Received 27 July 2018
Revised 10 April 2019
Accepted 11 July 2019

# Alternatives for airport management in Brazil

## The case of the innovative management model of the Zona da Mata regional airport

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### Abstract

**Purpose** – This paper aims to answer the following question: Is PPP a financially viable alternative for the management of regional airports in Brazil?

**Design/methodology/approach** – The methodology is based on the case study of the innovative model of Zona da Mata Regional Airport management. It was used Value for Money as a method to compare this case with the conventional airport management alternative.

**Findings** – It was observed that, when compared to the airport management alternative through contracting third parties, the public–private partnership (PPP) provided a reduction of almost 70% of public spending on the management of this infrastructure. Besides the financial advantage, other benefits of this PPP contract were also observed.

**Research limitations/implications** – The analyses carried out in this study are not exhaustive and can be improved and remade as the life cycle of the PPP contract studied is progressed.

**Practical implications** – It was concluded, from the results found, that PPP is an efficient alternative for the management of regional airports in Brazil, and the model can be replicated for similar airports.

**Originality/value** – When analyzing the results of this innovative project of managing a regional airport through a PPP, this work made it possible to measure the positive impacts of this alternative and demonstrate the potential of the PPP as an alternative for the management of other regional airports in Brazil.

**Keywords** Process innovation, Public–private partnerships, Regional airports

**Paper type** Case study

### 1. Introduction

According to data from the Air Transport Yearbook of 2015 (ANAC, 2016), from 2008 to 2017, the number of passengers that paid for air transportation in the Brazilian domestic and international market increased from 63.5 to 112.5 million, which represented an increase of 77 per cent. The volume of cargo transported also increased from 1,015 thousand tons in 2008 to 1,247 thousand tons in 2015, an increase of approximately 23 per cent.

However, in the same period, the Federal Government, constitutionally responsible for the management of airports in Brazil, was unable to make large investments in the



Innovation & Management Review
Vol. 16 No. 4, 2019
pp. 298-322
Emerald Publishing Limited
2515-8961
DOI 10.1108/INMR-07-2018-0051

sector due to fiscal and budgetary restrictions. According to data from the Central Bank of Brazil (Banco Central do Brasil – BACEN/Central Bank of Brazil – CBB, 2016), the primary result of the Federal Government in 2006 was a surplus of 3.20 per cent of the GDP, reaching a deficit of 1.88 per cent of the GDP (R$−111.2bn) in 2015, finally stretching to a deficit of 2.1 per cent of the GDP in 2018 (Balassiano, 2019). The shortage of resources in the period hampered the investments and modernization in numerous public equipment, including infrastructure.

One of the alternatives to maintain a satisfactory level of service in the airports of the country was to promote the concession of some of them. According to Nunes (2015), the concession programs started in 2011 and aimed at expanding airport capacity and improving the service delivery. For the author, the strong growth of aviation, in a period of low capacity of direct investments by the public sector, was one of the reasons that led the Federal Government to promote the concession of the airports to the private initiative. From 2011 to 2017, four lots of concessions occurred according to INFRAERO - Empresa Brasileira de Infraestrutura Aeroportuária (2017), which are fundamental for making feasible and expeditious investments in upgrading and modernizing the airport infrastructure. By March 2019, in the fifth round of concessions, another 12 airports were granted and more than R$3.5bn would be invested in them by the auction winners (ANAC, 2019b). However, despite the success of such concessions, there is still a large number of regional state and municipal airports that require investments and modernization in the country.

### *1.1 Research question*

In this context of budgetary constraints, the management of regional airports proves to be an even greater challenge given the fact that these airports – generally small and medium-sized – have low commercial profitability. According to the Infraero Airports Financial Report, year base 2013, published by the National Civil Aviation Agency (NCAA) (Agência Nacional de Aviação Civil – ANAC/National Civil Aviation Agency – NCAA, 2014), most small and medium-sized airports serving municipalities that are not capitals have presented negative financial results (without depreciation and without remuneration of capital) in 2013.

This means that the operational revenue of these airports – which is comprised of the sum of tariff and non-tariff revenues, cargo revenues and wharfage revenues – is not enough to cover the expenses and costs of operating the airport itself. This fact makes the attractiveness of these airports, in eventual concession processes, small. This low potential for commercial exploitation inhibits the investment of private entities in airport infrastructure and makes the public sector the sole responsible for financing and developing it, often requiring heavy investments not available in times of economic recession. The result, most of the time, is the failure to make the necessary investments, deteriorating an equipment so important for regional dynamism.

The precariousness of regional airports aggravates the economic and social isolation of some regions and their populations, once, according to Demant (2009), the existence of adequate infrastructure has a direct influence on the amount of movement of passengers and cargo in a given locality. According to the author, the lack of adequate infrastructure is one of the main obstacles to the expansion of the circulation of commercial aircraft and, consequently, to the development of regional aviation.

It is therefore evident the relevance of regional airports for the economic and social development of Brazilian municipalities and their integration into the national scenario. Thus, in a context where fiscal constraints in the public sector limit the management

capacity of such equipment, it is important to analyze and discuss alternatives. This work seeks to contribute to this discussion and to answer, from the case study of the innovative management model adopted by the Government of Minas Gerais for the Zona da Mata Regional Airport, the following question:

*Q1*. Is public–private partnership (PPP) a financially viable alternative for the management of regional airports in Brazil?

*1.2 Relevance of the study*

As a consequence of the limited capacity of governments to invest in adequate management, expansion and improvement of the infrastructure of regional airports, the airline network between medium and small municipalities is not yet consolidated in most of the Brazilian states. The difficult or time-consuming access to distant and less populous regions estranges investors, public agents (health, education, security), family and friends. In the long run, the very existence or inadequate airport infrastructure may ultimately mean the prosperity or stagnation of a region. In Brazil, the need to develop aerial transportation is unquestionable, especially considering the country's territorial extension and the importance of connectivity between municipalities, which drives development, attracts investment and facilitates the flow of people, products and businesses.

All things considered, this study seeks to contribute to the identification, analysis and discussion of alternatives for the management of regional airports in Brazil, based on the case study of the Zona da Mata Regional Airport, the single case in the country until the beginning of 2019, of PPP contract for the execution of investments and operation of airport services. The innovative character of this initiative enables several lessons to be drawn from it.

In a context of fiscal restrictions by the Federal Government and sub-national governments, the analysis proposed in this work is mainly financial, seeking to compare, from the point of view of public spending, the alternative of managing regional airports through PPP and public management by the Government of Minas Gerais.

Since the beginning of the twenty-first century, Brazilian public managers have had an additional alternative to attain investments in infrastructure: the PPP, established by the Federal Law 11,079 of December 30, 2004. The law conditions the opening for bidding for new projects in PPP-type contracting to the presentation of a technical study that demonstrates the convenience, the opportunity and also the observation of financial sustainability and socioeconomic advantages of the project (Brasil – República Federativa do Brasil, 2004). According to definitions found in literature, it is understood that these aspects required by law are contemplated in the Value for Money (VfM) analysis, although Brazilian law does not expressly mention this denomination. It should be emphasized that the VfM method can be applied in different countries and different realities, adapting the parameters used (Sarmento, 2010). Therefore, the choice of this methodology for the discussion of the financial viability of the adoption of PPP as a solution for the management of regional airports in Brazil is relevant, since it is a widely recognized methodology used to evaluate the nature the whole world.

Finally, this article still seeks to fill an academic gap. Research on PPPs is mainly theoretical and there is a lack of empirical studies that question the nature and functioning of these arrangements (Andon, 2012).

## 2. Literature review

### *2.1 Innovation of organizational processes in the public sector: new ways of providing public services*

In this paper, we seek to discuss management alternatives that are financially viable – given the context of fiscal restrictions of Brazilian federated entities – for regional airports in Brazil. To do so, it is necessary to understand the alternatives available to public managers for the attainment of public policies and provision of public services. In this section, we aim to show how the range of alternatives has been transformed and expanded over the years, with new possibilities emerging.

