

# ESTABLISHING A COMMERCIAL AIR ROUTE BASED ON MORE THAN JUST TECHNICAL VARIABLES: THE CASE OF BARRETOS CITY, BRAZIL

**Mauro Caetano**

*Aeronautics Institute of Technology (ITA)*

**Cláudio Jorge Pinto Alves**

*Aeronautics Institute of Technology (ITA)*

## ABSTRACT

The city of Barretos in Brazil has the largest cancer treatment center in Latin America, the Barretos Hospital of Cancer (HCB). The hospital provides medical care to about 4,000 daily. These patients come from about 1,600 cities, approximately 30% of the cities in Brazil. In terms of demand and initial structural conditions, Barretos is qualified to receive commercial flights, however, there are no regular flights to the city. Theoretical propositions are made on corporate social responsibility disregard nontechnical variables related to air transport operations, including the value of human life. The results of the present case study on the city of Barretos, with reference to the HCB, show the existence of initial favorable airport conditions for the implementation of a commercial airline in the city, such as runway extension, for example. Additionally, there are initiatives in the mobilization of public opinion, such as the Flight Against Cancer campaign, which can guide the adoption of nontechnical variables toward establishing a commercial airline in the city based on the value of human life and the reduction of human suffering. Managerial implications are presented, such as the redefinition of the metrics used in corporate social responsibility, the availability of public and private grants sharing agendas alternating between airlines and the establishment of a regional multimodal logistics platform.

Keywords: Airline Route; Health Care; Human Value.

**Dr Mauro Cateano** is a postdoctoral air transport researcher at the Aeronautics Institute of Technology (ITA) in Brazil. He holds a Ph.D. in Production Engineering from the University of São Paulo. He is also Professor, Researcher and Coordinator of Research Group in Air Transport Innovation Management at Federal University of Goiás (UFG), Brazil. Email: [caetano@ita.br](mailto:caetano@ita.br)

**Dr Cláudio Jorge Pinto Alves is Full Professor** at the Aeronautics Institute of Technology (ITA) in Brazil. Email: [claudioj@ita.br](mailto:claudioj@ita.br)

## **1. INTRODUCTION**

The establishment of commercial air transport routes requires the consideration of different conditions, including business strategies and airport conditions, demand, such as the available markets, and government conditions and regulations. Although there is a hierarchy among these conditions, the demand set by market conditions is believed to be one of the most relevant in designing a commercial airline route.

The analysis of market demands considers different financial variables adopted by airlines, which can be identified in the literature on corporate social responsibility (CSR). These variables include, on the shareholder side, the return on equity and net profit growth; on the customer side, the average price, on-time performance, accident rate, and flight frequency; on the employee side, the growth of employee revenues; on the government side, the tax performance; and, finally, on the general public side, the environmental protection investment, donations, and sponsorships (Wang et al., 2015). However, some variables, such as the value of human life and the reduction of human suffering, are neglected in theories. These should rather be considered as determining factors in the deployment of commercial airline routes.

The present study seeks to identify and show the possible application of new variables in the implementation of commercial air transport routes, based on a case study on a possible target of a regional route, the city of Barretos in São Paulo state, Brazil.

