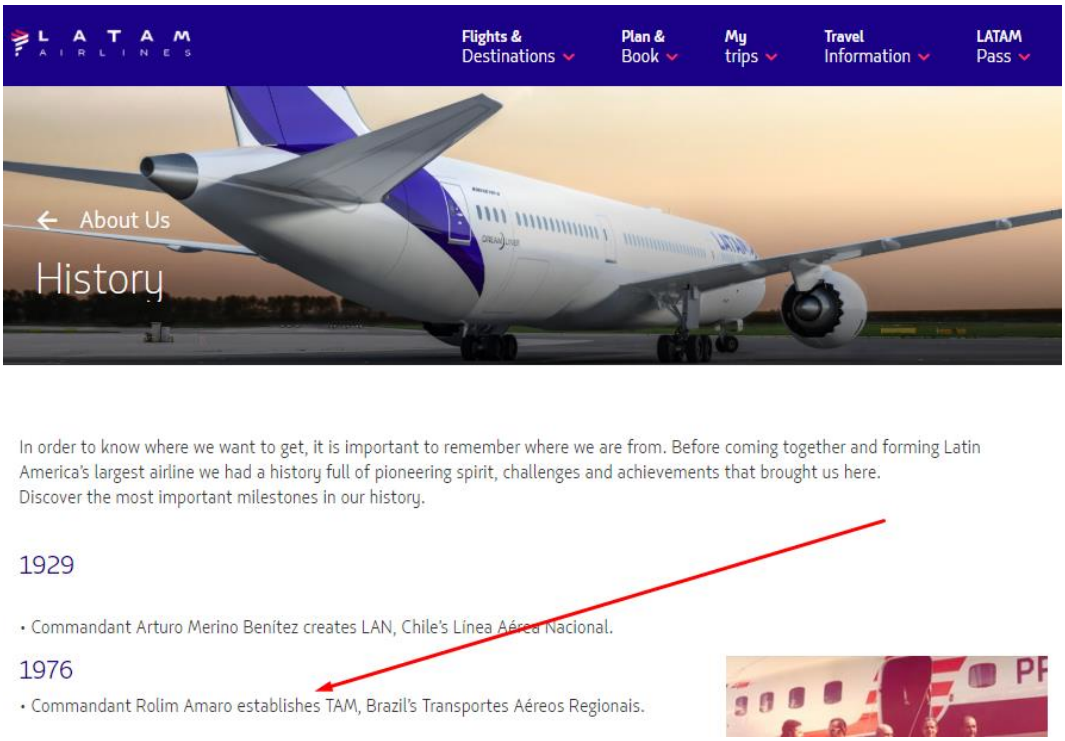


Figure 2.1 LATAM's History on the official website. Even the official source ignores the events before 1976 (LATAM, 2020).

In the 1960s, TAM was one of the main partners of the Ometto Group, one of Brazil's largest sugarcane producers, transporting passengers, document pouches and supplies to the group's plantations. In 1966, *Grupo Ometto* (Ometto Group) incorporated the former TAM cooperative to its business, and in 1967 Orlando Ometto, the head and founder of the group, transferred TAM headquarters to the city of São Paulo.

Teixeira (2006) mentions that Captain Rolim Amaro joined TAM in the early 1960's in a pilot standby scheme, where the flights are scheduled according to demand. His wish was to transport passengers instead of cargo, and comfort and maintenance were two of his major concerns. Around 1967, the Ometto Group injected capital to cover TAM's debts and became the major shareholder of the company. Captain Rolim Amaro left TAM to join *Líder Aviação* (Líder Aviation), an air shuttle company based in Belo Horizonte and in 1968 he joined VASP, one of Brazil's largest airlines, where he flew commercial aircrafts.

After a crisis period in VASP, Captain Rolim Amaro left the airline and got a bank loan to purchase a small single-engine aircraft. Then, he and his brother acquired another small aircraft to fly in Northern Brazil to meet farmer's needs in that region. As he noticed that some of the farmers own aircraft spent more time on ground at the main State capital's airports than flying,

Amaro offered to buy those idle aircrafts to connect the farms (one of the farmers was Orlando Ometto). In 1970, at the age of 27, he founded *Araguaia Táxi Aéreo* (Araguaia Air Taxi) with 10 aircraft.

In 1971, Orlando Ometto invited Captain Rolim Amaro to help solve TAM's financials problems; he accepted with one condition: he wanted to own 50% of TAM's shares. He rejoined TAM owning 33% of the company, and in 1972 he finally owned half of the shares.

Brazil's government created the *SITAR – Sistema Integrado de Transporte Aéreo Regional* (Integrated Regional Air Transport System) in 1975 to consolidate the regional companies in an integrated system to cover all the areas of Brazil. Captain Rolim Amaro understood this as an opportunity to expand TAM business. Finally, on March 13, 1976 TAM – *Transportes Aéreos Regionais* (Regional Air Transport) was formally created as a regular flight airline (not a local commuter airline service anymore). Amaro also purchased the entire company from Orlando Ometto.

TAM operated flights connecting São Paulo (city) and towns in the countryside of the States of São Paulo, Paraná and Mato Grosso (Figure 2.2). The fleet was basically made up of propeller engine planes such as the Cessna 402B (Figure 2.3), Piper Navajo (Figure 2.4) and the Embraer EMB-110 Bandeirante (Figure 2.5) purchased from VASP. In the 1970's TAM also started operations with its first jets, Learjet 24D, 25B, 25C, 25D and 35A (Figure 2.6).

Figure 2.2 TAM's routes in 1976. The focus was São Paulo, Paraná and Mato Grosso (Mato Grosso do Sul became a state only in 1977) (Aviação Comercial, 2020).

Figure 2.3 PT-JRT – Cessna 402B operated by TAM in the 1970s and 1980s (Oliveira, 1975).

Figure 2.4 PT-JKM – Piper Navajo operated by TAM in the 1970s and 1980s (Cedrini, 1980).

Figure 2.5 PT-GJY – Embraer EMB-110 Bandeirante operated by TAM in the 1970s, purchased from VASP (Cedrini, 1979).

Figure 2.6 PT-DVL – Learjet 25B. TAM's first jet (unknown source).

Even though the Embraer Bandeirante (15) transported almost the double the number of passengers compared to the Cessna 402 (6) and the Piper Navajo (8) (Conrado, 2015), Captain Rolim Amaro was not satisfied with its efficiency so the next step was to expand the business with another type of aircraft.

In 1980, TAM acquired the regional Fokker 27 (Figure 2.7) not only to replace the Embraer Bandeirante, but also in a strategy designed to enhance the company's visibility among the other competitors. The Fokker 27 was used to link central airports such as Congonhas Airport (São Paulo), Santos Dumont Airport (Rio de Janeiro) and Pampulha Airport (Belo Horizonte) (Aviação Comercial, 2020).

Figure 2.7 PT-LAH – Fokker 27 at Miami Opa-Locka Airport. The regional turboprop marked the beginning of a good relationship with the Dutch manufacturer (Dallot, 1983).

The first important acquisition took place in 1986, when TAM purchased VOTEC, a small commuter airline renaming it as *Brasil Central Linha Aérea Regional* (Central Brazil Regional Airline). That made it possible for TAM to expand to Brazil's northern and central western regions. Besides the Fokker 27, TAM also operated the larger Fokker 50 (Figure 2.8).

Meanwhile, in the late 1980's, inflation, price controls and the context of socioeconomic crisis in Brazil thrust the airlines into a complicated situation. As the President of TAM, Amaro was forced to adopt an austerity policy, firing employees, canceling routes, returning aircraft, and reducing expenses. Although TAM retracted its size, its financial situation was under control, unlike that of the other competitors. The 1990's started with good new opportunities.

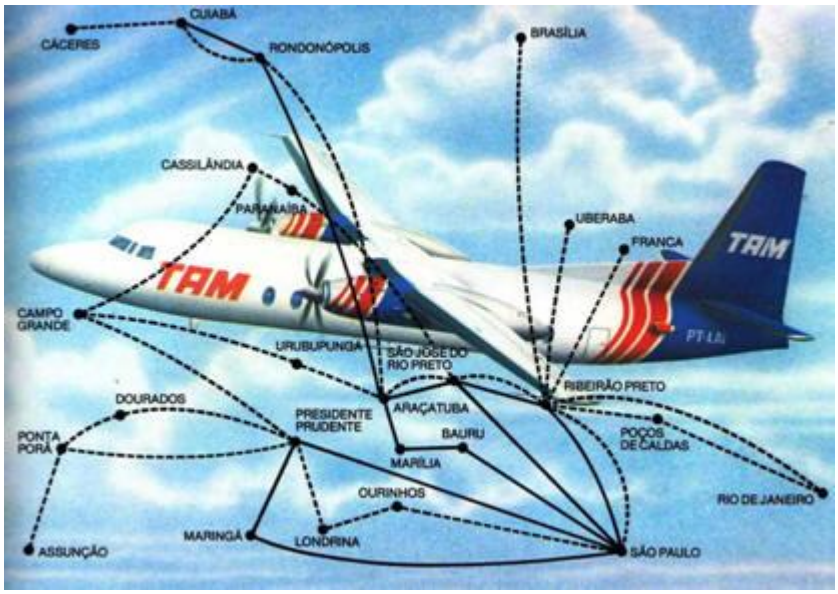


Figure 2.8 TAM's routes in 1984. The focus was still São Paulo, but new routes were established operated by the Fokker 50, in the background (Aviação Comercial, 2020).

2.2 TAM – THE PATH TO BECOMING BRAZIL'S FLAGSHIP IN THE YEARS 2000

According to the LATAM Airlines Group (2020), *"Brasil Central Linhas Aéreas changed its name to TAM - Transportes Aéreos Meridionais in 1990"*. In the same year TAM also obtained regulator authorization to operate the route between Rio de Janeiro (Santos Dumont Airport) and São Paulo (Congonhas Airport) in an independent way, outside the traditional *Ponte Aérea* (Air Bridge) operated by the VARIG, VASP and Transbrasil consortium.

The service between the two major Brazilian cities was provided with the Fokker 27, smaller than the competitors' aircraft. The company had to manage some kind of tradeoff between the high cost of Fokker 27 operation and the high price charged to passengers. The strategy adopted was product differentiation, a success among the businessmen insofar as they could enjoy high quality service, a comfortable flight, individual attention and good food onboard.

In the late 1980's, the former *DAC – Departamento de Aviação Civi*l (Civil Aviation Department, the military department which controlled civil aviation in Brazil before ANAC) prohibited jet operations at São Paulo's Congonhas Airport, only allowing jets at Guarulhos International Airport. Somehow Captain Rolim Amaro knew that this prohibition would not last long (it was thought to be likely because VARIG's Lockheed Electra II were becoming

outdated in 1989, and probably a jet would replace them…), and considered acquiring VASP. However, when he looked deeper into VASPS's financial situation, he gave up the deal. So, another way to work around that and enable TAM to start regular flights with jet engine aircraft was to lease another Dutch plane, the Fokker 100 in 1989 (Teixeira, 2006).

At this point, it is necessary to explain the structure of the Brazilian air transportation market. The airlines were divided in three specific groups: regional, national, and international airlines, and TAM was a regional one. The Fokker 100 (Figure 2.9) was a milestone for TAM and the Brazilian industry because at that time the national airlines operated basically Lockheed and Embraer turboprops, and Boeing and McDonell Douglas jets. Liasc Filho (2016) describes some important features about this aircraft: silent due to the engines located in the empennage; 3x2 rows configuration, instead of the 3x3 standard configuration of the Boeing 737-300; 13 tons lighter than the Boeing 737-300; and, it consumed 1.5tons of Jet A-1 (jet fuel) less than a Boeing 737-300 in a São Paulo-Brasília flight. Despite the lower performance compared to the Boeing 737-300, in short haul flights the difference was minimized.

The Fokker 100 marked the beginning of the transition from a regional to a national airline. Nonetheless, the DAC only authorized what were known as 'differentiated routes', connecting State capitals, but with a stop in the middle, which was not efficient at all (Teixeira, 2006). For example, the São Paulo-Brasília route was operated with a stop in Ribeirão Preto. A way around that situation was to land the aircraft, open the door, close the door, and take off immediately, without boarding anyone.

Passengers who flew with TAM in the 1990's immediately associate the company with the Fokker 100. Liasc Filho (2016) says that TAM received the first 2 units in 1990, the first one PT-MRA. Four years later new and used Fokker 100s were added to the fleet, expanding TAM's network. Even though the last brand-new unit was delivered in 1996, when Fokker went bankrupt, the airline kept seeking the Fokker 100 in the market until 2000, when the PT-MQW was the last one purchased by TAM. The airline was the second largest operator of Fokker 100s after American Airlines.

Figure 2.9 PT-MRA – This picture shows the very first Fokker 100 delivered to TAM at São Paulo Congonhas Aiport (Dallot, 1991).

At that time Captain Rolim Amaro made a point of highlighting TAM's quality of service onboard the Fokker 100 and the flight experience, releasing the phase of The Magic Red Carpet, where the crew waited to greet the passengers outside the plane and offer them welcome candies (Figure 2.10). In 1993 *TAM Fidelidade* (TAM Fidelity) program was launched (LATAM, 2020) as the first customer loyalty program in Brazil. Other initiatives were also launched to capture TAM competitor's passengers, such as, Christmas giveaways and the telephone channel *'Fale com o Presidente'* (Talk to the President).

Then, the DAC gradually deregulated TAM's restrictions and new routes and airports were opened for its operations. Even some regional routes were eliminated to keep the focus on the more profitable destinations. That fact and the massive marketing campaigns finally made TAM a competitor to VARIG, VASP and Transbrasil. Figure 11 from the onboard magazine shows the scenario in 1995.

Figure 2.10 The Magic Red Carpet experience. Sometimes it was possible to find Captain Rolim Amaro himself offering candies to the passengers at the stairs besides the crew (unknown source).

The year is 1996 and important changes happened. According to LATAM (2020), the cargo division, TAM Cargo, was founded to provide logistics services for the company. In the same year TAM acquired *LAPSA – Líneas Aéreas Paraguayas* (Paraguayan Airlines), a state-owned airline from Paraguay in a bad financial situation, which was the first movement outside Brazil. The incorporated company was rebranded as *Transportes Aéreos del Mercosur* (Mercosul Air Transport) or simply TAM Mercosur, to keep the original acronym. The first flight to Buenos Aires, Argentina took place and was a success.

On October 31, 1996, Flight 402 from São Paulos Congonhas Airport to Rio de Janeiro Santos Dumont Airport crashed to the ground one minute after takeoff roll due to a failure of the thrust reverser of the Fokker 100, registration mark PT-MRK. Among other causes was the fact that the pilots had not been properly trained for an inflight thrust reverser opening situation. That tragedy triggered a lack of reliability crisis among passengers who then avoided flying the Fokker 100 whenever possible. Added to that, in the following year a bomb explosion killed a passenger in a flight between São José dos Campos and São Paulo. This last accident had nothing to do with the model of the aircraft, because it could happen to any type. However, the case still hit TAM's Fokker 100 reputation hard (Aviação Comercial, 2020).

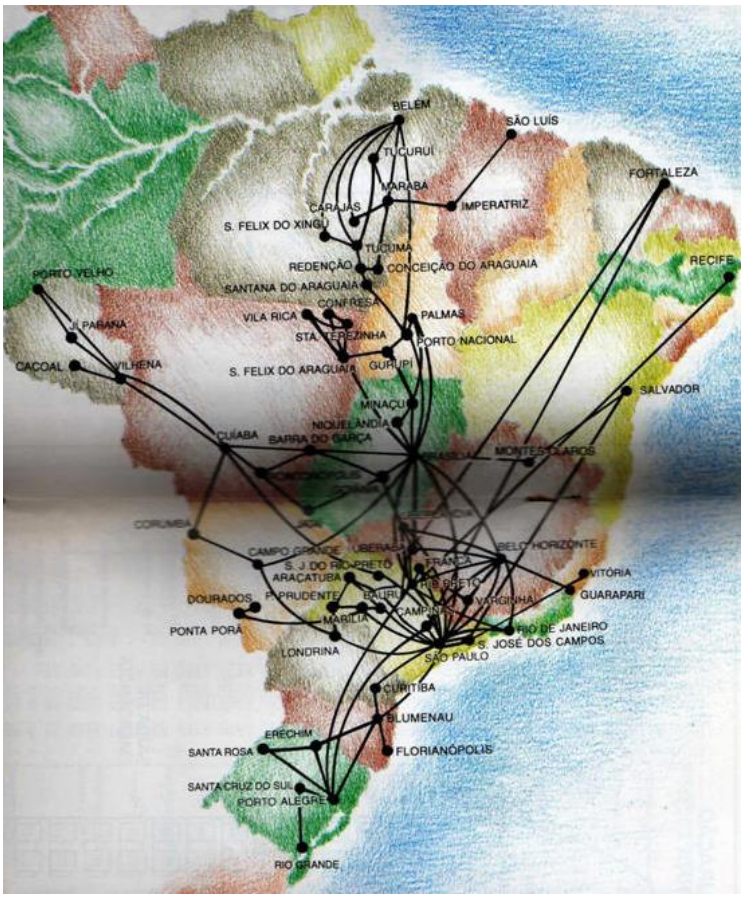


Figure 2.11 TAM's routes in 1995. National Expansion (Aviação Comercial, 2020).

As mentioned previously, the Dutch manufacturer went bankrupt in 1996, and TAM needed to expand and renew its fleet which consisted of more than 50 Fokker 100s. So, in the late 1990s, TAM, the former Lan Chile and the former TACA grouped to negotiate with the European manufacturer Airbus the acquisition of A319 (Figure 2.12), A320 and A330 aircraft. LATAM (2020) emphasizes that the first Airbus A330 flight from São Paulo to Miami took place in 1998, the first long-haul route of the company, highlighted in magazine advertisements as the flight with the most advanced aircraft in the world (Figure 2.13). In 1999, the first European destination was released, Paris, in a code share with Air France.