Since the 1990s, a process of redefinition of the public sphere in Brazil is being observed, starting with the construction of new institutional arrangements replacing the provision model run exclusively by the State and "the centralized uni-organizational standard that characterized the previous period" (Farah, 2001, p. 141). According to Diniz (1996), this change stems from the new international conditions, which are increasingly dynamic, integrated and complex, requiring the State to be more agile and flexible in the execution of policies and provision of public services, which culminates in the decentralization of attributions to new stakeholders both in civil society and market. Although the introduction of new arrangements between state, society and the market has been well-known, Nunes (1997) emphasizes that new forms do not substitute those that preceded; instead, they add up and combine to form new practices. The different institutional arrangements that underpin public policies have different designs in terms of three main perspectives: standardization, financing and policy makers (Lotta & Favareto, 2016).

For the understanding of institutional arrangements, the concept established by Pires and Gomide (2014, p. 13) is borrowed, and institutional arrangements are understood as the means that:

> [. . .] define the particular form of coordination of processes in specific fields, defining who is entitled to participate in a particular process, its object and objectives, and the forms of relations between the actors.

Lotta and Favareto (2016) classify the new institutional arrangements experienced by the Brazilian public sector since the 2000s into two major groups: horizontal integration arrangements (between public policy sectors) and vertical integration arrangements (between federative entities). For the authors, these new arrangements are established in response to at least one of these three needs: coping with cross-cutting and intersectoral issues; calls for policy management with joint coordination between government and civil society; and the embedding in the local contexts of policy implementation.

Pires and Gomide (2014) define the process of implementing public services as a process that includes all steps, from decision making, to action taking and perception of results of services provided. The authors point out that "the implementation processes are precisely the moment in which, through decisions and actions by government bureaucracies, interactions with democratic institutions reflect the impasses and obstacles or learning and innovations" (Pires & Gomide, 2014, p. 13).

As for innovation, Schumpeter (1982) argues that it is a process of "creative destruction", which can result in the introduction of a new product, a new method of production or management, a new source of raw material or even a new organization. As for innovation within the public sector, there are some variations between the classifications proposed in the literature on the subject. For Walker (2006), innovations in the public sector can be of five types: innovation in services, which will culminate in new services for new users; expansionist innovation, which will provide existing services to new users; evolutionary

innovation that will provide new services to existing users; organizational processes innovation; marketing innovation; organizational innovation and ancillary innovations. Windrum and Koch (2008) recognize six types of innovation: innovation in service; innovation in service delivery; administrative and organizational innovation; conceptual innovation; policy innovation and systemic innovation. For Bekkers, Edelenbos and Steijn (2011), there are seven types: innovation in products and services; technology innovation; process innovation; organizational and managerial innovation; conceptual innovation; innovation in governance and institutional innovation.

Farah (2007) identifies that the main innovation trends developed by sub-national governments take place in public policies and in the process of formulating and implementing them. On the latter, the author states that:

> Innovations in processes, in turn, concern changes in political and administrative processes, affecting how to do it: who are the actors involved in policy formulation and implementation; how they relate to each other, through which organizations and how these processes are flexible and efficient in the use of public resources. Innovations, in this case, constitute new decision-making processes and new forms of management oriented towards democratization – increasing participation in decisions regarding the formulation, implementation and control of public policies – and for the efficiency of public administration (Farah, 2007, p. 4).

Among all possible types of innovation in the public sector, this study analyzes exactly one innovation of organizational processes, more specifically, the process of provision of public services: the adoption of a PPP for the management of regional airports:

> Process innovation is the adoption of new or significantly improved production methods, including methods of product delivery. Such methods may involve changes in the equipment or organization of production, or a combination of those changes, and may stem from the use of new knowledge. The methods may be intended to produce or deliver technologically new or improved products that can not be produced or delivered with conventional production methods or to increase the output or efficiency of delivery of existing products (OECD - Organisation for Economic Co-operation and Development, 2005, p. 20).

Brose (2014) points out that the literature and scientific production on innovation in the public sector is still limited and probably is because this discipline is characterized as diffuse because of the intersection between ideological, cultural and partisan elements, hardly quantifiable.

Thus, to contribute to the consolidation of possible learning and innovations, the focus of this study is on the evaluation of the institutional arrangements that support the implementation of public policies, especially in the unprecedented and innovative case of the Regional Airport of Zona da Mata management via PPP.

The PPP is one of the possible ways of granting public services to private initiative, popular in developed and developing countries (Graham, 2011). Since 2011, the concession of airport infrastructure to the private sector is regulated by the Federal Government, according to Federal Decree 7,624/2011, which disciplined the conditions of exploitation by the private sector of the public airport infrastructure through concession and PPP.

In Brazil, current legislation provides that PPP contracts are remunerated, totally (administrative modality) or partially (sponsored modality) by governments; must have a minimum term of five years and a maximum of 35 years; and should present a prior and objective breakdown of project risks between contractual parties (Brasil – República Federativa do Brasil, 2004).

The Brazilian Code of Aeronautics (BCA), established by Federal Law n° 7,565/1986, establishes that the Federal Government has the ownership of all public airports in Brazil

(Brasil, 1996). However, it is well known that the monopoly of airport management by the Federal Government has several disadvantages for these enterprises (Campos & Souza, 2011; McKinsey & Company, 2010; Prazeres, Esteves, & Pecci Filho, 2011). Thus, according to the BCA, it is possible for the Federal Government to decentralize the management of airport undertakings, granting them to the management of the private initiative or delegating them to the states and municipalities to operate them, directly or indirectly (Brasil, 1996).

For the airport management model, through PPPs, to become a viable alternative for sub-national governments, it is necessary to have prior agreement with the Federal Government, delegating airport management to states and municipalities. In addition, the invitation to bid for the selection of the private partner must be submitted to the prior analysis of the Civil Aviation Secretariat (CAS).

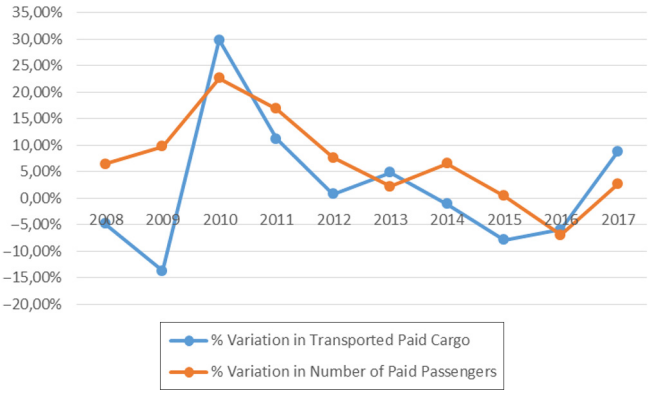
Besides the necessity of all these administrative acts, it can be affirmed that a challenge for this model is the governance structure of these enterprises. In addition to having to deal with the government that granted it the management of that infrastructure, it also needs to articulate with Federal Government agencies, such as CAS, NCAA and Infraero.

*2.2 Sector analysis: overview of the Brazilian airport sector*

According to data from the 2017 Air Transport Yearbook (ANAC, 2019a), in Brazil, the number of paying passengers transported by air modality increased by 77 per cent in a decade, from 2008 to 2017 (Figure 1). During this period, the growth was more intense between 2006 and 2012, followed by less accelerated growth in subsequent years and a decrease only in 2016.

In relation to cargo handling, there was a strong growth in traffic in 2010 and 2011, in which the growth rate was 29.89 and 11.21 per cent, respectively.

Regarding the classification of airports, Postorino (2010) states that there are three main criteria for classification. As for traffic, it states that the airport is considered "primary" when it has traffic of more than 5 million; when it has traffic of less than 5 million, it is considered "regional". As for the type of connection, it states that it is a "HUB" when there is a high relative number of connections; or a "feeder" when they are intended to supply the HUBs. As for the distance of the routes, the author classifies them as: "1st level", when it




**Source:** Elaborated by the authors based on data from NCAA (ANAC, 2019a)

**Figure 1.** Evolution of passenger and cargo transportation through the air modal from 2008 to 2017 – domestic and international flights

serves cities located at 3,000 km; "2nd level", when it serves cities located between 2,000 km and 3,000 km; and "3rd level", when it serves cities located up to 700 km.