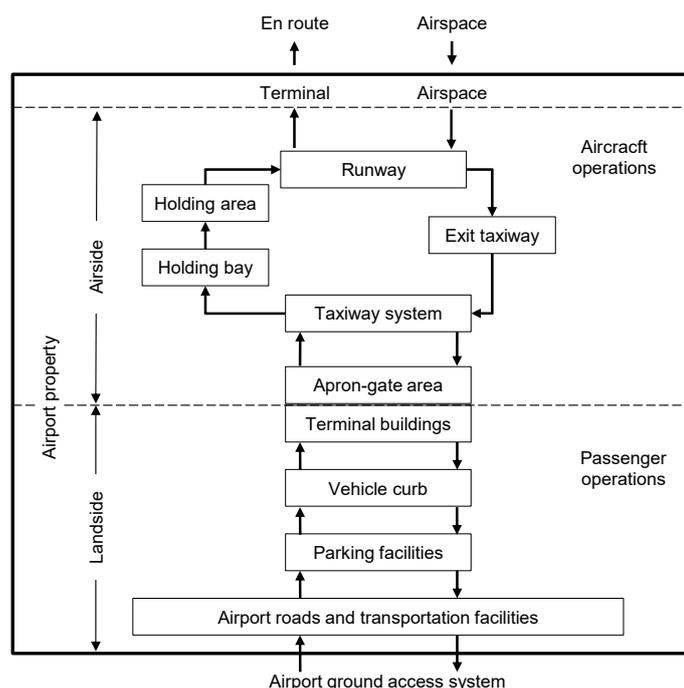
## **2. ESTABLISHING A COMMERCIAL AIR TRANSPORT ROUTE**

The establishment of a commercial air transport route considers different factors related to market demands, the provision of air transport products and services, airport structural conditions and approval from aviation control authorities, among others.

The market demands can be targeted based on variables related to the needs of consumers regarding the origin and destination of people or cargo, the prices charged by the airlines (Nicolau, 2011), the quality of services provided by companies (Wu and Cheng, 2013), the restrictions on access to other modal, time constraints or air transport priorities in relation to other kinds of transport and in addition to other variables, as identified in Valdes (2014). Note that most of these variables are objective and can be measured. Managers make choices of an air transport route as a rational process grounded in data, such as the financial costs or travel time for the passenger. However, subjective or emotional variables are often disregarded by companies and government agencies.

Besides the market demands, variables related to product offerings and air transport services are considered. These include the feasibility of providing a particular service according to an analysis of the costs per flight based on the aircraft size, cost per seat, schedule delay due to airport congestion (Silva et al., 2014), fleet assignment problem (FAP), resulting from the aircraft type and capacity, operational costs and potential revenues, as proposed by Sherali et al. (2006), landing and takeoff costs, maintenance and administrative costs, and airport facilities (see Figure 1).

**Figure 1 - The Components of an Airport**



Source: Young and Wells (2011).

As shown in Figure 1, the air transport services supply considers airport technical decisions on aircraft operations, including the airside (runway and apron), air traffic control systems, terminal buildings, and safety conditions for equipment and passenger operations personnel, as well as landside questions like government policies, airport slot allocation regulations (Knieps, 2014), equipment and infrastructure approvals and certifications, and compliance with the rules and guidelines set by relevant agencies, such as the National Agency for Civil Aviation (ANAC in Brazil), the International Air Transport Association (IATA), and the International Civil Aviation Organization (ICAO), among others.

Figure 2 presents an overview of the main factors that affect the establishment of a commercial air route and thus are considered in such operation.

**Figure 2 - Main Factors in an Air Transport Route Operation**



The factors presented in Figure 2 have a common feature. They can be measured to guide the decision-making of public and private stakeholders in establishing a commercial air route. However, there are factors that are neglected both in the literature and in practice. Although these are not easy to measure, they can make a significant difference in customers' lives.