The Airbus A320 family was the main competitor of the Boeing 737 family for short-haul flights, while the Airbus A330 was designed to compete against the Boeing 767 for high-density and long-haul demands. The good relationship with the Airbus consortium was an immediate success and continues to this day with LATAM.

Figure 2.12 Advertisement of the Airbus A319 that operated the 'Air Bridge' service between Rio de Janeiro and São Paulo (Aviação Comercial, 2020).

Figure 2.13 Advertisement for the Airbus A330 flight from São Paulo to Miami in a 1998 magazine (Aviação Comercial, 2020).

In 2000, a curious victory to enhance TAM's reputation: the airline was chosen as the official transporter of the President of Brazil on long-haul flights in a wet lease scheme (crew included). Due to constant mechanical failures of the Brazilian Air Force's old Boeing 707, the government opened a competitive bidding process to choose an airline that would transport

official missions. Thus, TAM made it against its main competitor, VARIG, and President Fernando Henrique Cardoso was transported onboard a latest generation Airbus A330 for two years. The configuration was the same as those of the regular flights, and Captain Rolim Amaro personally accompanied President Fernando Henrique Cardoso on one of the first flights.

Also, in the year 2000, the data provided by ANAC (2000) in Table 2.2.1 shows that TAM was Brazil's second largest air transporter in total numbers of enplaned passengers in domestic and international markets. The share was 24.27% (codes TAM and BLC), less than 5% smaller than VARIG. In that year, *TAM Meridional*, *TAM Express* and *TAM Regional* were consolidated in *TAM Linhas Aéreas* (TAM Airlines).

Table 2.1 Enplaned Passengers share in 2000 (domestic and international)

Airline code	Airline Name	Total	Share
VRG	VARIG – Viação Aérea Riograndense	10,872,942	29.13%
TAM	**TAM – Transportes Aéreos Meridionais**	**5,237,926**	**14.03%**
VSP	VASP – Viação Aérea São Paulo	4,074,885	10.92%
RSL	Rio Sul	4,029,596	10.80%
BLC	**TAM – Transportes Aéreos Meridionais**	**3,820,048**	**10.24%**
TBA	Transbrasil	2,347,687	6.29%
NES	Nordeste	1,164,370	3.12%
---	Others	5,773,325	15.47%
TOTAL		**37.320.779**	**100%**

Source: ANAC (2000)

According to LATAM (2020), the Services Academy and TAM MRO were opened in 2001. Nowadays, TAM MRO located in São Carlos, State of São Paulo, is one of the largest maintenance centers of Latin America. Unfortunately, that was a tragic year too. On July 8, 2001, Captain Rolim Amaro, 58-year-old president of TAM, died in a helicopter crash. It is hard to imagine History with 'ifs", but who knows what might have happened to the administration of TAM with Amaro in charge, if he had not died in that accident? He brought growth and professionalism to the company and engraved his name in the annals of Brazilian aviation.

Two months later, the September 11, 2001 attacks thrust aviation into a worldwide crisis that included Brazil. The demand for air transport on international routes dropped, forcing the suspension of overseas expansion. Another challenge arose in 2001: the creation of Gol Airlines, the first (supposedly) low-cost airline of Brazil and TAM's main rival for the next 20 years.

The decade of 2000 saw TAM become main air transporter of Brazil, boosted by the bankruptcy of VARIG, VASP and Transbrasil. In the year 2003, TAM and VARIG came to a code share agreement, but it lasted only one year. Mostardeiro (2019) says that "*through intervention of the Civil Office of the Presidency and the Ministry of Defense, representing the Federal Executive, in 2003, VARIG and TAM signed a letter of intention to unify, and thus, started sharing flights (code sharing), but without concluding a merger of the two airlines. In the following year, both companies started charging the same fares and proposed the creation of a company to manage the shared flights, an idea which was not put into effect".*

That would had been one of the largest mergers of Brazil's aviation history and, theoretically, both airlines would have benefited: VARIG would have had its financial problems gradually solved and TAM would have taken advantage of VARIG's international penetration. However, TAM's executives, after analyzing VARIG's balance sheets, realized the how formidable the challenge was and as the organizational culture, information systems, aircrafts and almost everything were different, the business merger bid failed.

In 2004, Marco Antônio Bologna, former Vice-President of Finance became the President of TAM. Some initiatives were adopted, such as the low-fare overnight flights, focused on tourist passengers. The Brazilian press reported that TAM had closed deals with the regional carriers Passaredo, Ocean Air and Trip to reach middle-sized cities (Folha de São Paulo, 2004). Total and Pantanal also joined the agreements, enabling TAM to serve 66 domestic destinations (41 are TAM's own routes).

Also, a new business class configuration was released, with 180º reclinable flatbed seats (instead of the previous 145º recline) on flights to Miami and Paris. Moreover, as Brazil's economy gradually resumed growth, the number of flights serving Miami reached 14 per week, and Paris reached 10 (Figure 2.14). LATAM (2020) says that Santiago, finally was served by the former TAM in 2004, setting a milestone in the relationship between TAM and the Chileans, as the South America market became another focus for the company.

Figure 2.14 Destinations in 2004. International Expansion (Aviação Comercial, 2020).

The first international flights out of São Paulo's Guarulhos Airport were launched in 2005, Rio de Janeiro-São Paulo-Miami and São Paulo-Recife-Paris. TAM also launched new flights to New York and Buenos Aires. An important financial fact of 2005: the initial public offering (IPO) of TAM was released in the São Paulo Stock Exchange (Bovespa) (LATAM, 2020).

In 2006 Lima and London were added as destinations from São Paulo; a non-stop route between Rio de Janeiro and Buenos Aires was opened; and the Fortaleza-Belém-Manaus-Miami flight was created to fill the gap left by VARIG (Aviação Comercial, 2020).

As TAM inherited VARIG's international routes between 2004 and 2006 (when VARIG went bankrupt), Airbus production rate could not meet TAM's international expansion. Then, a decision had to be made whether to choose the Boeing 777 (twin-engine) or the Airbus A340 (four-engine) to address the long-haul demand. Finally, a purchase (lease) of eight brand-new Boeing 777-300ER (Figure 2.15) was announced in 2006, the first deal with the American manufacturer; however, Boeing had to lease three ex-VARIG MD-11 (Figure 2.16) for a low value, until the deliveries of the Boeing 777-300ER could be made.

Figure 2.15 PT-MUJ – Boeing 777-300ER landing at Frankfurt am Main Airport (Leest, 2017).

Figure 2.16 PT-MSJ – MD-11 at São Paulo Guarulhos Airport. Three MD-11 were offered by Boeing to supply the demand until the deliveries of the 777-300ER (MikeFox, 2007).

One year after offering shares on the São Paulo Stock Exchange, TAM launched its IPO on the New York Stock Exchange (NYSE). *Museu TAM* (TAM Museum) opened in the city of São Carlos to preserve the memories of the company (later it would be closed due to high expenses).

Mock-ups were installed in the Service academy to be used in cabin crew training. New European destinations are opened: Frankfurt, Milan and Madrid (LATAM, 2020).

Anyone who accesses the link ‘History’ on LATAM’s official website will find a summary of the company’s past, with important facts, separated by a regular sequence of years. Except for the year 2007. That is probably due to the flight 3054 crash at São Paulo’s Congonhas Airport on July 17, 2007. An Airbus A320 from Porto Alegre, after touching the runway, could not brake properly, overran the airport boundary (Figure 2.17), crossed a highway and crashed into the TAM Cargo warehouse. The explosion killed 199 people onboard and on the ground (CENIPA, 2009).

Figure 2.17 PR-MBK – A surveillance camera recorded the moment that the Airbus A320 overran the runway at São Paulo’s Congonhas Airport. 199 people died (CENIPA, 2009).

The investigation, led by the Brazilian Air Force, could not came to an exact conclusion or pinpoint who was to blame. One fact was that both levers that control A320 thrust were in the climb position before the touchdown, but after it, the left thrust lever was retarded to the idle position, deploying the thrust reverser on the left engine, while the right thrust lever remained in the climb position, increasing thrust. Out of control, A320 did not manage to stop before the end of the runway (CENIPA, 2009).

That accident not only damaged TAM's reputation, but also Brazilian aviation's reputation. One year before, the Gol flight 1907 crash had triggered what came to be known as the *Apagão Aéreo* (Aerial Blackout): basically, a crisis of aviation infrastructure, safety, and lack of reliability. Both accidents contributed to that situation, and additional investments were allocated to improve air traffic control systems and training, and carry out airport improvements.

TAM changed its leadership in 2007, with David Barioni Neto as the new president, announcing some innovations for the following two years: the corporate identity would be modernized, costs had to be reduced (due to Gol's efficient low-cost strategy), TAM joined Star Alliance in 2008, and the first Boeing 777-300ERs were delivered. Figure 2.18 shows the huge international expansion to Europe and North America, with flights departing not only from São Paulo, but also from Rio de Janeiro, Salvador, Recife and Manaus.

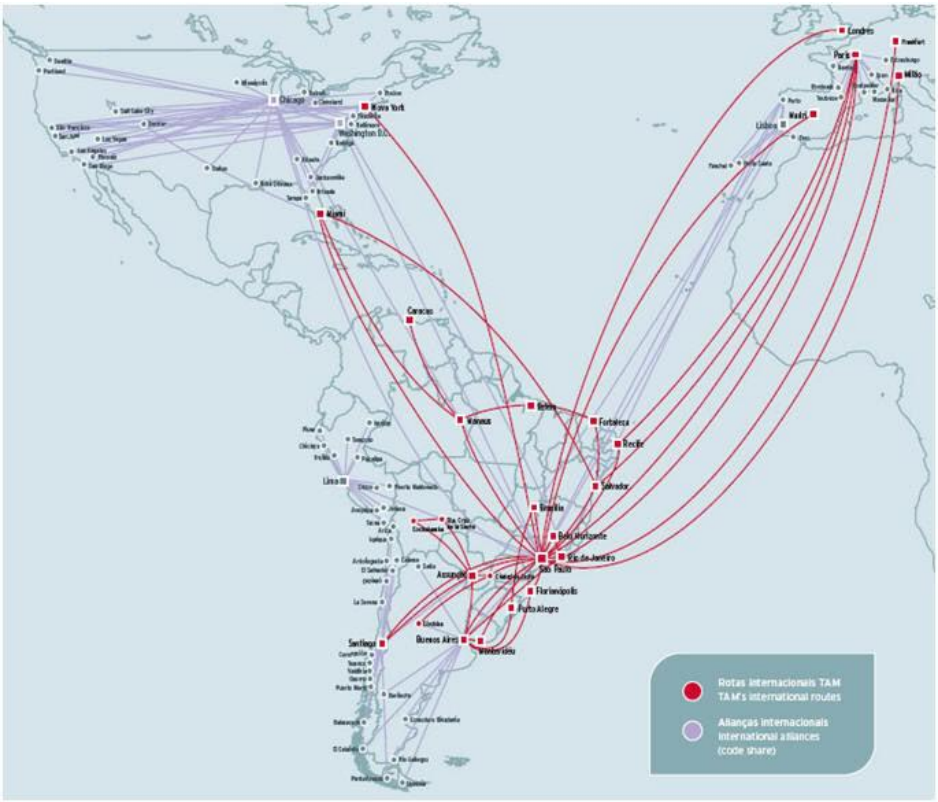


Figure 2.18 International destinations in 2008: 5 cities in Europe, 2 in North America and several in South America (Aviação Comercial, 2020).

The last flight with the Fokker 100 was made between Florianópolis and São Paulo in 2007 (Filho, 2016), closing a cycle of this type of aircraft begun in 1991. In June 2007, a great

announcement: the airline signed a memorandum of understanding with Airbus to acquire 22 latest generation Airbus A350XWB (O Globo, 2007). Two months later, the first A321 (longer than the A320) was delivered to be used to meet domestic and South American high-density demand. In October 2007, Airbus temporarily leased two four-engine A340 (Figure 2.19) due to the lack of available aircrafts to be applied to destinations such as Milan, Frankfurt and Madrid. That kind of plane was (even in 2007) extremely fuel inefficient. The TAM fleet reached 130 aircraft in 2008, mostly of the A320 family for short/medium-haul flights and A330, A340 and Boeing 777 for long-haul ones.

Figure 2.19 PT-MSN – Airbus A340 at Milan Malpensa Airport. Airbus offered some units of this four-engine jet to meet TAM's demand for long-haul flights (Giacobbo, 2011).

The loyalty program Multiplus (ex-TAM Fidelidade) became an independent company in 2009. Also, in the same year, TAM incorporated *Pantanal Linhas Aéreas* (Pantanal Airlines), an important acquisition to get Pantanal's slots at the Congonhas Airport. Some rumors in the airline industry suggested that the purchase of Pantanal was going to be the next step to a return to regional destinations, however TAM shut down Pantanal in 2013, showing that they were only interested in the slots at Brazil's most profitable airport (LATAM, 2020).

The strategy for market expansion included an invitation to join the Star Alliance (the largest alliance at that time) in 2009, but TAM only actually joined them in 2010. The first talks about a possible merger with LAN started around that time: in June 2010, the directors of both companies announced the merger and the creation of LATAM, which will be described in subsection 2.5.

2.3 LAN – CONNECTING THE LONGEST COUNTRY OF THE WORLD

The history of LAN is older than TAM's, and can be traced back to March 1929, when Comodore Arturo Merino Benítez founded the *Línea Aero-Postal Santiago-Arica* (Santiago-Arica Air Mail Line). LATAM (2020) website says that Benítez created the *Línea Aérea Nacional de Chile* (National Airline of Chile), but this information is incorrect, because that name only came to be used 3 years later. This chapter is widely based on Kreft (2016) registrations about LAN history and some historical documents. The documents in Appendix A (Figure A.1 and Figure A.2) support the historical facts.

The initial challenge at that time was to connect the capital of Chile, Santiago, to the northern part of the country, providing mail and other logistics services with a single engine De Havilland DH-60G "Gipsy Moth" (Figure 2.20). Chile is the longest country in the world (Russia is the widest one) and stretches more than 4,200 km from latitude 17ºS to 56ºS, but it is less than 200km wide. The website truesizeof.com shows Chile's real geographic dimensions: its length is the same as the distance from Lisbon to Moscow (Figure 2.3.2), from San Francisco to New York, or from Mexico City to mid-Canada (Figure 2.3.3). Among the challenges of flying in Chile are the climate, in a land with cold glaciers in the southern tip of South America and dry deserts in the north; and the Andes, the longest and one of the highest chains of mountains in the world (Quito, Bogotá and La Paz in nearby countries are among the highest national capitals).

Figure 2.20 The small De Havilland DH-60G "Gipsy Moth" restored in the National Aeronautics and Space Museum (Plane Catcher, 2015).

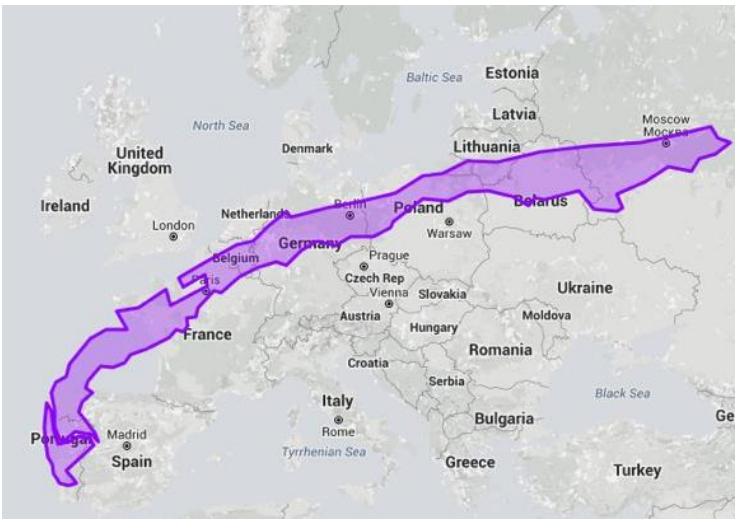


Figure 2.21 True size of Chile compared to Europe (made with truesizeof.com).

Figure 2.22 True size of Chile compared to North America (made with truesizeof.com).

Arturo Merino Benítez is considered to be the founding father of Chilean aviation, the Chilean Air Force and LAN Chile. In 1932, the government of Chile, under Benítez's supervision, officially created the *Línea Aérea Nacional de Chile* (LAN Chile), unifying several mail, passenger and cargo services provided by ex-*Línea Aérea Postal* and other air mail operations. LAN Chile "*had the exclusive right to run and explore all classes of air transportation in the territory of the Republic*" (Ministerio de Guerra, 1932). The airline would be a state-owned company until 1989. A review of the past shows that, for the government, LAN Chile played a strategic role in preserving the country's sovereignty, connecting Santiago to far distant towns.

From 1941 on, LAN Chile operated different models such as the Lockheed Lodestar C-60, the Lockheed Electra and the iconic Douglas DC-3 (Figure 2.23). The 1940's represented a strong expansion in passenger services for LAN, and more southern destinations were added: Concepción, Punta Arenas, Puerto Natales and Springhill (Kreft, 2016). In 1946 the modern Douglas DC-3, that could transport 21 passengers, crossed the Andes to open LAN's first international route to Buenos Aires.

Figure 2.23 CC-CLDP – Douglas DC-3 (unknown source).