In the Brazilian case, the Brazilian Aeronautics Code (Law n° 7,565, of December 19, 1986) does not present the definition of a regional airport. However, one way of identifying them is by checking the main characteristics of each airport and to what extent they fall within the doctrine classification criteria. According to Silva (2013), the connectivity between large municipalities is not new in the Brazilian scenario, as it is possible to identify the existence of regular flights as the 1930s. Such connectivity was a factor that drove the development of these big cities by connecting them with other regions. Investments were attracted and the flow of people, products and businesses was facilitated.

On the other hand, the consolidation of broad aerial connectivity with municipalities of medium and small size is not yet a consolidated reality in most of the Brazilian states. The difficult or time-consuming access to a region estranges investors, public agents (health, education, security), family and friends. According to Turolla, Lima, and Ohira (2011), in the long term, the very existence or not of adequate airport infrastructure can mean the prosperity or stagnation of a region. For the authors, the regular aerial connection is able to include the region in the axis of development of the nation.

This understanding was also developed statistically by Ishutkina and Hansman (2009). These authors assumed that air transport generates jobs and enables certain economic activities depending on the availability of aerial connection. Through analysis of GDP growth and air transport in 139 countries, they tried to understand the relationship between air transport and economic activity (Figure 2). They also tried to identify the factors that stimulate or discourage the development of air transport.

According to the authors, economic growth increases the demand for air transportation and makes it more attractive to undertake in this sector. Aviation growth, in turn, fuels the economy as it generates income, direct jobs and speeds up the flow of cargo and people. The Center of Excellence in Tourism (CET – Center of Excellence in Tourism/CET – Centro de Excelência em Turismo, 2007) also highlighted the importance of the aerospace sector to the economy. Through a methodology of estimation of the value added of a given activity, it showed the effect that the sector has on its suppliers.

In spite of the low participation of air transport in the value added to the economy (0.86 per cent in 2006), the aerospace sector generates stimuli in other sectors, which CET (2007) defined as "backward" effects (when moving sectors that supply some type of product and service) or "forward" (when moving sectors that it serves). The measurement of backward linkages showed that for each increase of R$1.00 in the production of final air transport services, an increase of R$1.25 was generated in the supply chain and R$0.32 in unfolding.

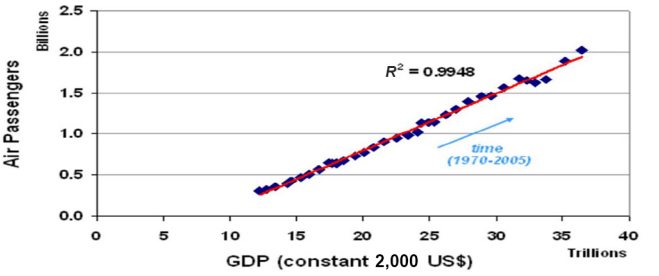



**Figure 2.**
Relation between demand for air transport and economic development in 139 countries in the period

**Source:** Ishutkina and Hansman (2009)

## 3. Methodology

To reach the objectives proposed in this research, a case study of the Regional Airport of Zona da Mata PPP, contracted by the Government of Minas Gerais in 2014, was carried out. It was intended, through this case study, to discuss if the PPP is a financially viable alternative for the management of regional airports in Brazil. To do so, a Value for Money (VfM) analysis of this PPP agreement is developed and explained below.

The case study was selected as a research strategy, since, according to Yin (1994), this method is justified both when trying to develop a theory and when trying to test it. One of the problems of case studies is the limited possibility of generalization of results. In this regard, Patton (1990) points out that although qualitative research is not intended to seek universal laws, this does not mean that studies conducted in a particular situation cannot be used to help interpret the same phenomena in other situations.

Thus, it is understood that the case study enables the detailed examination of a unit of analysis, establishing feasible inferences and promoting the knowledge of other illations of the same phenomenon in other units belonging to the same population (Bogdan & Biklen, 1994). Yin (1994) states that case studies are important in reinforcing theoretical propositions, in which the researcher strives to generalize a particular set of results into a broader theory.

As for the data analysis strategy, the choice of the VfM method for analyzing the financial feasibility of adopting the PPP as an alternative for the management of regional airports in Brazil is relevant, as this methodology is widely recognized and used for evaluation of the opportunity and convenience of contracts of this nature throughout the world. VfM analysis is a technique used in designing infrastructure projects to identify whether private partner participation creates sufficient value to offset the additional cost of private financing, to be assumed by the government (Flores, 2010).

According to Grimsey and Lewis (2005), to obtain VfM is to find the best price for the same package of services. Thus, it is necessary to develop comparative analyzes between the costs of different solutions that culminate in the same desired result. For Shaoul (2005), VfM is associated with three aspects: economy, efficiency and effectiveness. All other things held constant, the VfM can be obtained when the participation of the private partner in the provision of public service allows risk transfer, innovation and the best use of assets (Fitzgerald, 2004).

According to Sarmento (2010), several approaches are possible for the evaluation of VfM in PPP projects. The most widespread approach to the Public Reference Project is based on the estimation of all expected costs, revenues and risks of the project, which should be carried out by direct public investments, brought to present value by the discount rate defined by the public sector. The Public Reference Project can be understood as the net present cost of the project cash flow, calculated from the discount rate specified by the government (Grilo, 2008). Then, this value is compared to the value of the sum of payments to be spent by the public sector in favor of the private partner, in the case of PPP implementation, discounted by the same discount rate as selected (Sarmento, 2010). Whenever possible, the PPP model should be based on variables identical to those used in the construction of the Public Reference Project model, including inflation and the discount rate, so as to be able to compare adequately between the two contractual models (Grilo, 2008).

If the quality of service provided and the distribution of risks are identical in both alternatives, the VfM is favorable to the contracting of the PPP when the net present value of the payments to be owed to the private partner is lower than the net present value of the Public Reference Project (Sarmento, 2010). To discount cash flows and calculate the net

present value (NPV) of the project, an appropriate discount rate must be defined. There are different ways of estimating the discount rate to be used. The basic concept that permeates all of them is that of the opportunity cost of capital (Grilo, 2008).

The Federal Government recommends the use of the Long-Term Interest Rate (LTIR) as a discount rate in the financial analysis of major projects (Grilo, 2008). According to the author, often for practical purposes, it is assumed that the discount rate is the rate of the cost of capital to risk-adjusted government. However, such simplification ignores some important factors, such as risk premiums related to the increase in public debt and tax assumptions, for example.

The VfM analysis is one of the most important tools among those available to public managers to reach the decision to execute a project via PPP instead of executing it through direct public investment. This is because the use of this tool equip public managers with an objective methodology that allows them to estimate costs, benefits and risks involved in the project (Sarmento, 2010).

The use of PPP is only justifiable if it creates value for the public sector, either by reducing expenses or by increasing the efficiency of the service provided (Flores, 2010). In addition to the financial analysis, which compares the costs of both alternatives, the VfM analysis also requires qualitative analysis that addresses other aspects. The risk matrix, for example, should also be analyzed to compare the amount of risks assumed and risks transferred by the public sector in each of the alternatives.

## 4. Results and discussion

### *4.1 The case of the Zona da Mata regional airport*

Zona da Mata Regional Airport was designed by former president Itamar Franco in the late 1990s, when he was governor of the state of Minas Gerais; for this reason, the airport is also known as Presidente Itamar Franco Airport. The project emerged as part of a government strategy to leverage the economy of Zona da Mata, facilitating cargo transportation and expanding the offer for general transportation in the region. At the time, the Francisco Álvares de Assis Airport (popularly known as "Serrinha Airport") already operated, with some restrictions, in the city of Juiz de Fora, and the proposed construction of a new airport emerged as an alternative to fully meet the demands of the city.

According to data from the State Department for Transport and Public Works – SDTPW of Minas Gerais (SETOP - Secretaria de Estado de Transportes e Obras Públicas, 2014a), the construction of the airport began in December 2001 and was completed in 2005. Located on the border between the municipalities of Rio Novo and Goianá, the Airport has a track of 2,500 m in length and 45 m in width; a 30,000 $m^2$ aircraft courtyard; passenger terminal with an area of 5,000 $m^2$; and an elevated tank for aircraft fueling with a capacity of up to 35,000 liters of aviation kerosene.