### **3. THE CASE OF BARRETOS, BRAZIL**

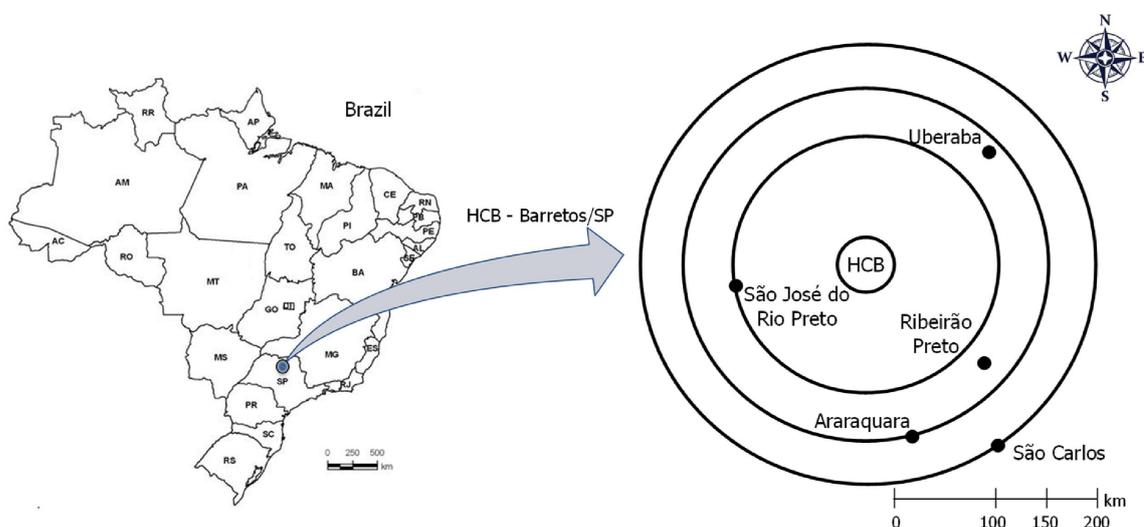
The city of Barretos is located in the state of São Paulo (SP), Brazil, about 420 km from the state capital, São Paulo. It has 119,000 inhabitants (IBGE, 2016) and is home to the Barretos Hospital of Cancer (HCB), the largest reference center for cancer treatment in Brazil and the largest cancer hospital in Latin America. The history of the HCB originated with the institution of Pio XII Foundation in 1967. Today, it has 260 doctors and about 3,500 employees. Besides having the infrastructure and highly qualified professionals in cancer treatment, the hospital differs from other institutions in that it adopts a humane treatment approach, considering much more than just technical criteria in treating patients and caring for the people involved (Prata, 2012).

About 4,000 daily attendance are performed at the hospital, seeing patients 1,585 municipalities from Brazil (HCB, 2015). The country has 5,570 municipalities (IBGE, 2016), and about 30% of these have had citizens attend the HCB for treatment. All treatments are carried through the Unified Health System (SUS) of the Federal Government, as well as the fundamental and significant collaboration of different individuals and corporations that often support the hospital by providing different types of resources.

This national relevance of the HCB in cancer treatment raises the issue of its difficult access by patients coming from different cities, given that the hospital is about 100 km from the nearest regional airport, which is located in São José do Rio Preto/SP (SBSR/SJP), with about

691,000 passengers annually in 2015 and operated by the airlines LATAM, Passaredo, Pantanal and Azul (DAESP, 2016). Four other cities, Ribeirão Preto/SP (SBRP/RAO), located 130 km distance and 1,1 million passengers in 2015, Uberaba/MG (SBUR/UBA), 140 km and 137,700 passengers in 2015 (Infraero, 2016), Araraquara/SP (SBAQ/AQA), 150 km and 6,500 passengers in 2015, and São Carlos/SP (SDSC/QSC), 200 km and 1,100 passengers in 2015, which are located up to 200 km away from Barretos, also have regional airports which can assist these patients. However, there is a tight supply or even a lack of regular commercial flights to these airports, making it difficult to access the hospital by air transport. Figure 3 shows an approximate representation of the distances of these airports relative to the HCB in Barretos/SP, Brazil.

**Figure 3 -Distances between the HCB and nearby Cities with Regional Airports**



Even when a patient or a professional uses one of the mentioned airports, as shown in Figure 3, road transport is still necessary to reach the HCB. If one of the airports serving the state capital of São Paulo (SBSP/CGH - Congonhas, SBGR/GRU – Guarulhos, or SBKP/VCP - Viracopos/Campinas) is used, it would still take at least four hours of land travel to get to the HCB. For a patient in treatment, who goes through weekly sessions of chemotherapy over several months, this travel time and the exposure to risks caused by land modal can not only worsen the prognosis but can also spell the difference between life and death. Moreover, if the mentioned travel time and conditions apply to the transport of organs, carrying out transplants in the hospital can become impractical.