In the next decade, accompanying the industry's technological evolution, LAN Chile acquired larger aircraft: DeHavilland Dove DH-104, Glenn Martin 202 and the Douglas DC-6. This last aircraft could finally carry 54 passengers from Santiago to Antofagasta and Arica (north) or Punta Arenas (south) without stops. Figure 2.24 shows a 1950 map with several domestic and international destinations; among the international ones are La Paz, Lima and Río Gallegos. Regarding the long-haul services to the United States, Kreft (2016) said that *"in August 1958 the flights to Miami started, transporting paid and invited passengers"* and *"1959 meant the consolidation of the United States route, where day after day people demonstrated their preference for LAN's services"*.

LAN received the first units of the Sud Caravelle in 1964, inaugurating the jet age in Chile. The speed increase was significant and allowed faster flights compared to the old propeller-powered DC-3 and DC-6. At that time, LAN's fleet was very heterogeneous: 3 Caravelle Vl-R, 7 Douglas DC -6, 1 Convair 340/440, 11 Douglas DC-3 and 1 Cessna 310-D (Kreft, 2016).

Figure 2.24 Some Lan Chile destinations in 1950 (Diseño Nacional, 1950).

The Southern Pacific has always been a strategic issue for the Chilean government, and a 'quick' connection between Santiago and Easter Island had to be established. Then, in 1966 *"the DC-6B was modified to an all-economy class, forty seat plane, and a year later, following improvements to the long level landing strip on the island, inaugurated a fortnightly service between Santiago and Easter Island* (Maddock, 2011)". One year later, the flight was extended

to Pape'ete, Tahiti, connecting South America to Oceania. Figure A.3 shows a historic picture of LAN presence in Easter Island.

In the 1960's LAN and the German Lufthansa were partners in the aviation industry, and their routes were supplementary, meaning that LAN desired to reach Europe, but its longest flight reached Miami; meanwhile, Lufthansa could not fly to the South Pacific via New York because it could only reach as far as Lima. Then, Lufthansa requested the Chilean authorities for the right to fly the Lima-Santiago leg, and LAN took advantage of the negotiation to make the Germans sell it an almost brand-new Boeing 707-330B, starting the long relationship between LAN Chile and the American manufacturer (Kreft, 2016).

On April 1, 1967, a historical fact: the first Boeing 707 (Figure 2.25), registration mark CC-CEA was delivered to LAN Chile. Two weeks later, LAN finally started the service between Santiago and New York with the new aircraft, opening new opportunities in the United States. The Boeing 707 also replaced the DC-6 on the Easter Island flights. The end of that decade brought some interesting acquisitions: LAN also ordered the British propeller-powered Avro HS-748 for short-haul flights, and the Boeing 727 jet. The latter were applied in South American medium-haul flights, as for example, to Rio de Janeiro and Asunción.

Figure 2.25 CC-CEA. The first Boeing 707 jet received by LAN at Sydney's Kingsford Smith Airport (Krep, 1973).

On June 2, 1970, Commodore Arturo Merino Benítez died in Santiago, at the age of 82, victim of a stroke. Even after retirement, Benítez kept up his relationship with the aviation world. To

preserve the pioneer's memory, in the same year President Salvador Allende proposed a draft bill to rename the Santiago International Airport (also known as Pudahuel Airport) as Arturo Merino Benítez Airport. To demonstrate the success of what Benítez helped to create, Kreft (2016) wrote about the company: *"in 1964, the international network of LAN was 10,602 km and in 1970, it was more than 40,000 Km"*.

Since LAN Chile was founded as a state-owned company, it had a fundamental role in what was known as the 'Southern colonization' (or Southern settlement) to ensure sovereignty over the entire country. Southern Chile is an inhospitable area, where small communities exist between the Andes and the Pacific Ocean, far away from the financial centers. Someone said once that this region was a *"zone of bad weather that made good pilots"* (Kreft, 2016). There is a similar situation in Brazil's portion of the Amazon forest, some parts of it are only covered by planes.

Firstly, the government used the LAN Chile DC-6 based in Coyhaique and Puerto Montt to serve the Southern towns in a strategy to keep those places covered by air routes. Then later, in the mid-1970s, the DeHavilland DHC-6 Twin Otter (Figure 2.26) operated the same missions formerly attributed to the older DC-6. Those kinds of aircraft were important because the airfield conditions were rough. However, in 1974 the DHC-6s were transferred to the Chilean Air Force. The other political strategy was the construction of the *Carretera Austral* (Austral Highway).

Figure 2.26 CC-CAE. DeHavilland DHC-6 Twin Otter. LAN's DHC-6 was part of Chile's national sovereignty strategy (Twin Otter World, 1974).

At that time, Chile faced a political crisis, with outbreaks of terrorist attacks across the country. In the same decade, aviation's reputation in Latin America also suffered because of various cases of hijacking. Nevertheless, the international expansion kept going in 1970, when LAN Chile finally opened a route between Santiago and Frankfurt, stopping in Madrid and Paris, accomplishing an old dream to connect Chile and Europe. Four years later, a Boeing 707 directly connected Sydney and Punta Arenas, opening the path to the Australian market via the transpolar route.

Kreft (2016) affirms that before the end of the decade, the Oil Crisis of 1975 forced some important administrative decisions to be taken: the fleet had to be standardized to use only the Boeing 707. That meant that the old DC-3, the Caravelle, the Boeing 727 and the Avro HS-748 were sold to other operators in an endeavor to make expenses more rational. However, as even in the 1980's the Boeing 707 model was not fuel efficient due to the outdated design, Kreft (2016) says that in 1980 LAN decided that both narrow and wide-body models should be purchased to meet the intermediate and long-haul route needs respectively: the Boeing 737-200 (Figure 2.27) and McDonnel Douglas DC-10-30 (Figure 2.28) were chosen.

Figure 2.27 CC-CEA. Boeing 737-200 at São Paulo's Guarulhos International Airport (Doria, 1990).

Figure 2.28 CC-CJS. McDonnell Douglas DC-10-30 at Frankfurt am Main (Plate, 1982).

2.4 LAN – PRIVATIZATION, EVOLUTION, AND INTERNALIZATION

The decade of 1980 characterized a phase of transition for LAN which changed from being a state-owned airline to being a privately-owned one. The process had started in the previous decade within a policy of state reduction, which included the sale of state-owned companies such as LAN. Since its conception, LAN had had the assignment of integrating and assisting all regions of Chile, no matter if the route were low density or low revenue. The wave of deregulation of air transport in the United States, as a solution to solve the inefficiency of the industry, also influenced the privatization of LAN. General Germán Stuardo, President of LAN, wrote a letter in 1975 demonstrating his concern about the matter.

In 1983, Chilean Government Resolution 01-291283 established the *Línea Aérea Nacional – Chile Limitada* (National Airline – Chile Limited), a kind of a public limited liability company owned by state agency CORFO - *Corporación de Fomento de la Producción de Chile* (Chile Production Development Corporation). Two years later, Law 18400 transformed LAN into *Línea Aérea Nacional – Chile S.A.* (National Airline – Chile S.A.). Finally, in 1989, the airline was privatized by the Chilean government; it sold 51% of the shares from the previous controller CORFO (US$ 42,300,000) to national investors of Icarosan S.A. (Kreft, 2016).

In 1993, Enrique Cueto was hired as Director of LAN, inaugurating a new era for the company. According to LATAM (2020), in 1994 *"LAN was at the height of privatization: 98.7% of the company shares had been acquired by the (then) current controllers and other shareholders"*. Juretić & Wigodski (2013) analyze that: *"the airline was totally privatized five years later, in 1994, when two Chilean family groups – Grupo Cueto and Grupo Piñera – became the major owners. The Cueto family had been in the airline business for a while, establishing the cargo airline Fast Air in the 1970's"*.

The decade of 1990 was a period of important evolution for the now privately-owned LAN Chile. Some low to medium demand markets were served by the recently acquired British BAE 146-200 aircraft (Figure 2.29), while long haul or high-density destinations required the services of Boeing 767s. The company also invested in international tourist routes such as Cancún (Mexico) and Punta Cana (Dominican Republic).

Figure 2.29 CC-CEN. BAE 146-200 at Puerto Montt, Southern Chile (Kambui, 1995).

LATAM (2020) says that in 1997 *"LAN started negotiating its shares on the New York Stock Exchange, becoming the first Latin America airline to negotiate shares on that important stock exchange*". Moreover, there was an important merger in its history: "*the directors of LAN proposed to the Chilean government a merger with Ladeco (Línea Aérea del Cobre), a smaller airline, which was approved in 1997. The merger allowed LAN to reach a greater number of flight routes […] to Brazil*" (Juretić & Wigodski, 2013). LAN also merged with the cargo company Fast Air, owned by the Cueto family (the major controller of LAN), making possible what was practically a monopoly of air transportation in Chile.

Since its foundation, and throughout the state ownership age, LAN had always been a huge monolithic company, trying to cover the whole country and overseas destinations, with different missions. This may have resulted in low administrative efficiency leading to a strategy change focusing on specialized branches.

In 1998, Ladeco S.A. incorporated Fast Air Carrier S.A., another subsidiary of LAN Chile S.A; in 2001 the brand was changed to LAN Chile Cargo S.A. (Figure 2.30); in 2004 the name changed again to LAN Cargo S.A., reinforcing LAN's cargo operations. This information was retrieved from the Santiago Business Registry and Chilean Commerce Registry. Another brand was released in the late 1990's, LAN Express (Figure 2.31), firstly connecting domestic cities, but then flying to nearby countries.

Figure 2.30 CC-CZZ. Boeing 767-300ER at Los Angeles International Airport. The Boeing 767 has been the workhorse of LATAM Cargo since the 1990s. (Irish, 1999).

Figure 2.31 CC-CZO. Boeing 737-200 at Santiago International Airport. LAN Express focused on the domestic market (Ruiz, 2002).

Santiago is LAN's headquarters and main operational base since its foundation by Commodore Arturo Merino Benítez. However, the need for expansion led LAN to make an important decision: to decentralize some operations in South America. To that end, in 1999 LAN Perú was opened; LAN Ecuador started operations in 2003, followed by LAN Dominicana a few months later; LAN Argentina was founded in 2005; and finally, LAN Colombia was launched after the acquisition of Aires, an airline of that country, in 2010 (LATAM, 2020). Figure 2.32 summarizes the coverage of LAN and its regional subsidiaries.

Figure 2.32 LAN Airlines and subsidiaries network in South America probably in 2010 (the year is uncertain) (Aviação Comercial, 2020).

The fleet strategy changed in 1998, when LAN decided to replace some old Boeing 737-200s with new Airbus A320 family models for the short/medium-haul routes. While the Boeing 767 were kept for long-haul flights, the need for the longer distance or high demand operations made the company incorporate some units of the four-engine Airbus A340 (Figure 2.33). Among the markets served were Sydney, Madrid and Frankfurt.

Figure 2.33 CC-CQC. Airbus A340-300 in old LAN Chile livery. This enormous jet was fundamental for non-stop long-haul operations (Bauer, 2001).

As part of the internationalization process, other initiatives were taken. In 1997 the first code share agreement with American Airlines was signed to expand the network to the United States. Three years later, LAN joined OneWorld, one of the main competitors of Star Alliance. Juretić & Wigodski (2013) quote a comment of Enrique Cueto: *"joining OneWorld, our logo started to appear together with the main world airlines"*.

In 2004, LAN Chile changed its name to LAN Airlines, also updating the corporate identity to a more modern image (Figure 2.4.6). The regional subsidiaries, whose name were previously formed by the word LAN plus the country (LAN Ecuador, LAN Argentina, LAN Peru, etc.) were unified under the new brand and the single name LAN (Juretić & Wigodski, 2013). The idea was to enforce the perception of a strong Latin America air power that offered high quality services. Between 2004 and 2006, 69 aircraft were painted with the new livery.

In 2006, LAN Express focused on low-cost flights within Chilean territory (Santiago to Puerto Montt and Punta Arenas), which offered minimum onboard services, reducing catering and newspapers to cut costs (Juretić & Wigodski, 2013). This model proved to be an instant success and was extended to all domestic flights one year later. Also, in 2007, the new 'Premium Economy' class debuted in domestic operations, offering a little bit more comfort than the regular Economy, but not as expensive as the Business class.

The year 2007 was also important due to the order of 32 state-of-the-art Boeing 787 (Figure 2.34), up until today one of the most advanced aircraft in the world. The first unit was received in 2012, when LAN had already merged with TAM. Finally, in 2010, LAN reached a milestone: the fleet gained its 100th aircraft, an Airbus A320. In August 2020, LAN and TAM decided to join forces to establish a dominant position in Latin America.

Figure 2.34 CC-BGI. LAN Boeing 787-9 painted with LAN's last livery (before the merger with TAM) at Santiago International Airport. (Torres, 2019).

2.5 LATAM – AIR POWER OF LATIN AMERICA

In 2010, there were six Airlines in Brazil's passenger air transportation market: TAM, Gol, Webjet, Azul, Avianca and TRIP (ANAC, 2010). In August of the same year, the companies TAM and LAN made a public announcement of the merger, integrating both Brazilian and Chilean operations the following year. According to LAN's Vice-President, Enrique Cueto in an interview to a Santiago newspaper, *"in current values (2010), without the synergies, the combined value of both companies is around 11.5 billion dollars"* (Soto, 2010).

Larroulet & Ardiles (2018) summarize the idea behind this phase: *"One brand name, one continent, one network. There is no other airline in the world named after a continent (LATAM), and this makes it easier for passengers to fly across the region. LATAM is very attractive as a partner in Joint Business Agreements (JBAs), and therefore British Airways, American Airlines,*

or Qatar Airways, for example, are willing to form global alliances with LATAM". Figure 2.35 shows a panorama of the South and Central American industry before (2010) and after the merger (2013).

Figure 2.35 Major airlines in the South and Central American industry in 2010 (left) and in 2013 (right).

In March 2011, Brazil's ANAC approved the merger agreement of both companies; also at that moment, the binding agreement between the Amaro Family (controller of TAM) and the Cueto Family (controller of LAN) was signed to combine both businesses (LATAM, 2019). The competition regulators of both countries approved the merger, although with some restrictions: in September, the *Tribunal de Defensa de la Libre Conpetencia – TDLC* (Court of Free Competition Defense) of Chile, and in December, the *Conselho Administrativo de Defesa Econômica – CADE* (Administrative Council for Economic Defense), of Brazil.

In November 2011, LAN and TAM signed up in the Securities and Exchange Commission – SEC in the United States, to negotiate shares on the New York Stock Exchange. In January 2012, TAM's shareholders agreed to a shares swap at the rate of 0.9 LANs share for each TAM share (Fernández, 2012). In May of the same year, the *Comissão de Valores Mobiliários – CVM*, Brazil's stock market regulator (equivalent to United States SEC), authorized the swap of shares between the companies.

Finally, on June 22, 2012, the merger was concluded, and **LATAM Airlines Group S.A**. was born, the largest airline of Latin America. Fernández (2012) goes deeper into the chronological order of the happenings of that operation.

The main idea behind that merger can be summarized as:

- Establish a global airline, with a regional identification under the LATAM brand (meaning Latin American Airlines) and international partnerships (American Airlines, IAG and Qatar Airways);
- Increase competitiveness in Latin America against other major groups: Gol, Avianca and Copa Airlines;
- Cost reduction, focusing on fleet standardization and high profit markets (including North America and Europe);
- Invest in Latin American long-term economic growth;
- LAN needed a way to enter the highly regulated Brazilian market, then shared basically between Gol and TAM (Azul and Avianca Brasil were not that big yet).

Nonetheless, the benefits of the merger also brought with them some challenges. Successive economic crisis in South America, instable politics and high rates of poverty must be considered when planning long-term demand. Larroulet & Ardiles (2018) remind us not only of the high boarding fees in the region, and the fact that each country has a different regulatory framework which increases costs, but also that in South America in 2018, the ultra-low-cost model was almost non-existent.

Table 2.2 summarizes the TAM and LAN historical analysis. Figure B.1 of Appendix B is a timeline of the evolution of both companies, extracted from Laroulet & Ardiles (2018).

Table 2.2 Summary of TAM and LAN historical analysis.

	TAM	**LAN**
Year	1961	1929
Origin	Brazilian Entrepreneur	Military
Range	Regional	National
Merger and acquisitions	Brasil Central LAPSA ABSA Pantanal	Ladeco Fast Air
Creations	TAM Mercosur TAM Cargo	LAN Perú LAN Argentina LAN Colombia LAN Ecuador LAN Express
Controller	Amaro Family	Cueto Family
Alliance	Star Alliance	One World
Focus	Brazil Argentina Paraguay Chile USA (Florida) Europe	Andean America Argentina Mexico USA (Florida and California) Australia/Pacific
Hubs	São Paulo Brasília Rio de Janeiro	Santiago Lima

3 THEORETICAL FRAMEWORK

3.1 RESEARCH SETUP

The initial step of the research was to define the scientific papers databases to be explored. Considering their prestige in the scientific community, three databases were chosen: Scopus, Web of Science (WoS) and Google Scholar. Then, the next step was to choose the best keywords which, combined in a search string, would cull the most relevant studies. In this case, the string chosen was ‘airline mergers’, and when it was applied to the database search engines, they automatically returned results with some variants, such as the plural form (for example ‘airlines mergers’). It meant that crossing-referencing the keywords ‘airline’ and ‘merger’ returned a satisfactory set of results.

Such results had to be filtered to pinpoint the most interesting fields of study and ensure that the research did not include any paper out of the context. The Scopus search was limited to ‘Engineering’, ‘Business, Management and Accounting’, ‘Social Sciences’ and ‘Economics, Econometrics and Finance’; 443 documents were found. The Web of Science search filters were ‘Economics’, ‘Transportation’, ‘Transportation Science Technology’, ‘Management’ and ‘Business’; the set of results was 210 documents. Finally, Google Scholar has a very broad search range, and cannot be limited to specific fields of study; thus, the search retrieved more than 35,000 papers. So, Google Scholar results cannot be analyzed with the same tools as Scopus and Web of Science.