After its inauguration, however, the airport remained without operation for some years. According to SDTPW, the airport's failure in the period was due to the delay, by the National Civil Aviation Agency (NCAA), in evaluating the runway and homologating its use.

The airport activities started only in 2010, when a public bidding process was opened by the Minas Gerais state government to select a company to manage and operate the airport. The company Multiterminais presented the most advantageous proposal and, in July 2010, signed a contract with the government, assuming, from that moment, the responsibility for the operation of the airport.

*4.2 The public–private partnership contract: an unprecedented initiative in the country*

The development process of the PPP of Zona da Mata Regional Airport was initially marked by the publication of the Procedure for Manifestation of Interest (PMI) by the Minas Gerais state government in November 2008, with the objective of receiving, from the market, studies, surveys and contributions to the project modeling.

From the contributions received and other data and information collected by the state government itself, the scope of the project was defined and the draft of the edict and the project contract were submitted to the public consultation for criticism and suggestions.

In September 2014, the bidding process was initiated, with the publication of the bidding document. In December 2014, the Government of Minas Gerais signed a PPP agreement with the consortium made up of Socicam and Universal Armazéns Gerais e Alfandegados, in which became the first PPP in the country for the management of airport projects.

The concession of the management of the airport to the private initiative has an expected duration of thirty years from the date of signature of the contract, extendable by another five, in accordance with current legislation.

As for the remuneration, the contract, in the form of a sponsored concession, provides that the concessionaire has three sources of remuneration: public payments; tariff revenue; and commercial revenues.

According to data from SDTPW (SETOP, 2014b), the compensation paid by the government was set at the time of bidding and corresponds to R$4,470,451.60 per year, at December 2014 prices. However, the amount that will to be paid each month to the concessionaire may be lower than the amount indicated, due to the total non-compliance with the indicators included in the Performance Indicators Table, defined in the contract. These indicators were created with the objective of allowing the government to objectively monitor the performance of the contract and to encourage, through the linkage of the level of performance to the monthly remuneration, the quality of the service rendered by the concessionaire. The indicators established in the contract are divided into four categories, each with a weight on the composition of the final grade: Operational Indicators (55 per cent); Satisfaction Indicators (30 per cent); Environmental Indicators (10 per cent); and Management Indicators (5 per cent).

For the collection of tariff revenues, in turn, the concessionaire must observe the current regulations and standards for charging tariffs for the use of the services provided and the airport infrastructure, especially with respect to maximum values (spending cap) defined by the regulatory agencies for these rates.

Lastly, the commercial revenues that can be exploited under this concession are those resulting from ancillary activities, such as parking and snack bar, provided that such activities do not compromise the operation, maintenance and conservation of the airport.

*4.3 Value for money analysis for Zona da Mata regional airport public–private partnership*

Given the need for public investments and the existence of different contractual modalities and forms to meet them, it is necessary to consider, on a case-by-case basis, the most appropriate form for the execution of investments, based on a cost and efficiency perspective. Also, knowing that there is discretion of the government for the choice of the form of provision of public services, the decision criterion must be guided by the search of the maximization of the economic and social benefits for the state.

To carry out the VfM analysis of the Regional Airport of Zona da Mata PPP, an alternative model was simulated, called Public Sector Comparator (PSC), which would be the form of airport management assumed by the Minas Gerais state government if PPP did not exist. Thus, in the end, the net present value of the annual public expenditures in each of the

models was compared, seeking to identify the one that presented itself as the most advantageous.

*4.3.1 Public expenditure in the public–private partnership model.* In the PPP model, the public expenditure is given by the public payment by the state government to the concessionaire. The annual public payment, defined at the time of bidding for this project, is R$4,470,451.60, at December 2014 prices. It is noteworthy that, in this model, tariff and commercial revenues are shared between the government and according to the sharing ranges defined in the agreement and presented in Section 4.4.3 of this survey. Thus, the cash flow of the project executed through PPP, for a period of 30 years, would be as shown in Figure 3.

*4.3.2 Public expenditure in the Public Sector Comparator model.* For the construction of the PSC model, it was considered that, in addition to the PPP, the Minas Gerais state government would outsource the management of the airport, contracting, under the rules of Federal Law n° 8.666/1993, a specialized company for this purpose.

For the projection of public expenditure in this model, it was based on the premises of the SDTPW Contract n° 008/2010, signed between the government and the company Multiterminais Alfandegados do Brasil for the provision of administration, operation, maintenance and support services for commercial exploitation and industrial area of Zona da Mata Regional Airport. This agreement provided that the company would receive R$6,326,484.15 to fulfill the obligations contracted for a one-year term. In July 2011, an addendum to the agreement was signed, extending its term by one year and the value of the services was revised to R$6,246,551.36 at June 2010 prices. Since it was revised to better adjust to reality, this last value was the one considered in the calculations for the estimation of the public expenditure in the PSC model and, readjusted by the National Wide Consumer Price Index – NWCPI, for December 2014 prices, corresponds to R$8,152,649.00.

It should be noted that, in this model, all tariff and commercial revenues resulting from the operation of the airport are fully earned by the state government. Thus, the project flow, executed in the PSC model, for the same period, would be as shown in Figure 4.

*4.3.3 Value for money analysis.* To enable a comparative analysis between the cash flows of the PPP Model and the PSC Model, the annual public expenditures projected for the execution of the project were brought to present value. For this, the SELIC rate was used as the discount rate, considering that this is, in the Brazilian context, the closest rate to capture the opportunity cost of government funds or the cost of public debt.

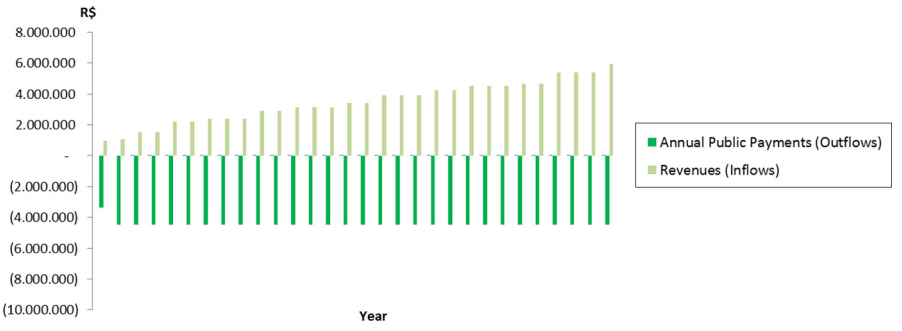



**Figure 3.**
Project cash flow in the PPP model

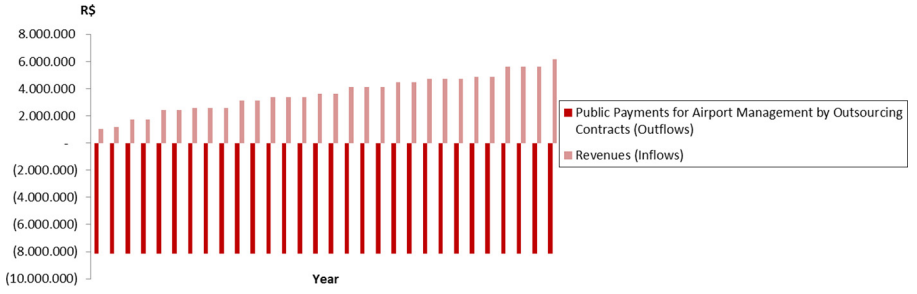
**Source:** Elaborated by the authors with research data

Considering that the PPP contract under analysis was signed in 2014, with an expected termination in 2044, the average annual SELIC rate effectively observed in the 2014, 2015 and 2016 fiscal years was used and, for the following years, based on the macroeconomic projections disclosed by Itaú Bank (Appendix 2). It should be noted that the projections disclosed by this bank predicted the expected value of the Special System of Settlement and Custody (SELIC) until the year 2020. Thus, to bring the values of the cash flows of other years (2021-2044) to present value, the constant discount rate was maintained in the VfM analysis, equivalent to the last value projected by the bank, 6.5 per cent per year.