Regarding the air transport service and supply conditions, the Chafei Amsef State Airport (SBBT/BAT) in Barretos, managed by the Airway Department of São Paulo (DAESP), is located 8 km away from the HCB or a few minutes by land transport between the airport and the

hospital. Certain factors are believed to have restricted the use of both airports solely to business purposes and at specific times of the year, such as during the international rodeo circuit of Barretos. These factors include the availability of operations and services, the strategies of airlines and the feasibility of implementing commercial flights.

Regarding the availability of a runway, which is just one of the main elements of airport conditions, the airport of Barretos has a sufficient runway length to receive aircrafts of the major companies operating in the country (85%), such as the Airbus A320 and A319 - which represents 37% of the commercial aircraft fleet in the country, the Boeing 737-800 and 737-700 - 33% of the fleet, and the Embraer EMB-195 and EMB-190 - 15% of the fleet (ANAC, 2015). Using the ANAC information, the runway extensions of the main airports in the region and the state were specified, as shown in Table 1.

**Table 1 - Runway Extensions of Nearby Airports**

<b>City/State</b>	<b>Runway extension (meters)</b>
Barretos/SP	1,800
<b>Main airports at the region</b>	
Araraquara/SP	1,800
Ribeirão Preto/SP	2,100
São Carlos/SP	1,630
São José do Rio Preto/SP	1,700
Uberaba/MG	1,800
<b>Main airports at the São Paulo state</b>	
São Paulo (Guarulhos)/SP	3,700
São Paulo (Congonhas)/SP	1,940
Campinas (Viracopos)/SP	3,240

The area extending from 60-750 meters (200-2.500 feet) after the end of runway threshold, identified as the runway protection zone (RPZ), was also measured but is not shown in Table 1 (Young and Well, 2011). Note that the runway at Barretos airport has the second largest extension in the region (elevation 579 meters), only less than Ribeirao Preto. It is also bigger than the runway at Congonhas airport, the second busiest airport in the country, which accounted for over 8% of total landings and about 80.000 flights in 2014 (ANAC, 2015). Thus, it can be said that Barretos airport satisfies one of the main conditions for airport operations.

Regarding airport regulations, government authorities have shown their political will in response to the economic conditions of the region and the demands presented by the HCB. To strengthen the hospital demand, an advertising campaign with the theme 'Flight Against Cancer' was launched (HCB, 2015), which seeks to increase the awareness of both public

authorities and airline managers regarding the need to establish a regular commercial air route to the city of Barretos. However, although one airline has actively participated in the campaign, and even carried out an inaugural flight to the city, such flights are still not commercially available.

Air transportation is significantly relevant in obtaining access to the city of Barretos not only because of the medical conditions of patients undergoing cancer treatment at the HCB, but also in view of the psychological conditions of these patients and their families, for whom death and human suffering are constant companions. Previous studies have shown that among the four main factors considered in establishing a commercial air transport route, in the case of the city of Barretos, the business strategies of airlines may be the deciding factor.

#### **4. CONCLUSION AND MANAGERIAL IMPLICATIONS**

Based on the theoretical analysis, initiatives could be taken to overhaul the concept of CSR, as proposed by Porter and Kramer (2006). In the case of air transport, companies can adopt social metrics that are related not only to the number of employees, percentage of female employees, number of accidents, number of trainees (Székely and Knirsch, 2005), or the financial and environmental impacts of the organization on its stakeholders (Wang et al., 2015), but also to the services provided to customers at risk, such as the patients of the HCB and their companions. The number of seats for these customers in different sections that lead to HCB could also be increased by civil aviation authorities to promote humanization in the transport of patients.