When the raw results for the ‘airline mergers’ string are sorted by number of citations, it is important to comment that, even with the knowledge areas filter applied, not all results were relevant for this study. For example, some studies mentioned mergers and acquisitions, but at the core of the paper were other subjects such as environment, employment relationships, marketing, or consumer behavior. It meant that if the main focus was not ‘airline mergers’, then the paper was not considered for analysis.

3.2 SEARCH RESULTS ANALYSIS

Firstly, the search analysis chart for Scopus shows an increase of interest after the year 2000, with a peak of publications in 2005 (Figure 3.1). In that year, ‘Aviation Week and Space Technology New York’ and ‘Airline Businesses’ together published 54 documents. The former published its last document related to this search in 2011, and the latter in 2005, which may indicate that these sources could be presumed to be outliers. The United States, the United Kingdom and Germany were responsible for approximately 44% of all publications. Lastly, the three most cited articles were from the early 1990s.

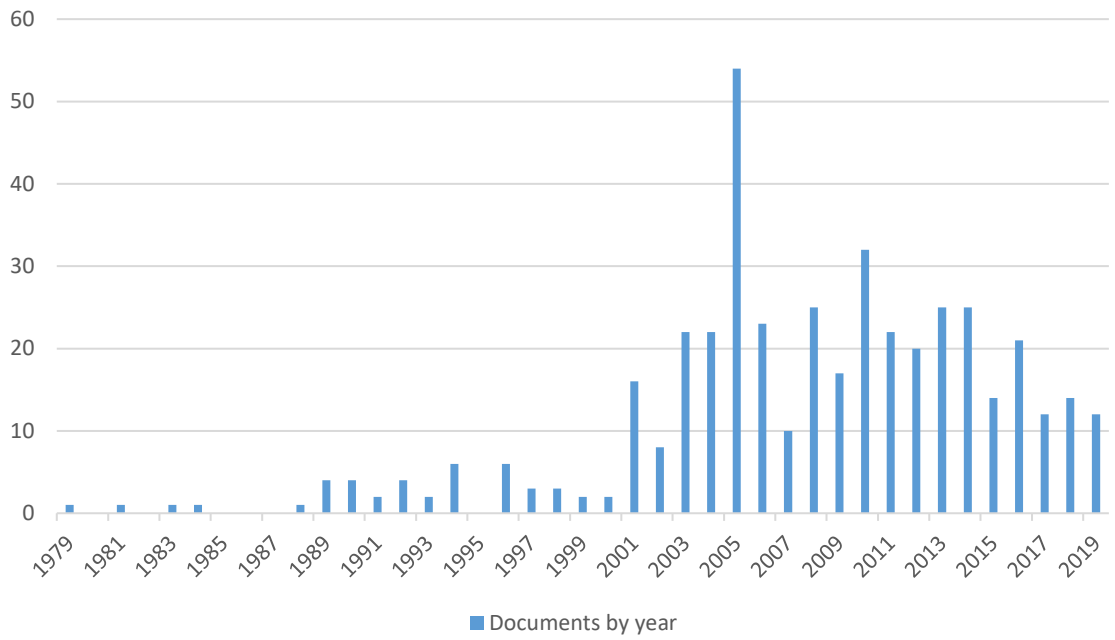


Figure 3.1 Scopus history documents results for ‘airline mergers’.

The Web of Science analysis displays a bar graph (Figure 3.2) with a slightly different result. The analysis tool excluded the documents before 1994 (unknown reason). Although both databases demonstrate the evolution of numbers of airline mergers research publications along the years, Web of Science has its lowest values in the mid-2000s, opposite to the highest values of Scopus.

The main sources were the ’Journal of Air Transport Management’, the ’International Journal of Industrial Organization’ and the ’Review of Industrial Organization’. The United States,

Canada and the United Kingdom accounted for 68% of the results. As in Scopus, the top three cited papers were published in the early 1990s (2 out of 3 were among the Scopus top three.

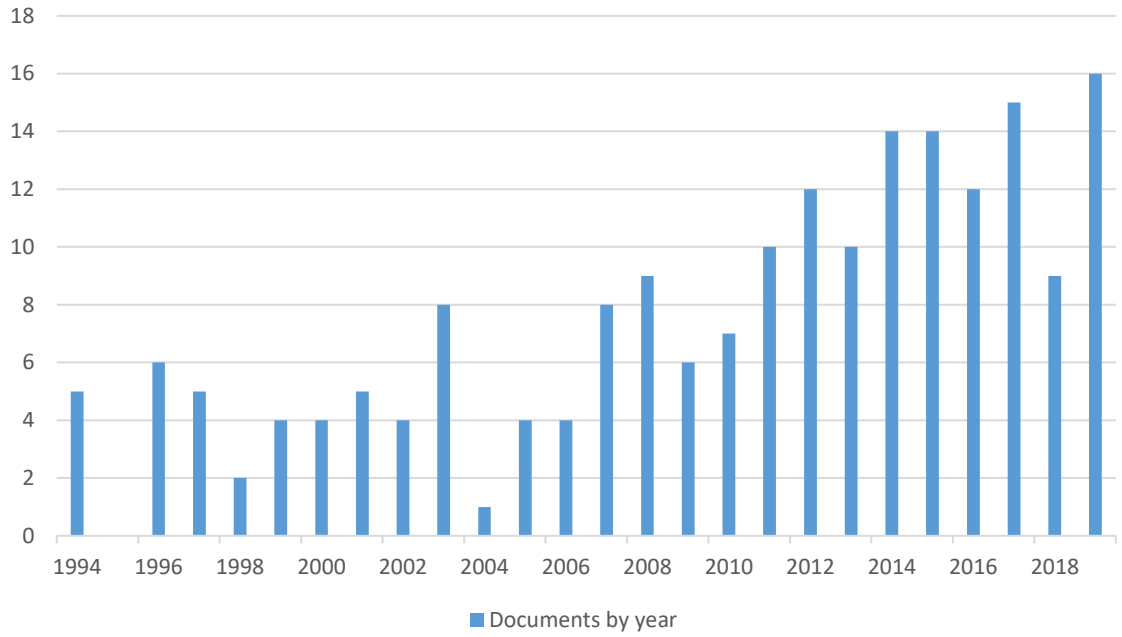


Figure 3.2 Web of Science history documents results for ‘airline mergers’.

When Google Scholar engine is used to search, it returns the same top three articles as Web of Science, probably because the engine is indexed to the popular scientific databases, such as WoS and Scopus. Table 3.1 summarizes the main sources of ‘airline mergers’ for Scopus, while Table 3.2 shows data on Web of Science; these numbers reflect articles and publishers that somehow were indexed by the search string ‘airline mergers’.

Table 3.2 also indicates that it is important to pay attention to the fact that the number of publications does not say anything about quality. Aviation Week and Space Technology New York belong to Quartile 4 and have a low JCR value. Their papers will not be considered.

Table 3.1 Summary of TOP 5 relevant journals – Scopus.

Source titles	Research count	% of 443	Citations	JCR	Quartile
Aviation Week and Space Technology New York	132	30.00%	6	0.1	Q4
Airline Business	36	8.10%	25	0.1	Q4
Journal of Air Transport Management	25	5.68%	419	1.09	Q1
International Journal of Industrial Organization	11	2.50%	295	1.24	Q1
Review of Industrial Organization	9	2.15%	85	0.63	Q2

Table 3.2 Summary of TOP 5 relevant journals – Web of Science.

Source titles	Research count	% of 210	Citations	JCR	Quartile
Journal of Air Transport Management	22	10.48%	173	1.09	Q1
International Journal of Industrial Organization	15	7.14%	96	1.24	Q1
Review of Industrial Organization	13	6.19%	74	0.63	Q2
Transportation Research Part E: Logistics and Transportation	11	5.24%	54	1.97	Q1
Journal of Transport Economics and Policy	9	4.29%	53	0.67	Q2

Tables 3.3 and 3.4 show the results for the top cited papers in Scopus and Web of Science. A relevant issue is that authors Borenstein, Kim & Singal, and Brueckner & Spiller are among the top 10 ranked as most cited in both databases. All the top 10 examine the airline industry in the United States.

To deal with the keyword's frequency, TagCrowd tool was used to create the word cloud for Scopus and Web of Science (Figures 3.3 and 3.4). The former shows a focus on the words 'mergers', 'acquisitions' and 'transportation'; the latter calls attention to 'competition', 'market', 'power' and 'performance'. The keywords airline and industry were common in both results; in fact, there were few differences between the two database sources.

Figure 3.3 Word cloud with generated keywords from Scopus.

Figure 3.4 Word cloud with generated keywords from Web of Science.

The last step was to select the criteria to decide which papers would form the theoretical framework to support the research. The selected criteria were: (1) the paper must focus on economic aspects of airline mergers, excluding co-related/similar themes (airline bankruptcies, customer behavior, employment relationships, etc.); (2) at least 70% of the papers have to be published after 2000 in order to capture the latest trends in airline mergers; (3) at least 50% of the papers must be published in an international journal. After setting up the basis of the research, came the moment to delve deeper into the main publications on mergers and acquisitions. The most interesting papers were selected to develop the literature review and will be summarized further at the end of subchapter 3.5.

Table 3.3 Top 10 cited papers in Scopus.

Paper Title	Authors	Year	Citations	Location
Mergers and market power: evidence from the airline industry	Kim E.H. & Singal V.	1993	252	United States
Airline mergers, airport dominance, and market power	Borenstein S.	1990	159	United States
Competition and mergers in airline networks	Brueckner J.K. & Spiller P.T.	1991	112	United States
Evaluating the performance of merger simulation: Evidence from the U.S. Airline Industry	Peters C.	2006	103	United States
The effects of mergers on price and output: Two case studies from the airline industry	Werden G.J. & Joskow A.S., Johnson R.L.	1991	67	United States
Hub-and-spoke network alliances and mergers: Price-location competition in the airline industry	Adler N. & Smilowitz K.	2007	63	United States/Europe
Flight frequency and mergers in airline markets	Richard O.	2003	56	United States
Airline mergers and competition: An integration of stock and product price effects	Singal V.	1996	47	United States
Airline mergers: A long view	Morrison S.A.	1996	45	United States
The price effect of eliminating potential competition: Evidence from an airline merger	Kwoka J. & Shumilkina E.	2010	42	United States

Table 3.4 Top 10 cited papers in Web of Science.

Paper Title	Authors	Year	Citations	Location
Mergers and market power: evidence from the airline industry	Kim E.H. & Singal V.	1993	217	United States
Economies of traffic density in the deregulated airline industry	Brueckner J.K. & Spiller P.T.	1994	163	United States
Airline mergers, airport dominance, and market power	Borenstein S.	1990	153	United States
The evolution of United States airline competition	Borenstein S.	1992	144	United States
Network effects, congestion externalities, and air traffic delays: or why not all delays are evil	Mayer, C. & Sinai, T.	2003	137	United States
Fare determination in airline hub-and-spoke networks	Bueckner, J.K., Dyer, N.J. & Spiller, P.T.	1992	137	United States
Competition and mergers in airline networks	Brueckner, J.K. & Spiller, P.T.	1991	110	United States
Evaluating the performance of merger simulation: Evidence from the US airline industry	Peters C.	2006	108	United States
The effects of airline alliances on markets and economic welfare	Park J.H.	1997	105	United States
Air Transport Liberalization and Its Impacts on Airline Competition and Air Passenger Traffic	Fu, Xiaowen; Oum, Tae Hoon & Zhang, Anming	2010	67	United States

3.3 MERGERS AND ACQUISITIONS IN THE AIRLINE INDUSTRY

Firstly, it is important to highlight the differences among the main types of mergers. Figure 3.5 shows the 3 types according to Rocha & Britto (2018). Merger (a) is also known as consolidation, when companies A and B finish their legal existence in order to create a new company, C. Merger (b) is a classic case of merger, when company A and company B merge themselves into a single company, but A keeps its corporate identity and name, absorbing B's assets and liabilities. The last type of merger (c) is known as acquisition, when A purchases a part of B, but both companies keep their legal existence. The terms used by different authors (merger, consolidation and acquisition) to discuss this same subject have so many similarities, that usually the literature refers to these transactions simply as 'mergers' (Ross *et al.*, 2015).

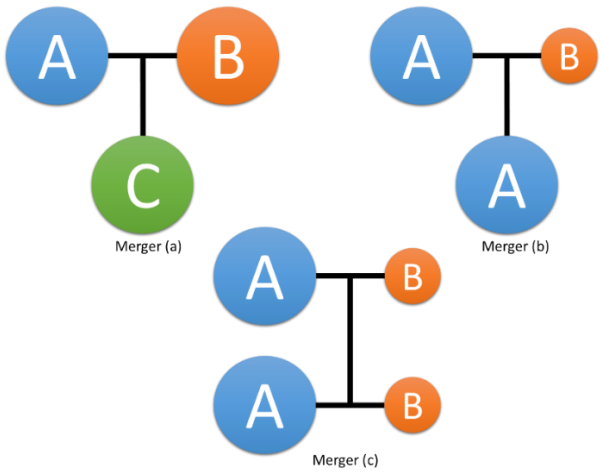


Figure 3.5 Differences among types of mergers. (Rocha & Britto, 2018).

In the early years of the 20th century many airlines were created around the world. In the 1920s, current aircraft manufacturer Boeing established United Aircraft Corporation (UAC) to operate passenger services, acquiring Pacific Air Transport; later UAC merged with engine manufacturer Pratt & Whitney, renaming the new company as United Aircraft and Transport Corporation, the mother company of the current United Airlines, one of the largest airlines in the world. Boeing's attempt to merge, in a vertically integrated way, different business segments such as airline services, aircraft manufacturing and engine manufacturing proved to be unfeasible.

From the 1920s to the 1970s few airlines were as gigantic as the present-day holding groups such as American Airlines, the Lufthansa Group, Air France–KLM, IAG–International Airlines Group (British Airways and Iberia) and the LATAM Airlines Group. In those days, mergers in the North American and European airline industries were basically between two small/regional companies, or between a big company and a small one. As discussed in subsection 4.1, the first study of airline mergers is the 1979 paper about the Delta–C&S (Chicago and Southern) case in the United States.

In Latin America, after World War II, the Colombian airlines SCATA (*Sociedad Colombo Alemana de Transportes Aéreos*) and SACO (*Servicio Aéreo Colombiano*) merged to form Avianca, the second-oldest airline still in activity. In recent years, some other mergers and acquisitions have taken place in the region. As an example of an international merger – type (b) – Avianca and TACA (from El Salvador) merged under the Avianca brand in 2009, flying to major cities in Latin America. The other example is the formation of the LATAM Airlines Group, between the Chilean LAN and the Brazilian TAM in 2012, to be discussed in a further analysis.

Analyzing the Brazilian market alone, many mergers have taken place throughout its history. Gol Airlines purchased Varig (at that time almost terminated), interested in the latter's international routes (Camargos & Minadeo, 2009). After Varig's bankruptcy, Gol and TAM formed a dominant duopoly, sharing around 90% of the market. Gol also purchased the low-cost company Webjet in 2011; a merger analyzed by Rocha & Britto (2018) using the discounted cash flow (DCF) method. Finally, in 2012, Azul, seeking expansion in regional routes acquired the control of TRIP, a regional airline that operated medium-sized aircraft (Castro *et. al.*, 2019). Table 3.5 summarizes those main mergers.

Table 3.5 Major airline mergers since 2000.

Merger	Year	Location	Description
Air China, China Eastern, China Southern	early 2000's	China	Ten state-owned Chinese airlines were merged into only three big groups.
Air France–KLM	2004	France and the Netherlands	Two flag carriers consolidated into Air France–KLM Group, keeping both brands.
Lufthansa–Swiss	2005	Germany and Swiss	Lufthansa purchased Swiss.
Cathay Pacific–Dragonair	2006	Hong Kong	Cathay Pacific, a major airline in the Asian market, purchased its competitor Dragonair.
TACA–AVIANCA	2009	Colombia and El Salvador	Avianca, the flag carrier of Colombia merged with TACA, one of the main airlines of Central America.
Delta–Northwest	2010	United States	Delta purchased Northwest.
United Airlines–Continental Airlines	2010	United States	Two major US airlines merged into a single company, preserving United Airlines name and Continental Airlines logo.
Gol–Webjet	2011	Brazil	Two low-costs airlines, Gol purchased Webjet, keeping only the Gol brand.
British Airways–Iberia	2011	United Kingdom and Spain	Two flag carriers consolidated into International Airlines Group (IAG), keeping both British Airways and Iberia brands.
LAN–TAM	2012	Brazil and Chile	Two major flag carriers merged into LATAM.
Azul–TRIP	2012	Brazil	Azul, a young airline at the time, purchased regional airline TRIP, keeping only the Azul brand.
American Airlines–US Airways	2013	United States	American Airlines merged with US Airways keeping only the American Airlines identity.
Alaska Airlines–Virgin America	2016	United States	Alaska Airlines acquired Virgin America, keeping only the Alaska Airlines identity.

3.4 LITERATURE REVIEW

The first record in both Web of Science and Scopus is the paper about the Delta–C&S airlines merger in the United States, by Lewis & Newton (1979). This demonstrates that the subject has been studied for more than forty years.

Kim & Singal (1993) developed a paper on the mergers of 14 US airlines between 1985 and 1988, using the Herfindahl-Hirschman Index to analyze market concentration. Fares increased on routes operated by the merged airlines, revealing their enhanced market power. Zhang & Round (2008) published an article on the creation of China's 'Big Three', namely, Air China, China Eastern and China Southern. Those companies were formed by mergers of smaller

airlines. The article concludes with some reasons for consolidating major Chinese state-owned airlines into three big players: global trends, pressure from competitive foreign airlines, and the pursuit of cost savings. It seems to have been a Chinese government strategy to strengthen the national companies.