For both models, it was considered the same projection of commercial and tariff revenues, that is, that estimated by the government of the state of Minas Gerais in the feasibility study of the PPP. In turn, this estimation considered the value of the tariffs defined by National Civil Aviation Agency in 2014 and the projection of flights carried out by the government for the whole term of the concession.

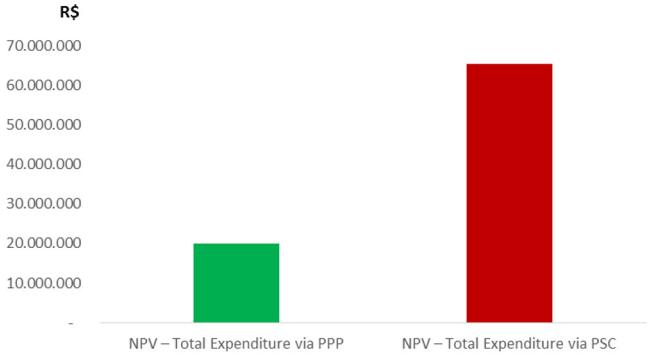
With the assumptions established and the revenue projections, the financial results were analyzed. This projection is in Appendix 2 and reveals that the disbursement for airport management, in the next 30 years, would cost R$20,150,259.54 (at December 2014 values), if it were via PPP, and R$65,443,121.30 (at December 2014 values), if it were via public model (PSC) (Figure 5).

Thus, comparing the values, it was observed that the PPP model for airport management represents savings of 69.2 per cent for the public coffers compared to the PSC model. According




**Source:** Elaborated by the authors with research data

**Figure 4.**
Project cash flow in the PSC model




**Source:** Elaborated by the authors with research data, 2019

**Figure 5.**
Comparison of net present value of total public expenditure for airport operation via PPP and PSC

to Sarmento (2010), assuming that the quality of the service provided is identical in both models, it can be said that the VfM, in this case, is favorable to the contracting of the PPP. This is due to the fact that the present value of the net payments due to the concessionaire via PPP is lower than the present value of the net public expenditures associated with the PSC model.

*4.4 The results of the PPP contract to date*

As of January 2019, the PPP of the Regional Airport of Zona da Mata is the only one in Brazil regarding airports, all other were regular concessions and, therefore, do not count on public payment. However, coming to this model was a long task.

It is possible to affirm that since 2008, with the launch of PMI, alternatives were already studied for the management of this airport. In 2010, the solution found was the hiring of a private operator for the provision of services, under the terms of Law n° 8,666. However, the alternative was not a success, as the company had no incentive to boost the airport for operational and cargo purposes, as its revenue was preset, varying little by expansion or contraction in passenger numbers.

The commercial operations began in 2011, and thereafter there were fluctuations in the number of passengers. This was due to the fact that the other airport located in the region, Francisco Álvares de Assis Airport (Serrinha), even with some restrictions for flights and departures, continued to receive flights regularly.

With the intention of continuing to develop alternatives for airport management, the state government envisaged the opportunity to hold a PPP at this airport. In 2013, a public hearing was held and, in 2014, the notice was issued. According to data from SDTPW (SETOP, 2014b), the state government signed the concession agreement with the winning bidding consortium in December 2014. In the year following the signing of this contract, it was already possible to observe some progress at the airport.

*4.4.1 Evolution of air traffic.* The first noticeable advance occurred a few months after the signing of the concession contract. The Zona da Mata Regional Airport (ZMRA), which was formerly served only by Azul Linhas Aéreas Brasileiras S/A, as a regular aviation operator, now has VRG Linhas Aéreas S/A (GOL), flying to Belo Horizonte and São Paulo (Congonhas Airport), since March 2015. Thus, there was an expansion of flight schedules and the number of destinations flown from the airport.

A second noticeable advance was that, while the Brazilian economy fell 3.8 per cent in 2015; and 3.6 per cent in 2016, the airport was able to demonstrate a growth in the number of passengers embarking and disembarking (regular, paying and non-paying) by 38 per cent in 2015 and 9 per cent in 2016, as can be observed in Table I and Figure 6.

Regarding freight transport, there was a strong increase in air cargo transportation in 2015 (36 per cent), followed by a 7 per cent drop in 2016, as can be seen in Table II.

**Table I.**
Evolution of the number of passengers (paid and unpaid) of regular aviation who embarked or disembarked in ZMRA

| Year | No. of passengers boarded and landed | Growth over previous year (%) |
|---|---|---|
| 2011 | 12,354.00 | – |
| 2012 | 65,692.00 | 432 |
| 2013 | 22,020.00 | −66 |
| 2014 | 90,739.00 | 312 |
| 2015 | 125,401.00 | 38 |
| 2016 | 136,183.00 | 9 |

**Source:** Adapted from NCAA (ANAC, 2016)

Although two years of contract execution are insufficient to draw assertive conclusions about the potential of the airport and the PPP, the fact that it can grow and serve more users in the midst of one of the biggest economic crises in Brazil signals the possibility of it developing even more so in a favorable scenario.

*4.4.2 Evolution of projects and investments.* According to the Airport Exploration Plan, in the PPP contract, the concession for the Zona da Mata Regional Airport (ZMRA), in 2014, the concessionaire, in addition to having to bear the costs of maintaining the airport, has to undertake mandatory interventions and conditional interventions.

With regard to mandatory interventions – MITV, it should be noted that all must be ready by the third year of concession and involve the revitalization of the access road to the airport and the development of 11 studies:

(1) *MITV* 1: Studies and Executive Design for 4D Code operation type and IFR Accuracy.

(2) *MITV* 2: Studies and Executive Project for expansion of the Landing and Take-off Runway - LTR.

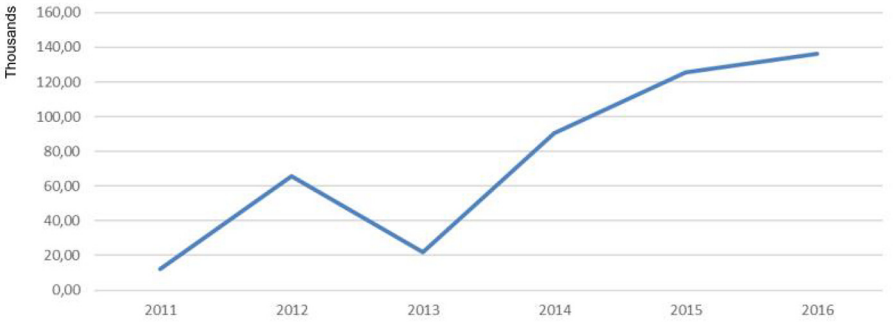
(3) *MITV* 3: Studies and Executive Project to implement the Taxi Track – Branch C.

(4) *MITV* 4: Studies and Executive Project to implement the Taxi Track – Branch D.

(5) *MITV* 5: Studies and Executive Project to implement the Taxi Track – Branch E.

(6) *MITV* 6: Studies and Executive Project for the implementation of the Cargo Court and Access Taxiway.

(7) *MITV* 7: Studies and Executive Project for implementation of the Cargo Terminal – CATE.




**Source:** NCAA (ANAC, 2016)

**Figure 6.**
Evolution of the number of passengers (paying and non-paying) of regular aviation who embarked or disembarked in ZMRA

| Year | Paid and unpaid cargo (Kg) transported by air via ZMRA | Growth over previous year (%) |
|---|---|---|
| 2014 | 43,869.00 | |
| 2015 | 57,335.00 | 36 |
| 2016 | 58,840.00 | −7 |

**Source:** NCAA (ANAC, 2016)

**Table II.**
Evolution of cargo transport in kg (paid and unpaid) transported from or destined to ZMRA

(8) *MITV* 8: Studies and Executive Project for the implementation of the General Aviation Courtyard.

(9) *MITV* 9: Studies and Executive Project to implement a road system for the areas of Support to Airlines.

(10) *MITV* 10: Studies and Executive Project to implement a road system for the Aircraft Supply Park – ASP.

(11) *MITV* 11: Study and Executive Project for concrete paving of part of the aircraft yard.