Regarding management practices, companies can provide patients with access to mileage points donated by customers participating in frequent flyer programs or even allow patients to use mileage points that have expired or are unused by customers. Also, airlines can offer discounted prices to verified patients and their companions. These discounts could be subsidized by public programs and offered alternately on a daily or weekly basis by different companies. Further, this service could be accompanied by the provision of public transport between the airport and the HCB or of an exclusive transfer service for patients and caregivers, optimizing the transport of patients.

The Essential Air Service program of the United States (Özcan, 2014), in which small communities receive airline services subsidized by federal programs, could be analyzed to aid the formation of public policies on air transport in Brazil, such as in the case of the HCB.

Finally, the use of commercial air transport services to carry cargo to the city could be encouraged by the development of other sectors of the regional economy, such as the establishment of a multimodal logistics platform for industries of interest, thus favoring the improvement of the socioeconomic conditions of the region.

Future research could identify other structural and managerial elements, related to the Barretos airport services, to create strategies to search investment and create the necessary conditions for the realization of scheduled flights to the city.

## ACKNOWLEDGMENTS

National Council for Scientific and Technological Development (CNPQ - Process: 160348/2015-3, PDJ) and The State of Goiás Research Foundation (FAPEG).

## REFERENCES

- Agência Nacional de Aviação Civil (2015). *Anuário do Transporte Aéreo 2014*. December.
- DAESP São Paulo Aeroportos (2016) *Estatísticas* Available at: <http://www.daesp.sp.gov.br/>. Access on: 25 May 2016.
- Hospital de Câncer de Barretos (2015) *Institucional*. Available at: <http://www.hcancerbarretos.com.br/>. Access on: 17 September 2015.
- Instituto Brasileiro de Geografia e Estatística (2016) Available at: <http://www.ibge.gov.br/home/> Access on: 23 May 2016.
- Infraero Aeroportos (2016) *Estatística*. Available at: <http://www.infraero.gov.br/index.php/br/estatistica-dos-aeroportos.html>. Access on: 25 May 2016.
- Knieps, G. (2014) Market versus state in building the aviation value chain. *Journal of Air Transport Management*, 41: 30-37.
- Nicolau, J. L. (2011) Testing prospect theory in airline demand. *Journal of Air Transport Management*, 17: 241-243.
- Özcan, I. Ç. (2014) A community evaluation of essential air services. *Journal of Air Transport Management*, 36: 110-119.
- Porter, M.E.; Kramer, M.R. (2006) Strategy & society: the link between competitive advantage and corporate social responsibility. *Harvard Business Review*, 84(12): 78-92.
- Prata, H. (2012) *Acima de tudo o amor*. Editora: Gente.

- Sherali, H. D.; Bish, E. K.; Zhu, X. (2006) Airline fleet assignment concepts, models, and algorithms. *European Journal of Operational Research*, 172: 1–30.
- Silva, H. E., Verhoef, E. T., Berg, V. A.C. (2014) Airline route structure competition and network policy. *Transportation Research Part B*, 67: 320–343.
- Székely, F., Knirsch, M. (2005) Responsible leadership and corporate social responsibility: metrics for sustainable performance. *European Management Journal*, 23(6): 628–647.
- Valdes, V. (2014) Determinants of air travel demand in middle income countries. *Journal of Air Transport Management*, 1-14.
- Wang, Q., Wu, C., Sun, Y. (2015) Evaluating corporate social responsibility of airlines using entropy weight and grey relation analysis. *Journal of Air Transport Management*, 42: 55-62.
- Wu, H. C., Cheng, C. C. (2013) A hierarchical model of service quality in the airline industry. *Journal of Hospitality and Tourism Management*, 20: 13-22.
- Young, S. B., Well, A. T. (2011) *Airport planning and management*. New York: McGraw-Hill.