Liang (2013) used econometric models to analyze the Delta–Northwest merger in the United States. The results showed that short trip fares slightly increased after the merger, while those of long trips increased considerably. Hsu & Flouris (2016) used statistical copula models to study the merger between Iberia and British Airways in 2011, Air France and KLM in 2008, and Lufthansa and Austrian Airlines, in 2009. Their results showed that the investors of the purchaser companies were benefited by the merger operation. Castro *et. al.* (2019) applied data envelopment analysis to measure efficiency gains in the Brazilian Azul-Trip merger; the simulations showed that the expected efficiency gains were insignificant or almost null.

Considering previous academic papers exclusively addressing the LAN–TAM case, according to Romano (2013), the LAN–TAM merger created some synergetic value, but TAM's stockholders earned more with the sale. Nóbrega *et. al.* (2016) evaluated the effect of the merger on the stock's performance. The authors noticed that TAM increased return and risk, on the other hand, even with the increase of risk, LAN did not improve its return. Similarly, Melo & Borges (2017) used data exploratory analysis to understand the effects of the merger on economic-financial performance through rate of return and debt indicators. Their conclusion is that the merger was appropriate for both LAN and TAM, improving rate of return and debt situation, despite the continued existence of great debt, even post-merger.

Previous paragraphs provided a synthesis of the importance of airline mergers, with authors observing different regions at different times. A good approach with high ranked authors, Kim & Singal (1993), and Hsu & Flouris (2016) is fundamental to understanding the basis of a good merger analysis. However, authors such as Zhang & Round (2008) are well ranked, but they went through a document-driven analysis, without the application of a specific method.

On the other hand, next subchapter 3.5 will introduce how SVA can be used to identify the favorable causes of success or failures of mergers by analyzing the financial data in an objective manner. Previously mentioned studies have not been capable of accurately pointing out the reasons for the variances between pairs of years (for example). Moreover, SVA can suggest the corporate strategy to be adopted by a company. The examples of Caster & Scheraga (2011,

2013), Mudde & Sopariwala (2008, 2010 and 2014), Alves & Rocha (2019), and Rocha (2020) must be part of the theoretical framework that supports the research.

In the specific LAN–TAM analysis of Nóbrega *et.al* (2016) and Melo & Borges (2017), there are only financial outcomes based on stock values, without going deeper into the reasons why the companies came up with those numbers. It would be more relevant to ask, for instance, what the factors that contribute to such numbers are. Did the merger meet its expected objectives? Nevertheless, it is fundamentally important to cross-reference the further SVA analysis of the LAN–TAM merger with the conclusions of those authors.

Schosser & Wittmer (2015) go deeper and state that "*LAN followed a multimarket strategy with regional hubs whereas TAM mainly operated the Brazilian market with a traditional hub-and-spoke business model. Hence, LAN generated more than half of its revenues with international flights whereas TAM relied heavily on the domestic market.*" This sentence demonstrates that different corporate strategies and/or cultural organization may have a quota of influence along the whole merger transaction. Their conclusions are very interesting because they compare the mergers in North America, Europe and Latin America, considering the possible influence of geographic aspects.

Finally, Alves & Rocha (2019) published in the annals of the 18th SITRAER – Brazilian Symposium of Air Transportation Research, an article, available only in Portuguese, *Análise estratégica da fusão das companhias LAN e TAM: uma abordagem da Strategic Variance Analysis* (Strategic Analysis of the LAN and TAM airlines merger: a Strategic Variance Analysis approach). It is a summary of this dissertation with the most relevant topics about the research. Table 3.6 consolidates all the articles selected to drive the research on this subject, sorted by year of publication.

Table 3.6 Selected publications to support the LAN–TAM merger research.

Authors	Paper Title	Year	Airlines	Location	Applied Methods	Study outcomes and results
Borestein	*Airline mergers, airport dominance, and market power*	1990	Northwest–Republic Airlines; Trans World Airlines–Ozark Airlines	United States	Literature Review, exploratory data analysis	The mergers caused market concentration and airport dominance where the companies operated before the transaction.
Kim & Singal	*Mergers and market power: evidence from the airline industry.*	1993	14 US airline mergers between 1985 and 1988	United States	Herfindahl-Hirschman Index/regression	The fares increased in routes operated by merged airlines, revealing enhanced market power.
Mudde & Sopariwala	*Examining Southwest Airlines' strategic execution: a strategic variance analysis.*	2008	Southwest Airlines only (not a merger)	United States	Strategic Variance Analysis (SVA)	Analysis of Southwest Airlines strategic position; the authors concluded that the company kept its successful leadership position in 2005.
Zhang & Round	*China's airline deregulation since 1997 and the driving forces behind the 2002 airline consolidations*	2008	China's Big Three mergers: Air China; China Eastern; China Southern	China	Literature Review, exploratory data analysis	Some reasons to consolidate major Chinese state-owned airlines in three big players: global trend, pressure by competitive foreign airlines, and pursuit of cost savings.
Caster & Scheraga	*A strategic variance analysis of the profitability of U.S. network air carriers.*	2011	7 major US airlines (not mergers)	United States	Strategic Variance Analysis (SVA)	Analysis of US airline industry after September 11 applying SVA.
Romano	*Strategy of mergers and acquisitions: examination of LATAM's merger effects in the stock market*	2013	LAN–TAM (merger)	Latin America	Event study	The merger created some synergic value, but TAM stockholders earned more than LAN's.
Liang	*What are the Effects of Mergers in the U.S. Airline Industry?*	2013	Delta–Northwest (merger)	United States	Econometric model/ regression	The fares of short trips slightly increased after the merger, and those of long trips increased considerably.

	Industry? An Econometric Analysis on Delta-Northwest Merger					
Caster & Scheraga	*An Analysis of a Strategic Transformation Plan: The Case of Alaska Airlines*	2013	Alaska Airlines only (not a merger)	United States	Strategic Variance Analysis (SVA)	The authors conclude that the strategic plan of Alaska Airlines announced in 2003 to transform it into a low-cost company was successful after 7 years.
Mudde & Sopariwala	*U.S. airways merger: a strategic variance analysis of changes in post-merger performance.*	2014	U.S. Airways–America West (merger)	United States	Strategic Variance Analysis (SVA)	Merger between a traditional legacy airline and a low-cost one. Productivity improved due to the merger, but price-recovery did not improve due to cost reductions.
Schosser & Wittmer	*Cost and revenue synergies in airline mergers – Examining geographic differences*	2015	Air France–KLM; Iberia–British Airways; Delta–Northwest; United–Continental; LAN–TAM; Avianca–TACA (mergers)	United States; Europe; Latin America	Literature Review, exploratory data analysis	This paper analyzed the expected synergy created by the mergers. The cases are heterogeneous with specific details; some mergers pursued cost synergy, while others revenue synergy; North American airlines (domestic mergers) seemed to achieve synergy faster than European or Latin American airlines (international mergers).
Nóbrega, Silva, Silva, & Franco	*The effect of LAN–TAM's merger on stock performance with respect to return and risk*	2016	LAN–TAM (merger)	Latin America	Exploratory data analysis	The authors noted that TAM increased returns and risk, on the other hand, even with the increase of risk, LAN did not improve its returns.

Hsu & Flouris	*Comparing global airline merger experiences from a financial valuation perspective: an empirical study of recent European based airline mergers*	2016	Air France–KLM; Lufthansa–Swiss; Iberia–British Airways (all mergers)	Europe	Event study/copula models	Mergers were in investors' favor in most cases.
Melo & Borges	*Analysis of economic-financial performance pre- and post-merger through rate of return and debt indicators: a LATAM Airlines case study*	2017	LAN–TAM (merger)	Latin America	Exploratory data analysis	The merger was appropriate for both companies, improving rate of return and debt, despite the great debt post-merger.
Castro, Salgado & Marinho	*Analysis of the Azul–TRIP merger under efficiency gains optics*	2019	Azul–TRIP (merger)	Brazil	Envelopment data analysis	The simulation showed that the expected efficiency gains were insignificant or almost null.
Rocha	*The strategy of acquisition by Gol: a strategic variance analysis methodology approach*	2019	Gol–Webjet (merger)	Brazil	Strategic Variance Analysis (SVA)	Although the merger increased operating revenue in 2012, fuel, lubricants, takeoff and landing fees, and aircraft leasing also increased operating costs.
Alves & Rocha	*Análise estratégica da fusão das companhias LAN e TAM: uma abordagem da Strategic Variance Analysis*	2019	LAN–TAM (merger)	Brazil	Strategic Variance Analysis (SVA)	The merger increased productivity but could not cover the losses with the rise of oil prices.

The main intention of this Chapter is to provide a supportive framework for further analysis of the LAN–TAM airlines merger. The subject of airline mergers has been studied for decades, starting with the United States market, where up until today it has received the most attention, but studies have been proliferating worldwide. The most cited articles in Scopus and Web of Science were from the 1990s, which demonstrates the wave of interest at that time. Scientific publications of other locations such as Europe, Latin America and China came later.

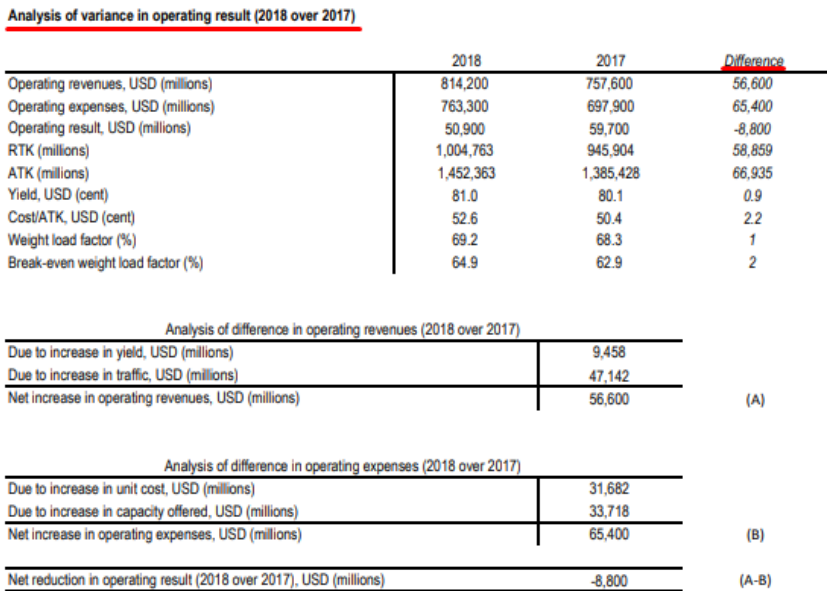
3.5 STRATEGIC VARIANCE ANALYSIS (SVA)

This study adopts the Strategic Variance Analysis (SVA) as the technique to evaluate the difference of a company's financial results between two periods of time (usually years). According to Horngren *et al.* (2000), the SVA considers the details of some strategic components: growth component, price-recovery component, and productivity component. Furthermore, Sopariwala (2003) extends the analysis and includes a fourth component, namely, capacity underutilization.

Searches in traditional journal bases and scientific paper indexing services such as Scopus, Web of Science and Google Scholar about SVA return only a few results on the United States air transportation market. Some examples of research that applied SVA: studies produced by Caster & Scheraga. (2011 and 2013), who analyzed the environment of American aviation at that time, when seven major airlines were competing; the same authors also made an analysis of Alaska Airlines strategic transformation in 2010; Mudde & Sopariwala (2008, 2010 and 2014) investigated the strategic execution of Southwest Airlines in 2005; they also developed a paper about the American Airlines case; and published a journal article about the US Airways and America West merger. Rocha (2020) applied SVA to the Brazilian airlines merger between Gol and Webjet.

Basically, SVA is a technical evaluation of the operational situation in a certain year in comparison with a previous year (not necessarily the immediately previous year), inspecting the financial-operational numbers of a company. Although Horngren *et al.* (2000) have developed this SVA concept for the manufacturing industry, Mudde & Sopariwala adapted the framework for the specific issues of the airline industry. To reinforce understanding, *"variance analysis is the term applied to the process of specifying the reasons why actual profits in any given period differ from the expected or planned level of profits"* (Shank *et. al.*, 1977).

It is important to highlight that the concept of SVA discussed here, has nothing to do with the traditional concept of variance applied to statistical analyses. As an example, the International Civil Aviation Organization – ICAO –, the world's major civil aviation organization, also applies the SVA method in some studies and reports. Figure 3.1.1 shows, as an example, three tables extracted from the ICAO (2018) Annual Report comparing the variance between two years. The intention of Figure 3.6 is just to demonstrate that the concept is used in important official documents. The rest of the report goes deeper and develops a full examination with SVA.



Analysis of variance in operating result (2018 over 2017)

	2018	2017	Difference
Operating revenues, USD (millions)	814,200	757,600	*56,600*
Operating expenses, USD (millions)	763,300	697,900	*65,400*
Operating result, USD (millions)	50,900	59,700	*-8,800*
RTK (millions)	1,004,763	945,904	*58,859*
ATK (millions)	1,452,363	1,385,428	*66,935*
Yield, USD (cent)	81.0	80.1	*0.9*
Cost/ATK, USD (cent)	52.6	50.4	*2.2*
Weight load factor (%)	69.2	68.3	*1*
Break-even weight load factor (%)	64.9	62.9	*2*

Analysis of difference in operating revenues (2018 over 2017)

Due to increase in yield, USD (millions)	9,458	
Due to increase in traffic, USD (millions)	47,142	
Net increase in operating revenues, USD (millions)	56,600	(A)

Analysis of difference in operating expenses (2018 over 2017)

Due to increase in unit cost, USD (millions)	31,682	
Due to increase in capacity offered, USD (millions)	33,718	
Net increase in operating expenses, USD (millions)	65,400	(B)
Net reduction in operating result (2018 over 2017), USD (millions)	-8,800	(A-B)

Figure 3.6 This screenshot is a simple example of practical usage of SVA extracted from the ICAO 2018 Annual Report (ICAO, 2018).

One of the ideas originating from SVA is to relate what the financial-operational numbers say about a company and its market strategies used in competition. Porter (2008) posited three major strategies to get competitive advantage: a) cost leadership, when a company pursues operational efficiency to lower its costs; b) product/service differentiation, a strategy focused on providing a product or service with qualities that somehow differ from those of the other competitors; and c) niche-seeking, where a small part of consumers, willing to pay higher prices, are seeking specific premium products/services, but are not served by producers/suppliers (this strategy is characterized by low sales volume and high profit margins.

Among some of the constraints, Caster & Scheraga (2011) mentioned in the American market paper that *"an SVA of a single company, taken by itself, may produce misleading results"*, and

that *" the SVA for Delta is insightful and interesting, but it is an incomplete analysis without taking into consideration what was happening with its closest competitors".* Therefore, despite not being the focus of this paper, it is important to highlight that a complete analysis of the LAN and TAM merger should consider the SVA for the other competitors at that time, as well.

3.6 SVA COMPONENTS

Before presenting the details of SVA components, it is important to explain the main terms and concepts it uses:

- ***revenue passenger kilometers (RPK):*** a transportation engineering metric used to calculate the number of transported passengers along a defined distance (in kilometers). In this study, it is the multiplication of the number of passengers by the distances flown.

- ***passenger enplanements:*** the actual number of passengers that boarded the aircrafts.

- ***available seat kilometers (ASK):*** a transportation engineering metric used to define the available carrying capacity of a transporter (the number of seats available by the number of kilometers flown).

- ***revenue:*** the total revenue of the airline operations (flights, onboard sales, marketing revenue, etc.).

- ***used fuel liters:*** the total liters of fuel used by the company in one year.

- ***fuel cost:*** the total amount that the company spent to purchase fuel in one year.

- ***fuel cost/liter:*** the average price of fuel paid by the company (fuel cost divided by used fuel liters)

- ***passenger load factor:*** the actual occupancy of the flights (RPK divided by ASK).

In the next set of equations, the subscript word *"actual"* refers to the least recent year analyzed, 2010, while the subscript *"expected"* refers to the most recent year, 2013. The word *"expected"*

is used instead of the word planned, because the calculated values are not officially provided by the airline, but it is an expectation based on the previous year's numbers.