With regard to conditioned interventions (CITV), it is emphasized that they are precisely the implementation of studies and projects developed as mandatory interventions, in addition to:

- *CITV* 14: Expansion of the Passenger Terminal.
- *CITV* 15: Expansion of vehicles parking lot.
- *CITV* 16: Extension of Sescinc (Prevention, Rescue and Fire Fighting Service).
- *CITV* 17: Expansion of the ramp equipment area.

The works listed in the contract as CITV are executed if and only if it is observed growth of the volume of passengers that justifies them. That is, they are works of expansion and adequacy of the airport infrastructure that aim to support the progressive growth of demand for services at that airport.

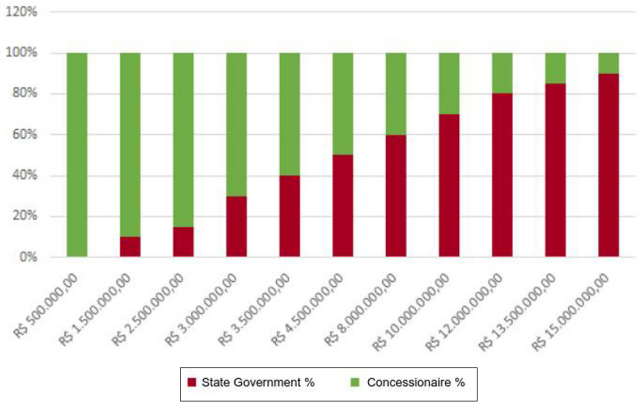
Thus, when the execution of the work is required to the concessionaire, the cost of its execution can be object of economic and financial rebalancing of the contract. The public administration may also choose to execute the work directly, leaving the concessionaire solely with the role of supervisor (without the right to remuneration for this).

In addition to the "MITV" and the "CITV", it can be said that users of the Zona da Mata Regional Airport, through the concession, earn, in the short term, a guarantee of 30 years of airport operation, better management of the commercial area of the airport and an improvement in accessibility. In the medium and long term, with the increase in the number of passengers, users tend to win a more modern airport with better infrastructure, since the expansion of demand would make it mandatory to expand the runway, improve the airport category, implement taxiway tracks, taxiway and cargo yards, loading terminals, extension of patios, supply parks, extension of terminals, parking expansion, improvement of the service against fire, etc.

*4.4.3 Evolution of the financial contributions of the state government.* According to Appendix 5 – Tariff Policy and Payment Mechanism of the bidding for the Regional Airport of Zona da Mata, in 2014, the concessionaire's remuneration is comprised of tariff revenue, commercial revenue and public payment.

Tariff revenue is common to the entire airport and involves boarding fees, landing fees, permanency rates, storage fees, wharfage charges, connection fee, communications usage and *en route* air navigation aids, tariff use of communications and radio aids to air navigation in the area of approach control and communications usage tariff and radio aids to air navigation in an aerodrome control area.

It should be noted that the tariff prices must respect the category in which it will be at the time and the limits regulated by the National Civil Aviation Agency ordinance n° 700/SER of April 16, 2012. It should also be noted that there will be a revenue sharing, according to Figure 7, for purposes of discount of the public payment due by the State Government.




**Source:** Adapted from ZMRA sponsorship announcement. Tariff policy and payment mechanism in the PPP contract (2014)

**Figure 7.** Tiers of tariff revenue sharing between the concessionaire and the state government of Minas Gerais

Regarding commercial revenue, the concessionaire was exclusively responsible for the revenue sharing, which would be through a direct distribution, regardless of the volume that is collected in this way, 80 per cent would be with the concessionaire and 20 per cent would be with the concession holder. The 20 per cent collected by the granting authority is also offset against the amount of the monthly public payment due to the concessionaire.

The public payment is the remuneration paid by the State Government to the concessionaire to keep the airport in operation. It should be noted that this amount is adjusted annually by the National Wide Consumer Price Index – NWCPI (IPCA). Such counterpart may also be updated annually until June 1 of the following year by the growth or decrease of tariff and commercial revenues.

Following these considerations, SDTPW was asked to provide a register of the counterparts already paid to the ZMRA concessionaire. According to data provided by this State Secretariat, the public payment was initiated after the concessionaire made mandatory equipment available in April 2015, in accordance with the terms of the contract. Thus, R$3,352,838.00 was paid to the concessionaire in 2015; R$4,523,519.00 in 2016; and R$784,816.00, until February 2017 (Tables III-V).

According to the data presented, there is a monetary correction of the amount of the counterpart in January, which increased the upward trend of the counterpart paid by the state of Minas Gerais. However, there is a sharp drop in the counterpart paid by the state from June 2016, indicating a significant increase in the use and collection of tariff and commercial revenues at this airport.

Another observation is that 2015 payments only started in April, which helped pull down the annual public payment the state had to pay that year. However, if there were payments in January, February and April in the same amount as in the other months, R$368,000, the evolution of the counterpart from 2015 to 2016 would have been relatively low. It is noteworthy that this low correction would occur in a year in which the inflation recorded by the National Wide Consumer Price Index (index fixed by the adjustment agreement) was 10.67 per cent, which would demonstrate the decrease in the real value of the counterpart paid by the state.

If all of these developments were noticeable in years of economic recession, it is plausible to see the significant drop in state monetary compensation in the medium term.

*4.4.4 Airport management public–private partnership model replication in Minas Gerais.* According to Audit Note n° 1300.0568.16, of the State General Controllership, Usiminas

**Table III.**
Public payments paid by the Minas Gerais state government to the concessionaire of Zona da Mata regional airport – 2015

| Period | Bill of sale | Bill of sale emission date | Paid by the state (Date) | Gross value | Net value |
|---|---|---|---|---|---|
| April/2015 | – | – | – | 372,537.63 | 368,812.14 |
| May/2015 | – | – | – | 372,537.63 | 368,812.14 |
| June/2015 | – | – | – | 372,537.63 | 368,812.14 |
| July/2015 | – | – | – | 372,537.63 | 368,812.14 |
| August/2015 | – | – | – | 372,537.63 | 368,812.14 |
| September/2015 | – | – | – | 372,537.63 | 368,812.14 |
| October/2015 | – | – | – | 372,537.63 | 368,812.14 |
| November/2015 | – | – | – | 372,537.63 | 368,812.14 |
| December/2015 | – | – | – | 372,537.63 | 368,812.14 |
| April to December/2015 | 530 | 23/03/2016 | 23/05/2016 | 3,352,838.00 | 3,319,309.28 |
| 22/12 to 31/12/2015 | 2016001556 | 02/09/2016 | 03/02/2017 | 22,315.68 | 22,092.52 |

**Source:** SETOP, 2017

**Table IV.**
Public payments by the state government of Minas Gerais to the concessionaire of Zona da Mata regional airport – 2016

| Period | Bill of sale | Bill of sale emission date | Paid by the state (Date) | Gross value | Net value |
|---|---|---|---|---|---|
| January/2016 | 2016000155 | 02/09/2016 | 15/02/2017 | 437,299.07 | 432,926.08 |
| February/2016 | 2016001557 | 02/09/2016 | 15/02/2017 | 437,299.07 | 432,926.08 |
| March/2016 | 2016001558 | 02/09/2016 | 15/02/2017 | 437,299.07 | 432,926.08 |
| April/2016 | 2016001559 | 02/09/2016 | 15/02/2017 | 437,299.07 | 432,926.08 |
| May/2016 | 2016001560 | 02/09/2016 | 15/02/2017 | 437,299.07 | 432,926.08 |
| June/2016 | 2016001561 | 02/09/2016 | 15/02/2017 | 333,860.57 | 330,521.96 |
| July/2016 | 2016001562 | 02/09/2016 | 15/02/2017 | 333,860.57 | 330,521.96 |
| August/2016 | 2016002214 | 29/12/2016 | 15/02/2017 | 333,860.57 | 330,521.96 |
| September/2016 | 2016002215 | 29/12/2016 | 15/02/2017 | 333,860.57 | 330,521.96 |
| October/2016 | 2016002216 | 29/12/2016 | 15/02/2017 | 333,860.57 | 330,521.96 |
| November/2016 | 2016002217 | 29/12/2016 | 15/02/2017 | 333,860.57 | 330,521.96 |
| December/2016 | 201700000002379 | 03/02/2017 | 15/02/2017 | 333,860.57 | 330,521.96 |

**Source:** SETOP, 2017

**Table V.**
Public payments by the Minas Gerais government to the concessionaire of Zona da Mata regional airport – 2017

| Period | Bill of sale | Bill of sale emission date | Paid by the state (Date) | Gross value | Net value |
|---|---|---|---|---|---|
| January/2017 | 201700000002522 | 20/03/2017 | 10/04/2017 | 412,399.03 | 408,275.04 |
| February/2017 | 201700000002523 | 20/03/2017 | 10/04/2017 | 372,417.07 | 368,692.90 |

**Source:** SETOP, 2017

Airport, also known as Ipatinga Airport and, now, as Vale do Aço Regional Airport (serving the municipalities of Ipatinga, Coronel Fabriciano, Timóteo and Santana do Paraíso), was jointly managed from 2012 by Usiminas and Socicam.