As mentioned previously, Mudde *et. al.* (2008) explain that the SVA must be done by breaking it down into four specific components. The **growth component** measures the change of operating revenue caused by variations in Revenue Passenger Kilometers (RPK), keeping sales price, input costs and input-output relationships constant). The variance of this component is caused by changes in market share or in market size. This component is calculated by equations from (1) to (4), from year i to year j :

a. Revenue effect of the Growth Component:

$$variance_1 = (revenue_i/RPK_i) \times (RPK_j - RPK_i) \quad (1)$$

b. Fuel cost effect of the Growth Component:

$$variance_2 = (fuel\ cost/liter_i) \times (used\ fuel\ liters/ASK_i) \times (ASK_{i\ (actual)} - ASK_{j(expected)}) \quad (2)$$

c. Flight-related cost effect of the Growth Component:

$$variance_3 = (flight\ related\ cost/ASK_i) \times (passenger\ load\ factor_i) \times (ASK_{i\ (actual)} - ASK_{j(expected)}) \quad (3)$$

d. Passenger-related cost effect of the Growth Component:

$$variance_4 = (passenger\ related\ cost/passenger\ emplanements_i) \times (passenger\ enplanements_{i(actual)} - passenger\ enplanements_{j(expected)}) \quad (4)$$

The **price recovery component** evaluates the variance in the operating revenue due to variations in unit input costs and sales price, holding sales unit and input-output relationships constant. Horngren *et al.* (2000) suggest that this component indicates a product differentiation strategy: a positive value in the component of price-recovery means that the differentiation strategy produced enough power pricing to the company, so that the passengers were induced to pay a higher amount than the increased costs the company had. This component is calculated by equations from (5) to (6), from year i to year j:

e. Revenue effect of the Price-Recovery Component:

$$variance_5 = (RPK_j) \times (revenue_j/RPK_j - revenue_i/RPK_i) \quad (5)$$

f. Fuel cost effect of the Price-Recovery Component:

$$variance_6 = \left(ASK_{j\ (expected)}\right) \times (used\ fuel\ liters/ASK_i) \times \left(fuel\ cost/liters_i - fuel\ cost/liters_j\right) \quad (6)$$

g. Flight-related cost effect of the Price-Recovery Component:

$$variance_7 = \left(passenger\ load\ factor_j\right) \times \left(ASK_{j\ (actual)}\right) \times \left(flight\ related\ cost/ASK_i - flight\ related\ cost/ASK_j\right) \quad (7)$$

h. Passenger-related cost effect of the Price-Recovery Component:

$$variance_8 = \left(passenger\ enplanements_{j\ (expected)}\right) \times \left(passenger\ related\ cost/passenger_i - passenger\ related\ cost/passenger_j\right) \quad (8)$$

The **productivity component** is the difference in operating revenue produced by variations in the input-output relationships, making sales price and input costs constant. Horngren *et. al.* (2000) indicate that this component may show a tendency of the company to choose a low-cost strategy. Thus, a positive value in productivity component indicates that the company gets its operating revenue from the increase in productivity. This component is calculated by equations (9) to (11), from year i to year j:

i. Fuel cost effect of the Productivity Component:

$$variance_9 = (fuel\ cost/liter)_j \times \left(ASK_{j(expected)}\right) \times \left((used\ fuel\ liters/ASK)_i - (used\ fuel\ liters/ASK)_j\right) \quad (9)$$

j. Fuel (ASK) cost effect of the Productivity Component:

$$variance_{10} = (fuel\ cost/liter)_j \times (used\ fuel\ liters/ASK)_j \times \left(ASK_{j(expected)} - ASK_{i(actual)}\right) \quad (10)$$

k. Passenger-related cost effect of the Productivity Component:

$$variance_{11} = (cost/passengers\ enplanements)_j \times \left(passenger\ enplanements_{j(expected)} - passenger\ enplanements_{j(real)}\right) \quad (11)$$

Finally, the **capacity underutilization component** measures the difference in respect to the operating income caused by variations of costs of unused capacity between time periods. Sopariwala (2003) proposes that this component shows whether a company achieves success managing its used/unused relationship capacity. This component is calculated by equations (12) to (14), from year i to year j:

l. Variations in flight-related costs relating to unused capacities:

$$variance_{12} = \left(ASK_{j\ (actual)} - RPK_{j(actual)}\right) \times \left((cost/ASK)_i - (cost/ASK)_j\right) \quad (12)$$

m. Variations in flight-related costs of available capacities:

$$variance_{13} = (cost/ASK)_i \times \left(ASK_{i(actual)} - ASK_{j(actual)}\right) \quad (13)$$

n. Variations in flight-related costs of used capacities:

$$variance_{14} = (cost_i/ASK) \times \left(RPK_j - RPK_i\right) \quad (14)$$

If more than one airline is to be compared, it is recommended that the calculated values from (1) to (14) be normalized, dividing the variances by the Revenue Passenger Kilometers (RPK).

4 METHOD AND DATA

4.1 RESEARCH BASIS

It is important to break the research down into steps that lead the investigation towards its objective. Figure 4.1 is a simplified scheme of the path of this research, from the historical contextualization (Chapter 2), passing through the theoretical framework and literature review the (Chapter 3) until the current chapter, method.

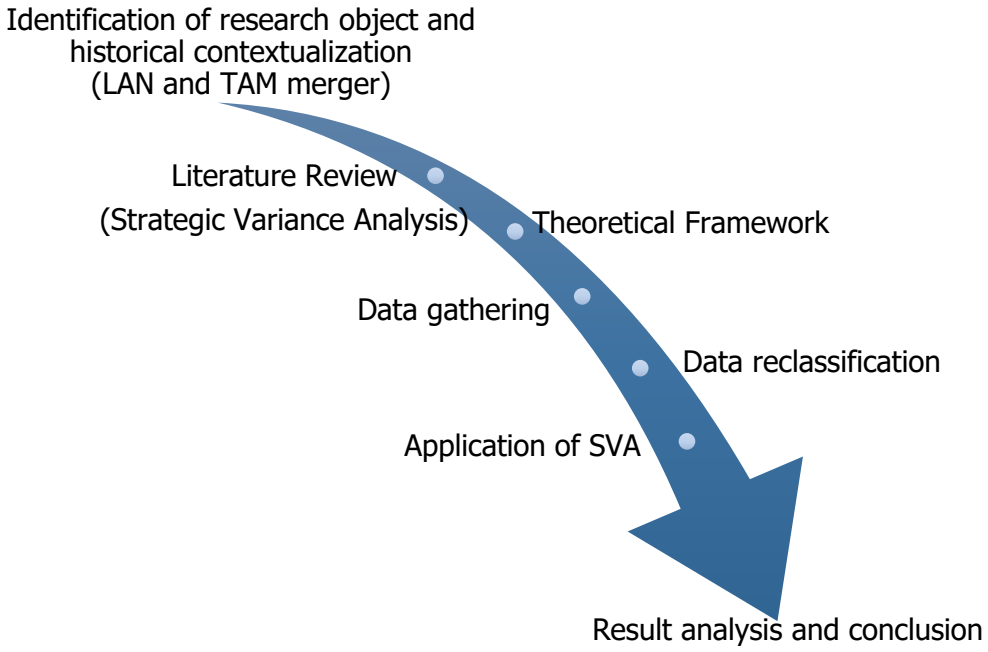


Figure 4.1 Research steps scheme.

This is a documental research because it is based on exploratory document analysis, a traditional method whereby documents are gathered and analyzed, information is extracted and processed, and then the results must be interpreted to lead the researcher to some conclusions. Glenn (2009), in his 'Document Analysis as a Qualitative Research Method', cites several types of documents to be considered in research: *"advertisements; agendas, attendance registers, and minutes of meetings; manuals; background papers; books and brochures; diaries and journals […];* ***organizational or institutional reports****; survey data; and various* ***public records****"*.

ICAO (2020), as the UN organization that coordinate civil aviation, highlights some methods for data gathering in its Training Need Analysis course, part of the official Global Aviation

Training program. Among those methods are focus groups, job observation or testing, interviews, surveys, and **document review**, whose instruments are *"internal or external documents with information about the organization and the issues affecting it*".

The essence of this study are the official public ANAC reports that all Brazilian airlines must provide to the agency. Among Brazil's market regulatory agencies (aviation, oil, ground transportation, health insurance, electricity, etc.), ANAC has one of the most well organized and classified sets of financial data on its target industry. The next subsections deal with the TAM data retrieved from its statement of operations (Tables C.1 and C.2, Appendix C). Other reference documents are the balance sheets (Tables C.3 and C.4), and the Income Statements (Tables C.5 and C.6).

The Strategic Variance Analysis discussed in Chapter 3 was the method chosen to be applied to LAN and TAM case. The subsections below describe how the data obtained from ANAC repositories were treated. The procedure applies the same steps as those Caster & Scheraga (2011) followed to analyze the American airline industry.

4.2 DATA GATHERING

In alignment with the studies Caster *et. al.* (2011) conducted, the following information was gathered: **financial data** (revenue and expenses, depreciation, amortization, profit, etc.), **operational data** (revenue enplaned passengers, revenue passenger kilometers (RPK) and available seat kilometers), **fuel data** (total used liters, total fuel cost and average fuel cost per liter). These data are considered sufficient to conduct the analysis.

In order to situate the context in time, a 4 year time frame (2010-2013) was defined for this study: embracing the exact moment of the merger announcement, disclosed in 2010; and the period following the moment when the merger was concluded in 2012. The justification for this period is that the changes triggered by the merger needed a certain time to cause financial and operational impacts in the new company. The SVA is a study of situations at distinct moments (usually years) thus an analysis of the intermediate years was unnecessary.

The primary data sources are the ANAC Air Transportation Annuals (2010, 2013) and ANAC Statistical Data (2010, 2013), both available on the agency's website (only in Portuguese). The

date used in this research had to be better organized in several tables, to make it easier to understand the calculation.

Table 4.1 shows the operational data of the former TAM (2010) and of the current LATAM (2013), while the fuel data for the two years are listed in Table 4.2. The concept "Enplaned Passengers' considers those who effectively boarded the aircraft and paid for the air ticket.

The fuel data used could have been retrieved from the ANP – Agência Nacional do Petróleo (*National Oil Agency*) official website, but the Operational Statement (*DRO – Demonstrativos de Resultado Operacional*) provided the amount of used fuel (in liters) and the total cost spent with fuel. Dividing the first by the second was the way used to come up with the average fuel cost.

Table 4.1 Operational Data

	2010	**2013**
Enplaned Passengers	31,515,633	35,902,761
Revenue Passengers Kilometers (RPK)	50,467,259,599.00	59,261,578,110.00
Available Seats Kilometers (ASK)	70,046,837,151.00	74,355,999,311.00

Source: ANAC (2010, 2013)

Table 4.2 Fuel Data

	2010	**2013**
Used Fuel Liters	2,398,143,381	2,486,504,931
Total Fuel Costs (R$)	**3,374,858,840.00**	**5,278,656,660.00**
Average Fuel Cost (R$/l)	1.40	2.12

Source: ANAC (2010, 2013)

The financial data obtained from Tables C.1 and C.2 (Appendix C) were organized and reclassified in Table 4.3 according to two major groups: flight related costs (excluding fuel) and passenger related costs. This table is quite similar to the one used by Caster and Scheraga (2011).

The expenses were separated into two groups. The first, Flight Related Costs (excluding fuel), includes factors that directly influence the flight costs such as maintenance and ground organization. Although fuel is obviously related to the flight, following Caster and Scheraga's (2010) proposal, this component was considered separately due to the traditionally high proportion of the expenses it represents.

The second group, Passenger Related Costs, is limited to onboard services and passenger traffic organization, indirectly related to the flight, but directly related to passengers.

Table 4.3 Gathered and Reclassified Financial Data (R$)

	2010	2013
Crew	1,384,702,200.00	1,546,284,400.00
Maintenance	850,197,630.00	1,384,601,190.00
Airport and Air Navigation Fees	593,698,570.00	873,618,640.00
Leasing and Insurance	435,159,850.00	879,470,850.00
General and Administration Expenses	774,345,290.00	1,094,423,600.00
Flight Equipment Depreciation	577,785,770.00	544,245,020.00
Handling, Cargo and Ground Organization	716,700,360.00	902,985,810.00
Flight Related Costs (excluding fuel)	**5,332,591,680.00**	**7,225,631,523.00**
Onboard Services	304,267,100.00	349,673,870.00
Passenger Traffic Organization	1,747,068,690.00	1,758,836,390.00
Passenger Related Costs	**2,051,335,790.00**	**2,108,510,260.00**
Operating Revenue	**10,288,871,650.00**	**13,265,776,270.00**
Operating Expenses	**10,758,784,300.00**	**14,612,796,420.00**
Fuel Costs	3,374,858,840.00	5,278,656,660.00
Flight Related Costs	5,332,591,680.00	7,225,631,523.00
Passenger Related Costs	2,051,335,790.00	2,108,510,260.00
Operating Profit/Loss	**-469,912,650.00**	**-1,347,020,160.00**

Source: ANAC (2010, 2013)

It is important to describe each one of the expense components in order to clarify the information that it represents. The **Fuel** component may be obvious, but it includes not only the fuel itself, but also the whole service. The fuel supplier must consider the pipeline usage (in major airports) or the fuel truck (in smaller airports), quality tests, fuel storage, tanks and safety extinguisher systems. The fuel price fluctuations consider all these factors.

The **Crew** component is basically the in-flight employees, such as captains (higher salaries), co-pilots and flight attendants. The wages paid to the crew usually consist of a fixed and a variable part. In Brazil, the wages are paid monthly and depend on the hours flown, the type of flight (domestic or international), the type of aircraft (narrow or wide body) and the monthly schedule.

Maintenance, as the name suggest, covers all the activities and expenses associated to keeping the flight operationally regular. This includes aircraft mechanics, hangars, training, and repair components. Unlike automobile maintenance, aircraft maintenance cannot be done in ordinary workshops, but must be done in a certified and authorized maintenance center, in strict compliance with all the maintenance regulations.

The **Airport and Air Navigation Fees** are paid, respectively, to the airport operators (Infraero, Inframerica, RioGaleão, GRU Airport, BH Airport, among others), and DECEA – *Departamento de Controle do Espaço Aéreo* (Department of Airspace Control). While the

former provides all the necessary infrastructure to run the air transportation activities on the ground (terminal, air conditioner, security staff, apron lighting, etc.), the latter provides the radio and navigation systems used by pilots to fly the aircraft.

Leasing and Insurance are important parts of an airline expenses sheet. The prices of last generation narrow body aircraft (Boeing 737-8-MAX or Airbus A320NEO) are around tens of million dollars (as of 2020 values), which means that the total cost of ownership of a single unit of a jet cannot be affordable for many companies. One strategy adopted by the industry is to lease the aircraft, a kind of rent where the lessee pays a smaller part of the price to the lessor, instead of purchasing 100% of the aircraft. Sometimes the insurance is also negotiated together with the leasing.

The ANAC Annuals do not specify the meaning of **General and Administration Expenses**, but it is believed to be about non-flight activities, such as human resources, accounting, paperwork, and other bureaucratic activities.

The **Flight Equipment Depreciation** is basically the loss of value of aircraft over time. Depreciation is a financial concept that means the reduction of value of an asset as time goes by. The aircraft, after some years, require more and more maintenance, which may force the values of ownership down.

Handling, Cargo and Ground Organization includes all the ground activities such as the ground power units, pushback tugs, airstairs, container loaders and belt loader trucks, water and lavatory services trucks, and crew transportation vans.

Onboard Services are all the services provided in-flight, for example, dinner, drinks, pillows, blankets, multimedia services, toothbrushes and socks. Cutting down on those services has been a trend in low-cost airlines in the last few decades, as a strategy to increase revenue.

Passenger Traffic Organization relates to all passenger-related legal issues. In Brazil this is traditionally a huge share of expenses for airlines: flight cancelation refunds, damaged luggage, hotel accommodation, overbooking and special need passenger assistance. Brazil is one of the countries where cancelled flights due to bad weather conditions imply an automatic passenger refund or hotel stay and food vouchers.

Then, some additional necessary data to run SVA were calculated based on Tables 4.1, 4.2 and 4.3, and displayed in Table 4.4: average revenue per RPK, passenger load factor, expected

available seat kilometers (ASK), average RPK per passenger, expected enplaned passengers, average used liters per ASK, average related costs per ASK, average cost per enplaned passenger, idle or unused capacity (ASK) and expected idle or unused capacity (ASK). These are considered to be secondary data obtained from original primary data.

Table 4.4 Processed Data used in SVA

	2010	**2013**
Operating Revenue	10,288,871,650.00	13,265,776,270.00
Revenue Passenger Kilometer (RPK)	50,467,259,599.00	59,261,578,110.00
Average revenue per RPK	0.204	0.224
Revenue Passenger Kilometer (RPK)	50,467,259,599.00	59,261,578,110.00
Available Seats Kilometer (ASK)	70,046,837,151.00	74,355,999,311.00
Passenger Load Factor (%)	72.05%	79.70%
Expected Available Seats Kilometers (ASK)		82,250,628,900.00
Revenue Passenger Kilometer (RPK)	50,467,259,599.00	59,261,578,110,00
Enplaned Passengers	31,515,633	35,902,761
Average RPK per Passenger	1601.34	1650.61
Expected Enplaned Passengers		37,007,493
Used Fuel Liters (l)	2,398,143,381	2,486,504,931
Available Seats Kilometer (ASK)	70,046,837,151.00	74,355,999,311,00
Average Used Liters per ASK	0.0342336	0.0334405
Flight Related Costs	5,332,591,680.00	7,225,631,523.00
Available Seats Kilometers (ASK)	70,046,837,151.00	74,355,999,311.00
Average Flight Related Costs per ASK	0.0761	0.0972
Passenger Related Costs	2,051,335,790.00	2,108,510,260.00
Enplaned Passengers	31,515,633	35,902,761
Average Cost per Enplaned Passenger	65.09	58.73
Revenue Passenger Kilometer (RPK)	50,467,259,599.00	59,261,578,110.00
Available Seats Kilometers (ASK)	70,046,837,151.00	74,355,999,311.00
Idle or Unused Capacity (ASK)	19,579,577,552.00	15,094,421,201.00
Expected Idle or Unused Capacity (ASK)		22,989,050,790.00

The variance equations (1) to (14), were used to compile Table 5.1, based on data from Tables 1 to 4. For each SVA component, the values were summed to get the total of the component. In the end, the numbers of Table 6.1.1 indicate what the new company, LATAM, did strategically over the years along the merger process, and the factors that led them to profit or loss, according to further analysis in Chapter 6.

5 RESULTS ANALYSIS

5.1 STRATEGIC VARIANCE ANALYSIS OF TAM/LATAM

Table 5.1 displays the compiled results of SVA. Firstly, it is important to note that the airline increased its productivity between the year it announced the merger, and the year immediately after its conclusion. That is, after all, one of the objectives of a merger process. The productivity component generated more than R$ 1 billion of operating profit for the company, supported mainly by reduction of average cost per enplaned passenger (from R$ 65.09 to R$ 58.73); and by the increase of passenger load factors (occupancy rate) in the aircrafts (from 72.05% to 79.70). As a factor affecting productivity increase, it is worth mentioning that in the early 2010s, TAM phased out the four-engine Airbus A340 for long haul flights (Europe), and started operations with two-engine Boeing 777 (greater fuel efficiency).