However, in 2016, in the midst of an unfavorable economic scenario, Usiminas opted to terminate its activities at the airport, transferring its administrative responsibility to the Federal Government, the body originally responsible for this activity. The Federal Government, in turn, chose to delegate this responsibility to the State of Minas Gerais Government, through Delegation Agreement 023/2016, without, however, providing financial resources that would allow the financing of this activity.

Without its own resources to do so, as an alternative for the management of this infrastructure equipment, SDTPW envisaged the possibility of delegating it to the private sector through a PPP contract, under the sponsored concession modality. Thus, in 2016, it launched a public notice for the sponsored concession of the airport. The state's annual public payment was set in favor of the Concessionaire for a maximum amount of R$7 million, totaling public expenditure of approximately R$200m during the 30 years of the concession. With this project, the state government seeks to keep the airport operating at the lowest possible financial expense. Thus, the criterion for choosing the winner of the contest is the lowest price offered.

To not interrupt the activities of the airport during the bidding process, SDTPW signed an emergency management contact with Socicam, supported by item IV, art. 24 of Federal Law n° 8.666/1993 and State Decree n° 4.381/2004, which authorize the execution of contracts with exemption of bidding in case of emergency.

The PPP project designed for the Vale do Aço Regional Airport is based on the same terms as the Zona da Mata Regional Airport (ZMRA) project, which highlights the potential of this model as a viable alternative for managing regional airports (Figure 8).

In addition to these two Minas Gerais airports mentioned, there are several studies that advocate the concession of more airports to the private sector. Through this process, an increase in management efficiency, greater investment in airport infrastructure, cost reduction and greater transparency are advocated.

One of these studies was conducted by Urban System in 2015, which elected the 10 best regional airports in the country that would be good candidates for a concession process. For


**Source:** Elaborated by the authors based on research data

**Figure 8.**
Illustrative map of airports that underwent or are going through concession process, via PPP, in Minas Gerais

this, 17 criteria were analyzed: length/width of the track; track resistance; importance of the city where the airport is located; local economy; existence of scheduled flights; tourist attractiveness; attractiveness for doing business; attractiveness as a medical center; attractiveness as an educational center; existence of interstate bus lines; imports made; exports made; industrial production; accommodation available; retail strength; education level; and health level.

Based on these criteria, the five airports with the highest potential for PPP were highlighted: 1st São José dos Campos Airport (SP); 2nd Ribeirão Preto Airport (SP); 3rd Joinville Airport (SC); 4th Campos dos Goytacazes Airport (RJ); and 5th Uberlândia Airport (MG).

It is noteworthy that the sponsored concession modality may not be necessary for these slightly larger regional airports, but undoubtedly it would be important for slightly smaller regional airports that would still be able to bring benefits to the region served, especially in most remote locations.

## 5. Concluding remarks

Given the strong growth in demand for air transportation, the Federal Government needed to develop alternatives that would enable investments and the modernization of Brazilian airports. The most successful alternative was airport concessions.

The traditional concession model, used by the Federal Government in the four concession lots between 2011 and 2017, represented an opportunity to generate investments, create jobs, and raise the quality of service and revenue. In these four lots, more than R$49bn were collected (the 2nd lot raised R$24.5bn, the 3rd R$20.8bn and the 4th R$3.72bn), and more than R$25bn in direct investments in airports.

However, the traditional concession model is only possible at large airports, as small and medium-sized regional airports do not have sufficient passenger and cargo flow to meet the high costs of maintaining and expanding airport infrastructure. Given this reality and an economic scenario of scarcity of public resources, the Government of Minas Gerais modeled an innovative alternative that made possible the maintenance and management of regional airports: the PPP, in the sponsored concession modality, aimed at airport management. This innovation in the provision of public services, reformulating organizational processes, from the creation of new institutional arrangements in substitution of the state-only provision model, brought efficiency to the public administration, which could thus achieve results that in conventional ways would not possibly be achieved.

ZMRA PPP provided the Government of Minas Gerais with a long-term solution for airport management and operation, with a pre-established quality standard under contract, accompanied by periodic benchmarking of performance indicators. In addition to being an efficient solution for the provision of these services, the PPP provided the state government with reduced costs with financing airport activities: as observed in the VfM analysis performed in this study, compared to the airport management alternative through the outsourcing, PPP represents a reduction of about 70 per cent of public expenditures.

The results of this unprecedented concession in the country are already apparent. Even in a year of severe economic crisis, in which GDP retreated 3.8 per cent, it was possible to see a 38 per cent increase in the number of passengers, as well as the expansion of the number of airlines that serve the municipality (besides Azul Linhas Aéreas Brasileiras S/A, VRG Linhas Aéreas S/A started to serve the municipality). Another highlight was that the first review, in June 2016, of the amount paid by the state of Minas Gerais fell from R$437,299.07 to R$338,860.57, indicating a downward trend in the real amount of disbursement paid by the granting power.

However, not all data were positive. The expected spread of economic development from the airport concession to the local economy was not confirmed by data from RAIS - Relação Anual de Informações Sociais (2017) and Alice Web (2017). There was a decrease in the number of jobs (−2.31 per cent), a fall in imports (−19.11 per cent, in value, in dollars) and a drop in exports from air transport (−34.90 per cent, in value, in dollars). The economic crisis, in this context, proved to be a much more relevant factor in determining the prosperity of the local economy.

The replication of the PPP model for the management of Vale do Aço Regional Airport (MG) shows the potential of this solution as an alternative for regional airport management. In this sense, studies such as the one elaborated by Urban Systems (2015) can be preliminary for this model to be replicated, thus creating investments, jobs, generating cost reduction and increased efficiency in airport management of Brazilian medium and small regional airports.

Finally, it can be concluded that the analysis of the case of Zona da Mata Regional Airport shows that PPP is a financially viable alternative for the management of regional airports in Brazil. However, it is noteworthy that the analyzes carried out in this study are not exhaustive and can be refined and redone as the PPP project life cycle progresses, given the concrete results achieved by this concession.

Thus, this study contributes to the identification, analysis and discussion of alternatives for the management of regional airports in Brazil in a critical context of public sector fiscal constraints that makes especially important the ability of governments to innovate and seek other solutions to meet the social demands. Among the types of public sector innovation, this study analyzes an innovation of organizational processes, more specifically, the process of providing and rendering of public services: the adoption of PPP for airport management, contributing to the consolidation of empirical data on public sector innovation.