Table 5.1 Strategic Variance Analysis TAM/LATAM (2010-2013) (R$)

Growth Component	
Revenue effect of the Growth Component	1,794,040,980
Fuel cost effect of the Growth Component	-584,891,615
Flight-related cost effect of the Growth Component	-669,134,512
Passenger-related cost effect of the Growth Component	-357,465,167
TOTAL	**182,549,686**

Price Recovery Component	
Revenue effect of the Price-Recovery Component	1,185,231,560
Fuel cost effect of the Price-Recovery Component	-2,027,329,290
Flight-related cost effect of the Price-Recovery Component	-1,250,422,530
Passenger-related cost effect of the Price-Recovery Component	235,367,655
TOTAL	**-1,857,152,605**

Productivity Component	
Fuel cost effect of the Productivity Component	138,293,904
Fuel (ASK) cost effect of the Productivity Component	865,173,904
Passenger-related cost effect of the Productivity Component	64,880,910,40
TOTAL	**1,068,348,720**

Capacity Underutilization Component	
Variations in flight-related costs relating to unused capacities	-318,492,287
Variations in flight-related costs of available capacities	-327,927,240
Variations in flight-related costs of used capacities	669,247,639
TOTAL	**22,828,112**

The price recovery component of the TAM/LATAM merger stands out due to the huge negative value, a loss of R$ 2 billion. This component measures the capacity of an airline to increase fares, according to its increase in operational costs, holding all the rest constant. It means that the fares charged to passengers could not cover the operational costs, coinciding with the rise

of fuel prices throughout this period (from R$ 1,40 in 2010 to R$ 2,12 in 2013, an increase of more than 51%). Figure 5.1 shows a comparison of the component shares of the expenses. The fuel share increased by almost 5% in four years.

Another significant issue for a bad price recovery component was the increase of flight-related costs (from R$ 0.0761/ASK to R$ 0.0972/ASK, a variation of more than 27%). Table 4.3 demonstrates that aircraft leasing and insurance costs more than doubled. The handling, cargo and ground organization decreased by more than 4%. This result is interesting because until the year 2018 LATAM was the only airline in Brazil to self-provide the handling services; all the others used third-party companies. That seems to have been an advantage during those years.

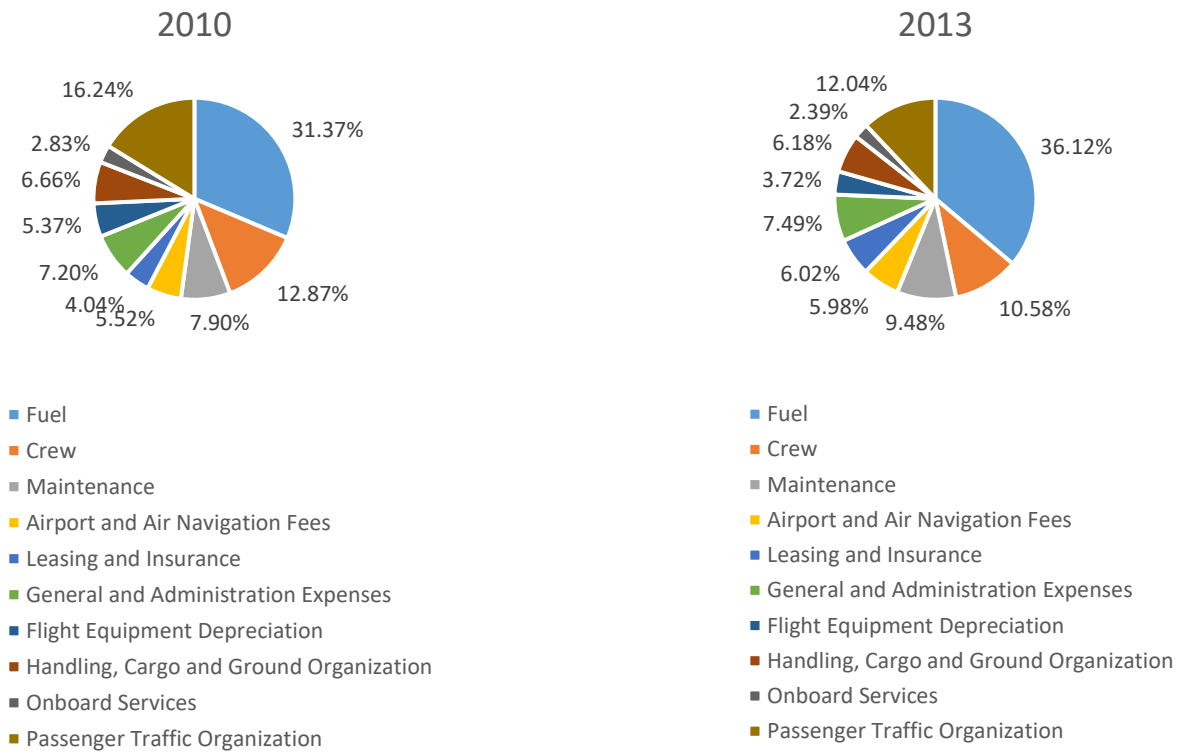


Figure 5.1 Pizza charts of each expense's share based on Table 4.3.

The growth component brought a little more than R$ 180 million of operating profit for LATAM, a reasonable value. The main ingredient which may explain this result is the increase of RPK in almost 9 billion flown-passengers-kilometers, influencing the increase of operating revenue in almost R$ 3 billion.

The capacity underutilization component showed a R$ 22 million increase for the company, which denotes that they were capable of reducing the underutilized capacity from more than 19.5 billion available-seats-kilometers to a little more than 15 billion. This ASK reduction implies that the airline succeeded in reducing its cost per unused ASK.

5.2 RESEARCH LIMITATIONS

This study is a snapshot of TAM/LATAM's situation before and after the merger, based on official reports published by the Brazilian regulatory agency of the air transportation market. This means that the financial data provided by ANAC are the only source taken into account.

Another issue is that the research would have been more effective if the data from LAN could have been retrieved from the Chile DGAC online platforms. The data provided for the period had fewer details than the data provided by the Brazilian ANAC, and fundamental information such as the amount of fuel consumed or the cost with maintenance was not available.

It may lack other market considerations such as the expansion of TAM's main competitor, Gol, to South America and the Caribbean, the premium service offered by Avianca Brasil, or the expansion of Azul, applying effectively the hub-and-spoke model in Campinas Viracopos Airport.

Finally, ideally, the SVA should be applied to other airlines in order to give a broader dimension of the difference between 2010 and 2013 situations.

6 CONCLUSIONS

This research explored the numbers behind the LAN-TAM merger, applying the SVA method, which enabled identification, in the financial/operational balance sheets, of the causes of failure discussed in Chapter 6 – Results Analysis. As mentioned previously, Horngren *et al.* (2000) suggests that SVA is, *de facto*, more efficient if the data of all players of the industry are cross-referenced. Nevertheless, the SVA numbers, limited to the period between 2010 (merger announcement) and 2013 (the year after the consolidation of the new company), still managed to identify how, throughout the transition years, the expected benefits of the merger had already been overcame by high losses, although these data alone are not sufficient to affirm that the merger failed.

Among exogenous factors (increase of fuel price) and endogenous factors (increase in aircraft leasing and insurance costs, for example), the good productivity component performance emphasizes that a cost leadership strategy was adopted, which is quite reasonable because, naturally, it is one of the main objectives of an airlines merger. Thus, one conclusion that can be drawn is that the success of the productivity component was the fact that enabled LATAM to reduce its passenger-related costs.

On the other hand, a high magnitude price recovery component, but with negative value, indicates that product/service differentiation, was not LATAM's strategy. It means that a slight increase in fares prices did not cover the operating costs, a recurrent problem in Brazil. In a historically low competition market such as Brazil's airline industry, one is unlikely to come across a product/service differentiation strategy.

However, LATAM's evolution from a national airline to a transnational one took place with a huge operating loss. Immediately, it was identified with the increase of fuel costs in that time interval. In the early 2010s, the world faced a historical rise in oil prices that led to an increase in fuel costs; Brazil suffered more than other developing countries. According to ANAC (2017), based on ANP, the average price of jet fuel (QAV) rose from R$ 1.13 per liter in August 2010 to R$ 2.06 per liter in March 2014. In an SVA perspective, this is *de facto* the main evidence of LATAM's huge operating loss, even though that on its own is not sufficient to justify the negative result.

By the end of the 2010 decade, the long-term geopolitical strategy of LATAM's merger, which started almost ten years before, finally seemed to have made its consolidation as the main "Latin

American Airline" successful. Figures 6.1 and 6.2 display the top 20 airlines by RPK and absolute carried passengers in 2019 (IATA, 2020). It is important to highlight four major clusters with high level competition: United States, Europe, Middle East and China. LATAM is the only Latin American airline in the rankings.

The local competition in Latin America is quite intense with Azul, Gol, Avianca, Aeromexico and Copa Airlines. However, compared to them, as a global player, in 2019 LATAM was the only one to fly from Sydney to Johannesburg, from Los Angeles to Tel Aviv, from Ushuaia to Toronto, consolidating São Paulo, Santiago and Lima as major hubs.

Figure 6.1 Top 20 airlines by Revenue Passenger-Kilometers in 2019 according to IATA (2020).

Figure 6.2 Top 20 airlines by absolute Carried Passengers in 2019 according to IATA (2020).

6.1 RECOMMENDATIONS FOR FUTURE RESEARCH

In future research, the SVA method can be expanded to other airlines at that time (Gol, Webjet, Azul, Trip and Avianca), comparing all the competitors in the market to provide a better understanding of the scenario. Also, as this research applied SVA in a time interval that covered a relevant fact to TAM (its merger with LAN), it would be interesting to choose other periods associated to other important facts for Brazil's aviation: the concession and expansion of Guarulhos International Airport in 2013 (LATAM's main hub); the FIFA World Cup 2014; the checked baggage and the onboard food sale deregulation in mid-2017; and Avianca Brasil's bankruptcy in 2019.

Finally, as stated in the Introduction chapter, the COVID-19 crisis has completely changed the aviation scenario worldwide in 2020:

- airports and aircrafts have been treated as vectors of disease transmission;
- international borders have been closed indefinitely (each country defining its own rules);
- domestic flights have also been limited to essential services only (cargo and healthcare professionals);
- passenger demand has dropped, and passenger planes have been grounded;
- on the other hand, the cargo demand has skyrocketed, due to the need for medical equipment and supplies, but there have been insufficient cargo planes to meet the demand;
- revenue has dropped due to the low demand;
- maintenance and other expenses have escalated; and
- cleaning and sanitization expenses have also increased.

The above is only a short list of what has been happening in 2020. Aviation had previously suffered from the H1N1 Pandemic in 2009, however the COVID-19 crisis is far greater because the disease is relatively unknown to science, the vaccines are still under development, and the main countermeasures taken by authorities are limited to social distancing and crowd avoidance (the opposite concept of air travel). Moreover, some socioeconomic changes seem to be far from returning to pre-coronavirus status; for example, the slower pace of the tourism industry and the change of businesses' behavior (the reality of home office).

As of August 2020, ICAO (2020) analyzes the prediction of scenario in a 175-page report named *Effects of the Novel Coronavirus (Covid-19) on Civil Aviation: Economic Impact Analysis*. The summary of the numbers are described as follow: a*n overall reduction of air passengers ranging from 53% to 59% in 2020 compared to 2019; an estimated loss of over 50% of passenger traffic and 57% or over USD 97 billion in airport revenues in 2020 compared to business as usual; a 54.7% decline of revenue passenger kilometers (RPKs, both international and domestic) in 2020 compared to 2019 (by IATA).*

In Brazil, where aviation is more vulnerable to economic recession, prior to the coronavirus disease, airlines were gradually recovering from the mid-2010s economic crisis and the bankruptcy of Avianca Brasil, that led to a market rearrangement. Major airlines, Gol, Azul and LATAM were in a delicate financial situation, but the coronavirus crisis pushed them over the edge.

LATAM was the most affected. The first measures were to ground the fleet and renegotiate employment positions and leasing contracts. The fact of having higher costs than its competitors, and that in July 2020, LATAM's crew union did not accept a permanent salary reduction (Gol and Azul made a temporary salary reduction deal) triggered a 2700 pilots and flight attendants firing process.

Before the COVID-19 crisis, according to Viana (2020), LATAM operated 340 aircraft (33% leased and 66% self-owned). That is why LATAM will likely storage the self-owned aircrafts in the desert for the long term, or anticipate their retirement, instead of returning lots of aircraft to the lessors. LATAM expects to return 32 leased aircrafts, and renegotiate the leasing contract, to be charged not monthly, but per flight hour (which is being gradually accepted). As of August 2020, 23 aircraft had already been phased out. Figure 6.3 shows LATAM's fleet forced to be grounded.

Figure 6.3 LATAM's fleet squeezed in São Paulo – Congonhas Airport in 2020 as consequence of COVID-19 demand reduction (Almeida, 2020).

Three months before, in May 2020, LATAM filed for USA Chapter 11 bankruptcy. The last update is that LATAM will try to renegotiate debts to keep their operations in Brazil, in Chile and in the United States. In June 2020, LATAM and Azul announced a codeshare agreement, and some rumors circulating in the market indicate some possibilities: a full sale to Azul; a partial sale of Brazilian branch of LATAM to Azul; or bankruptcy. After the events of 2020, an SVA study of LATAM financial records may reveal the causes of this situation.

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APPENDIX A – HISTORICAL DOCUMENTS

HOY SE INAUGURA OFICIALMENTE EL CORREO AEREO POSTAL

El acto se realizará a las 8 horas en la Escuela de Aviación con asistencia de las autoridades y altos jefes de Aviación. --- El acta llevará la firma de S. E.

pio de las relaciones sociales del Co-

A las 8 horas de la mañana de hoy, será inaugurado oficialmente el correo aéreo postal al norte, cuya organización ha sido confiada a la Dirección Militar de los servicios aéreos, y que, con el acto de hoy, quedará definitivamente incorporado a las actividades del progreso del país.

Como lo hemos informado en diversas oportunidades, tanto el Gobierno como el comando de la aviación militar y la Dirección de Correos y Telégrafos, no han omitido sacrificios para llevar a feliz término y lo antes posible, la implantación de estos nuevos servicios de comunicación y transporte a través de la República.

A tales propósitos prestarán poderosa ayuda las bases aéreas instaladas en Ovalle, Copiapó, Antofagasta, Iquique, Arica y otras importantes ciudades del norte, a cuyo servicio se ha destacado a distinguidos y expertos pilotos de nuestra aviación militar.

EL ACTO DE HOY

Al acto de hoy han sido invitados S. E. el Presidente de la República, Excmo. señor Ibáñez; Ministro de Guerra, General don Bartolomé Blanche; Ministro del Interior, don Guillermo Edwards Matte; Director de Correos y Telégrafos, don Enrique Ovalle Castillo; autoridades, altos jefes de aviación y otras personalidades.

EL PUBLICO TENDRA LIBRE ACCESO

La Dirección de Aviación ha acordado que para el acto de la inauguración oficial del correo aéreo postal, tenga libre acceso a la Escuela el público, el cual podrá presenciar en detalle todos los pormenores del acto que se realizará esta mañana.

EL TENIENTE MENESES

Encargado de transportar la correspondencia de El Bosque a Ovalle ha sido designado el teniente aviador señor Meneses, quien, con el raid de hoy, efectuará por duodécima vez el vuelo de ida y vuelta, Santiago - Ovalle, en el servicio aéreo postal.

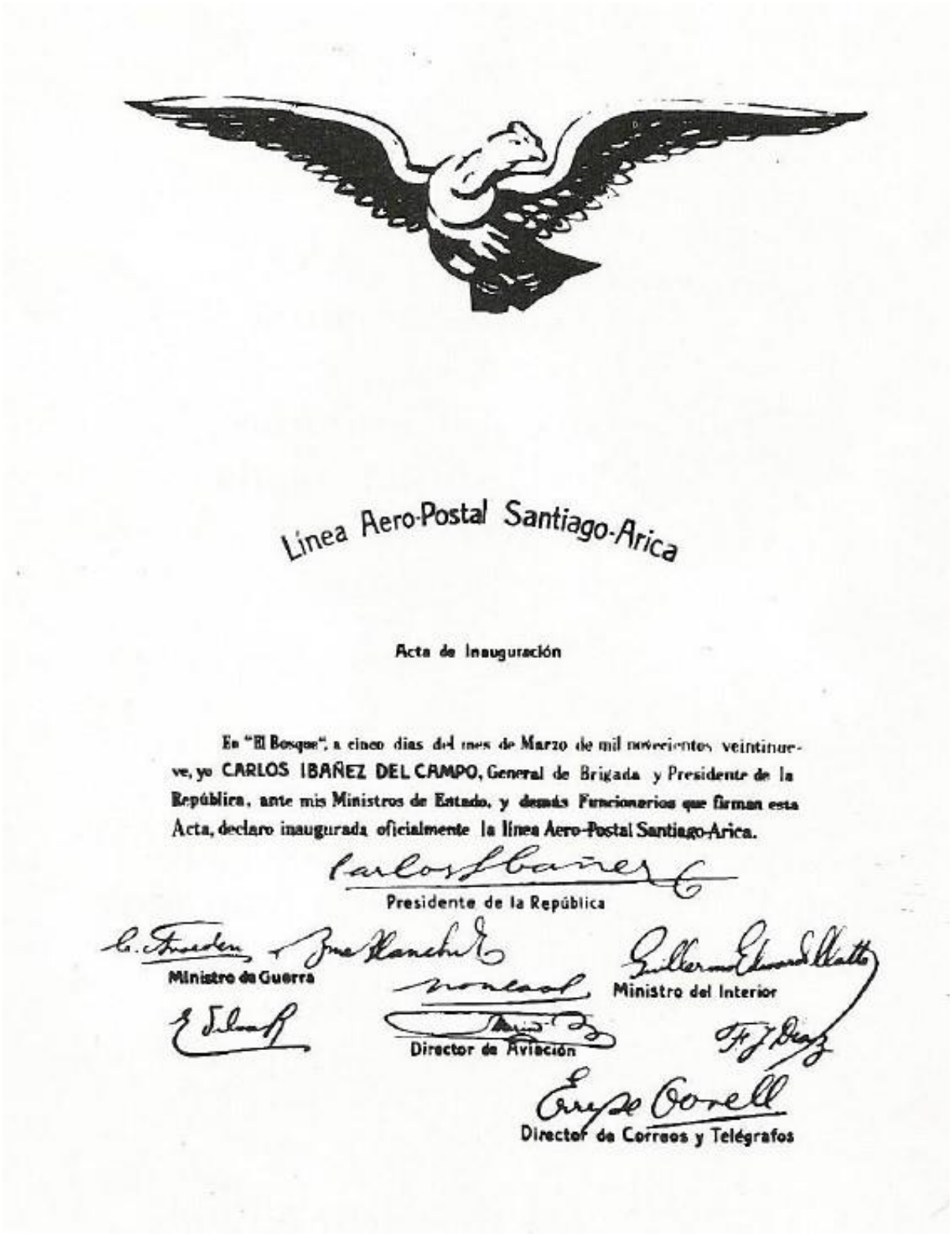
CIRCULAR A LOS INTENDENTES Y GOBERNADORES

Además del acta oficial de inauguración que se firmará, se enviará hoy por el avión postal una comunicación a los Intendentes y Gobernadores de las provincias del norte, por la cual se declaran inaugurados oficialmente los servicios aéreos postales en el país, llamados a unir estrechamente los pueblos de la República. En esa circular se formulan, además, votos por que la nueva era de progreso en las actividades del país, será firmada por S. E. el Presidente de la República y Ministros de Estado.