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**Associate editor**: Felipe Mendes Borini

**Appendix 1**

**Table AI.**
Value for money analysis of the Zona da Mata regional airport public–private partnership

| VFM Analysis – ZMRAPPP | *Period* | 0 | 1 | 2 | 3 | 4 | 5 | 30 |
|---|---|---|---|---|---|---|---|---|
| | *Year* | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2044 |
| | *SELIC Rate* | *11,02%* | *13,58%* | *14,17%* | *10,23%* | *8,25%* | *7,19%* | *6,50%* |
| | *Discounting Factor* | *100,00%* | *88,04%* | *76,72%* | *74,66%* | *72,83%* | *70,68%* | *15,12%* |
| *Public Expenditure - via PPP* | *at Dec./2014 prices* | | | | | | | |
| Maximal Public Payment | | | 3.352.839 | 4.470.452 | 4.470.452 | 4.470.452 | 4.470.452 | 4.470.452 |
| (-) Sharing of Tariff Revenues Discount | | | 949.294 | 1.016.316 | 1.440.635 | 1.440.635 | 2.148.469 | 5.908.829 |
| (-) Sharing of Commercial Revenues Discount | | | 13.400 | 33.413 | 54.675 | 54.675 | 54.675 | 54.675 |
| (=) Total Public Payment | | | *2.390.144* | *3.420.723* | *2.975.141* | *2.975.141* | *2.267.307* | *(1.493.052)* |
| *Total Public Payment – via PPP* | *29.304.549* | – | *2.390.144* | *3.420.723* | *2.975.141* | *2.975.141* | *2.267.307* | *(1.493.052)* |
| *NPV – Total Expenditure via PPP* | *20.150.259* | – | *2.104.309* | *2.624.456* | *2.221.355* | *2.166.686* | *1.602.469* | *(225.729)* |
| *Public Expenditure – via Public Sector Comparator* | *at Dec./2014 prices* | | | | | | | |
| Public Payments for Airport Management by Outsourcing Contracts | | | 8.152.649 | 8.152.649 | 8.152.649 | 8.152.649 | 8.152.649 | 8.152.649 |
| (-) Tariff Revenues Earned by the State | | | 949.294 | 1.016.316 | 1.440.635 | 1.440.635 | 2.148.469 | 5.908.829 |
| (-) Commercial Revenues Earned by the State | | | 67.000 | 167.063 | 273.375 | 273.375 | 273.375 | 273.375 |
| (=) Total Public Payment | | | *7.136.354* | *6.969.270* | *6.438.638* | *6.438.638* | *5.730.804* | *1.970.445* |
| *Total Public Payment – via PSC* | *134.577.224* | – | *7.136.354* | *6.969.270* | *6.438.638* | *6.438.638* | *5.730.804* | *1.970.445* |
| *NPV – Total Expenditure via PSC* | *65.443.121* | – | *6.282.924* | *5.346.981* | *4.807.336* | *4.689.023* | *4.050.372* | *297.904* |
| *Public-PPP Difference* | *45.292.862,76* | *69,2%* | | | | | | |

**Source:** Elaborated by the authors with research data

**Appendix 2**

| | Long-term scenario | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| *World economy* | | | | | | | | | | | |
| World GDP Growth | 5,4% | 4,2% | 3,5% | 3,3% | 3,4% | 3,2% | 3,1% | 3,6% | 3,6% | 3,6% | 3,5% |
| EUA | 2,5% | 1,6% | 2,2% | 1,7% | 2,4% | 2,6% | 1,6% | 2,3% | 2,4% | 2,0% | 2,0% |
| Euro Zone | 2,0% | 1,6% | −0,9% | −0,2% | 1,2% | 1,9% | 1,7% | 1,8% | 1,5% | 1,4% | 1,1% |
| Japan | 4,2% | −0,1% | 1,5% | 2,0% | 0,0% | 1,2% | 1,0% | 1,4% | 1,0% | 1,0% | 1,0% |
| China | 10,6% | 9,5% | 7,9% | 7,9% | 7,2% | 7,3% | 6,7% | 6,5% | 5,8% | 5,7% | 5,5% |
| CPI EUA | 1,4% | 3,0% | 1,8% | 1,5% | 0,7% | 0,7% | 2,1% | 2,8% | 2,4% | 2,4% | 2,4% |
| *Brazil* | | | | | | | | | | | |
| External sector and exchange rate | | | | | | | | | | | |
| BRL/USD (Nominal) - End of the Period | 1,66 | 1,87 | 2,05 | 2,36 | 2,66 | 3,96 | 3,26 | 3,25 | 3,35 | 3,35 | 3,35 |
| BRL/USD - year average | 1,76 | 1,68 | 1,95 | 2,16 | 2,35 | 3,33 | 3,49 | 3,18 | 3,30 | 3,35 | 3,35 |
| Trade Balance - USD Bil | 20 | 30 | 19 | 2 | (4) | 20 | 48 | 60 | 40 | 39 | 37 |
| Exports - USD Bil. | 202 | 256 | 243 | 242 | 225 | 191 | 185 | 212 | 207 | 209 | 214 |
| Imports - USD Bil. | 182 | 226 | 223 | 240 | 229 | 171 | 138 | 152 | 167 | 170 | 176 |
| Checking account - % GDP | −3,4% | −2,9% | −3,0% | −3,0% | −4,2% | −3,3% | −1,3% | −1,2% | −2,3% | −2,1% | −2,1% |
| *Economic activity* | | | | | | | | | | | |
| Nominal GDP - BRL Bil. | 3.886 | 4.376 | 4.815 | 5.332 | 5.779 | 6.001 | 6.267 | 6.576 | 7.101 | 7.597 | 8.090 |
| Nominal GDP - USD Bil. | 2.208 | 2.612 | 2.463 | 2.468 | 2.455 | 1.802 | 1.797 | 2.067 | 2.149 | 2.269 | 2.416 |
| GDP Real Growth | 7,5% | 4,0% | 1,9% | 3,0% | 0,5% | −3,8% | −3,6% | 1,0% | 4,0% | 3,3% | 2,9% |
| *Inflation* | | | | | | | | | | | |
| IPCA | 5,9% | 6,5% | 5,8% | 5,9% | 6,4% | 10,7% | 6,3% | 3,9% | 3,8% | 3,5% | 3,5% |
| INPC | 6,5% | 6,1% | 6,2% | 5,6% | 6,2% | 11,3% | 6,3% | 3,9% | 3,8% | 3,5% | 3,5% |
| IGP-M | 11,3% | 5,1% | 7,8% | 5,5% | 3,7% | 10,5% | 7,2% | 2,2% | 3,8% | 3,6% | 3,5% |
| IPA-M | 13,9% | 4,3% | 8,6% | 5,1% | 2,1% | 11,2% | 7,2% | 2,2% | 3,8% | 3,6% | 3,5% |

(*continued*)

**Table AII.**
Banco itaú long-term macroeconomic projections for 2017 to 2020

Table AII.

| | Long-term scenario | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| *Interest rate* | | | | | | | | | | | |
| Selic - end of the period | 10,75% | 11,00% | 7,25% | 10,00% | 11,75% | 14,25% | 13,75% | 8,25% | 8,25% | 6,75% | 6,50% |
| Selic - year average | 10,0% | 11,7% | 8,5% | 8,4% | 11,0% | 13,6% | 14,2% | 10,2% | 8,3% | 7,2% | 6,5% |
| Real Interest Rate (SELIC/IPCA) - end of the period | 3,9% | 4,9% | 2,5% | 2,4% | 4,3% | 2,6% | 7,4% | 6,1% | 4,3% | 3,5% | 2,9% |
| CDI - end of the period | 10,61% | 10,86% | 7,11% | 9,78% | 11,51% | 14,14% | 13,63% | 8,13% | 8,13% | 6,63% | 6,38% |
| TJLP - % Dec. | 6,00% | 6,00% | 5,50% | 5,00% | 5,00% | 7,00% | 7,50% | 7,00% | 7,00% | 6,25% | 6,50% |
| *Public finances* | | | | | | | | | | | |
| Primary Super\bacute\aévit - GDP % | 2,6% | 2,9% | 2,2% | 1,7% | −0,6% | −1,9% | −2,5% | −2,2% | −1,7% | −0,7% | −0,3% |
| Nominal Super\bacute\aévit - GDP % | −2,4% | −2,5% | −2,3% | −3,0% | −6,0% | −10,2% | −9,0% | −7,5% | −6,1% | −5,5% | −4,9% |
| Net Debts - GDP % | 38,0% | 34,5% | 32,3% | 30,6% | 33,1% | 36,0% | 46,2% | 51,5% | 53,4% | 55,0% | 55,6% |
| Gross Debts - GDP % | 51,8% | 51,3% | 53,7% | 51,5% | 56,3% | 65,5% | 69,9% | 74,1% | 74,4% | 75,1% | 75,4% |

**Sources:** Banco itaú. Banco itaú long term projections, 2017. Retrieved from www.itau.com.br/itaubba-pt/analises-economicas/projecoes/longo-prazo-Maio-2017 . Accessed 28 May 2017