LA CORRESPONDENCIA

En la tarde de ayer se notó un gran entusiasmo entre el público por aprovechar el envío de correspondencia a las ciudades del norte. Podemos adelantar que en atención al reducido recargo de las tarifas, ha tenido gran aceptación entre el comercio el servicio del correo postal que hoy se inaugura. Con el mismo se hará el envío de giros postales, los que pueden ser cobrados en el mismo día en Antofagasta.

Figure A.1 La Nación newspaper, March 5, 1929 highlights the creation of the Air Mail Line (La Nación, 1929).



Línea Aero-Postal Santiago-Arica

Acta de Inauguración

En "El Bosque", a cinco dias del mes de Marzo de mil novecientos veintinueve, yo CARLOS IBAÑEZ DEL CAMPO, General de Brigada y Presidente de la República, ante mis Ministros de Estado, y demás Funcionarios que firman esta Acta, declaro inaugurada oficialmente la línea Aero-Postal Santiago-Arica.

Presidente de la República

Ministro de Guerra

Ministro del Interior

Director de Aviación

Director de Correos y Telégrafos

Figure A.2 Act of creation of the *Línea Aero-Postal Santiago-Arica* (IIHACH – Instituto de Investigaciones Histórico Aeronáuticas de Chile, 2014).

Figure A.3 Picture from a booklet with four commemorative stamps of the Easter Island flight (Maddock, 2011).

APPENDIX B – TIMELINE OF THE LAN AND TAM MERGER

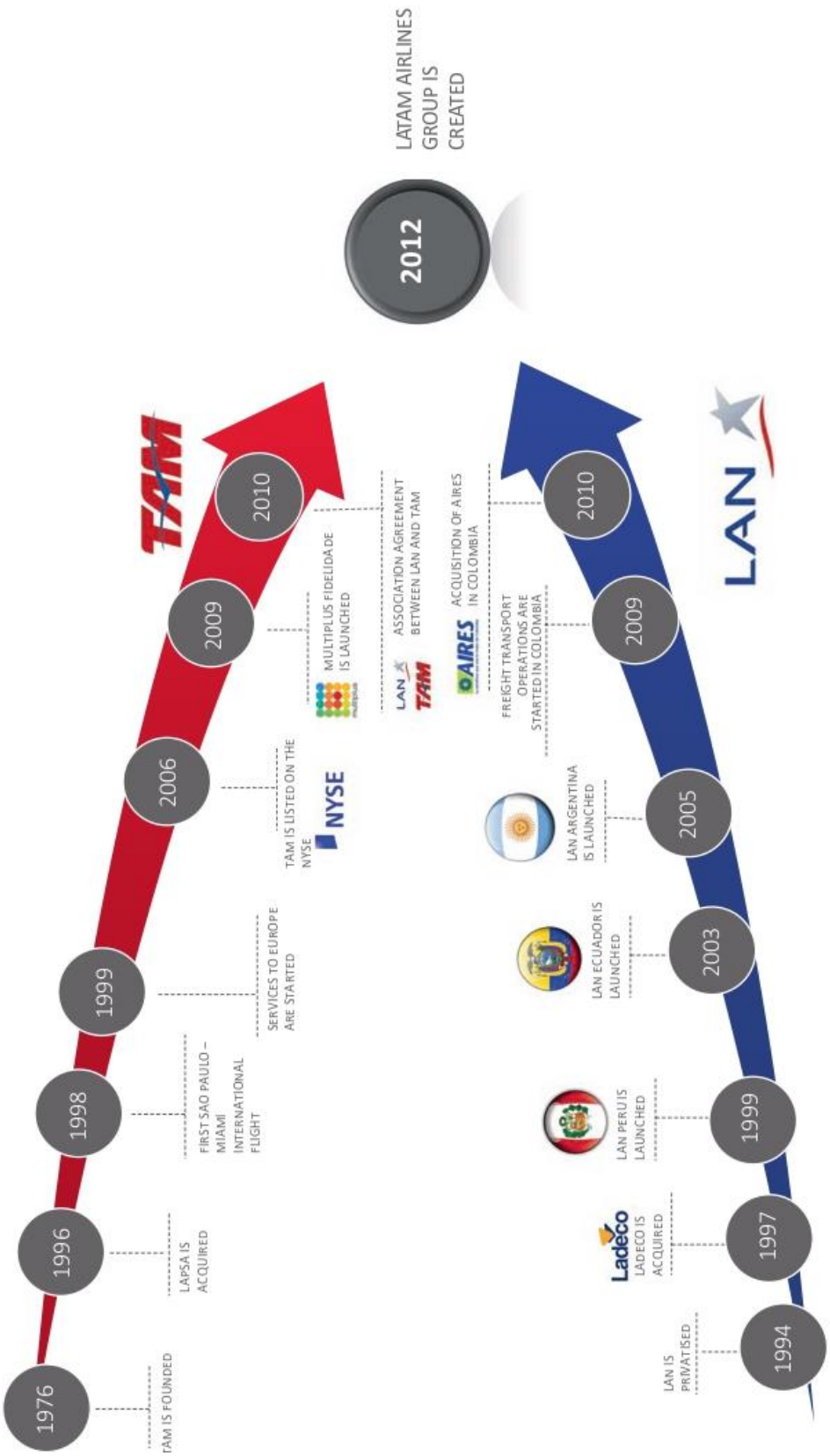


Figure B.1 Timeline of LAN and TAM merger (Larroulet & Ardilles, 2018).

APPENDIX C – DATA COLLECTED FROM ANAC AIR TRANSPORTATION ANNUAL REPORTS

C.1 Statement of Operations

The original Statement of Operations data applied to this research were obtained from ANAC Air Transportation Annual Reports, a compilation of information about the Brazilian airline industry. Tables C.1 and C.2 are a rearrangement of the raw data available as Excel spreadsheets. These data were reclassified to make Table 5.2.3. ANAC's Statement of Operations spreadsheet breaks down into monthly details, not considered for this SVA (ANAC, 2010, 2013).

Table C.1 TAM's 2010 Statement of Operations

	Total	%
Revenue		
Total Revenue from Flights	**10,288,871,650.00**	**100.00**
Tickets Revenue	9,038,355,310.00	87.85
Excess Baggage Revenue	56,412,500.00	0.55
Cargo Revenue	1,079,450,870.00	10.49
Mail Revenue	995,210.00	0.01
Charter – Passenger Revenue	113,657,760.00	1.10
Charter – Cargo Revenue	0.00	0.00
Overnight Mail Network Revenue	0.00	0.00
Additional Fees Revenue	0.00	0.00
Other Flight Revenues	0.00	0.00
Costs		
Total of Costs and Operational Expenses	**10,758,784,300.00**	**100.00**
Total Costs	**8,027,315,330.00**	**74.61**
Total Direct Costs	**7,216,402,850.00**	**67.07**
Flight Deck Crew Costs	818,803,850.00	7.61
Cabin Crew Costs	565,898,350.00	5.26
Fuel Costs	3,374,858,840.00	31.37
Flight Equipment Depreciation Costs	577,785,770.00	5.37
Maintenance Costs	850,197,630.00	7.90
Aircraft Insurance Costs	29,675,440.00	0.28
Aircraft Leasing Costs	405,484,410.00	3.77
Airport Fees Costs	206,996,580.00	1.92
Air Navigation Fees Costs	386,701,990.00	3.59
Total Indirect Costs	**810,912,480.00**	**7.54**
Ground Organization Costs	506,645,380.00	4.71
Onboard Services Costs	304,267,100.00	2.83
Other Indirect Costs	0.00	0.00
Total of Operational Expenses	**2,731,468,970.00**	**25.39**
Passenger Traffic Organization	1,747,068,690.00	16.24
Cargo Traffic Organization	210,054,980.00	1.95
General and Administrative Expenses	774,345,290.00	7.20
Other Operational Expenses	0.00	0.00
Result of Flight	**-469,912,650.00**	

Source: ANAC (2010)

Table C.2 TAM's 2013 Statement of Operations – R$

	Total	%
Revenue		
Total Revenue of Flight	**13,265,776,270.00**	**100.00**
Tickets Revenue	12,167,783,300.00	91.72
Revenue of Excess Baggage Revenue	102,081,040.00	0.77
Cargo Revenue	917,567,760.00	6.92
Mail Revenue	234,050.00	0.00
Charter – Passenger Revenue	78,110,120.00	0.59
Charter – Cargo Revenue	0.00	0.00
Overnight Mail Network Revenue	0.00	0.00
Additional Fees Revenue	0.00	0.00
Other Flight Revenues	0.00	0.00
Costs		
Total of Costs and Operational Expenses	**14,612,796,420.00**	**100.00**
Total Costs	**11,624,032,190.00**	**79.55**
Total Direct Costs	**10,506,876,750.00**	**71.90**
Flight Deck Crew Costs	911,679,760.00	6.24
Cabin Crew Costs	634,604,640.00	4.34
Fuel Costs	5,278,656,660.00	36.12
Flight Equipment Depreciation Costs	544,245,02000	3.72
Maintenance Costs	1,384,601,190.00	9.48
Aircraft Insurance Costs	32,098,210.00	0.22
Aircraft Leasing Costs	847,372,640.00	5.80
Airport Fees Costs	427,337,800.00	2.92
Air Navigation Fees Costs	446,280,840.00	3.05
Total Indirect Costs	**1,117,155,440.00**	**7.65**
Ground Organization Costs	767,481,570.00	5.25
Onboard Services Costs	349,673,870.00	2.39
Other Indirect Costs	0.00	0.00
Total of Operational Expenses	**2,988,764,240.00**	**20.45**
Passenger Traffic Organization	1,758,836,390,00	12.04
Cargo Traffic Organization	135,504,240,00	0.93
General and Administrative Expenses	1,094,423,600,00	7.49
Other Operational Expenses	0,00	0.00
Result of Flight	**-1,347,020,160,00**	

Source: ANAC (2013)

C.2 Balance Sheets

TAM's Balance Sheets as of 2010 and 2013 are displayed on Tables C.3 and C.4. The original data shows all the operating airlines at that time in Brazil, but the tables have been reduced to show only TAM and the industry totals.

The analysis of both tables indicates that before the merger the net equity of TAM (excluding ABSA and Pantanal) represented 39.92% of the whole industry; three years after it was 73.43%. The net equity of TAM decreased from R$ 1,879,110,000.00 (2010) to R$ 796,333,000.00 (2013), a 58% reduction. One of the reasons was the US Dollar appreciation in relation to the

Brazilian Real, from US$ 1.00 to R$ 1.70 in December 2010, to R$ 2.34, an approximately 30% increase.

Table C.3 TAM's Balance Sheet as of December 2010 – R$

ITEM	TAM	INDUSTRY TOTAL
Total Assets	**12,349,314,000**	**24,019,359,000**
Current Assets	2,457,397,000	5,889,963,000
Noncurrent Assets	9,891,917,000	18,129,396,000
Long-term Assets	593,550,000	3,132,834,000
Investments, Fixed and Intangibles	9,258,449,000	14,934,633,000
Others	39,918,000	61,929,000
Total Liabilities	**12,349,314,000**	**24,019,359,000**
Current Liabilities	4,193,350,000	7,409,432,000
Noncurrent Liabilities	6,276,854,000	11,903,487,000
Net Equity	**1,879,110,000**	**4,706,440,000**
Capital Stock	752,727,000	4,565,501,000
Accumulated Profit or Losses	-590,001,000	-2,911,611,000
Fiscal Year Result	590,001,000	717,313,000
Others	1,126,383,000	2,335,235,000
Current Liquidity Ratio	0.59	0.79
General Liquidity Ratio	0.29	0.47
Net Equity Situation	1,879,110,000.00	4,706,439,560.00
Participation of Third-party Capital on Total Resources	0.85	0.80
Multiplier of Owner's Equity	6.57	5.10
Degree of indebtedness	5.57	4.10
Degree of adjusted indebtedness	4.24	2.54

Source: ANAC (2010)

Table C.4 TAM's Balance Sheet as of December 2013 – R$

ITEM	TAM	INDUSTRY TOTAL
Total Assets	**13,245,923,000**	**27,512,528,000**
Current Assets	4,226,489,000	9,168,154,000
Noncurrent Assets	9,019,434,000	18,344,374,000
Long-term Assets	1,221,381,000	4,117,222,000
Investments, Fixed and Intangibles	7,798,053,000	14,226,471,000
Others		
Total Liabilities	13,245,923,000	27,512,528,000
Current Liabilities	6,727,593,000	13,192,334,000
Noncurrent Liabilities	5,721,997,000	13,235,723,000
Net Equity	**796,333,000**	**1,084,472,000**
Capital Stock	940,949,000	5,318,501,000
Accumulated Profit or Losses	-3,997,469,000	-9,864,349,000
Fiscal Year Result		4,008
Others	3,852,853,000	5,626,312,000
Current Liquidity Ratio	0.63	0.70
General Liquidity Ratio	0.44	0.50
Net Equity Situation	796.333.000,00	1.089.797.000,02
Participation of Third-party Capital on Total Resources	0.94	0.96
Multiplier of Owner's Equity	16.63	25.29
Degree of indebtedness	15.63	24.29
Degree of adjusted indebtedness	2.60	2.42

Source: ANAC (2013)

C.3 Income Statements

Table C.5 TAM's 2010 Income Statement – R$

ITEM	TAM	INDUSTRY TOTAL
Net Operational Income	**11,207,997,000**	**22,344,326,000**
Costs of Provided Services	**-8,063,240,000**	**-17,110,217,000**
Gross Profit	**3,144,757,000**	**5,233,109,000**
Operational Expenses	**-2,293,797,000**	**-3,747,987,000**
Result of Equity Equivalence	**-73,574,000**	**-73,624,000**
Result before Financial Result	**777,386,000**	**1,411,237,000**
Financial Result	**207,626,000**	**-234,642,000**
Variations of Fair Value of Fuel Derivatives	36,504,000	36,504,000
Financial Revenue	1,270,212,000	1,450,928,000
Financial Expenses	-1,099,090,000	-1,744,006,0000
Net Results with Derivatives	0	-
Net Exchange Rate Variations	0	32,411,000
Others	0	-10,493,000
Other Operating Resources	0	166,000
Result Before Tax Income and Social Contribution	**985,012,000**	**1,177,008,000**
Tax Income and Social Contribution	**-395,011,000**	**-462,694,000**
Others	**0**	**3,717,000**
Fiscal Year Net Result	**590,001,000**	**718,031,000**
Gross Margin	0.28	0.23
Net Margin	0.05	0.03
EBIT	**777,386,000**	**1,411,237,000**
EBIT Margin	6.94%	6.32%

Source: ANAC (2010)

Table C.6 TAM's 2013 Income Statement – R$

ITEM	TAM	INDUSTRY TOTAL
Net Operational Income	**14,398,895,000**	**32,529,766,000**
Costs of Provided Services	**-11,628,757,000**	**-26,958,459,000**
Gross Profit	**2,770,138,000**	**5,571,307,000**
Operational Expenses	**-3,517,273,000**	**-5,796,047,000**
Result of Equity Equivalence	**-147,012,000**	**-239,049,000**
Result before Financial Result	**-894,147,000**	**-463,788,000**
Financial Result	**-1,191,875,000**	**-2,313,394,000**
Variations of Fair Value of Fuel Derivatives	5,671,000	**5,671,000**
Financial Revenue	669,894,000	1,285,496,000
Financial Expenses	-1,867,440,000	-3,243,949,000
Net Results with Derivatives		-2,000
Net Exchange Rate Variations		-351,009,000
Others		-9,601,000
Other Operating Resources		**3,000**
Result Before Tax Income and Social Contribution	**-2,086,022**	**-2,777,178**
Tax Income and Social Contribution	**432,736**	**376,556**
Others		**0**
Fiscal Year Net Result	**-1,653,286**	**-2,400,622**
Gross Margin	-0.05	0.06
Net Margin	-0.11	-0.07
EBIT		-463.788.000
EBIT Margin	0.00%	-1.43%

Source: ANAC (2013)