ESTABLISHING A PRIORITY HIERARCHICAL FOR REGIONAL AIRPORT INFRASTRUCTURE INVESTMENTS ACCORDING TO TOURISM DEVELOPMENT CRITERIA: A BRAZILIAN CASE STUDY

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ABSTRACT

The Brazilian government stepped up investments in works related to improving access to cities, when it was announced as the venue for the 2014 Football World Cup. The difficulties observed to guide these investments were to select regional airports of greater relevance for the tourism sector. Given the unavailability of data that could serve this purpose, the present study sought to define, from secondary and qualitative information extracted from government documents, five indicators to allow a priority hierarchical. The methodology applied the hierarchical analysis method (AHP) and standardization procedures, resulting in the selection of five airports in the North region, four airports in the Southeast, South and Northeast regions, and one in the Center-West region of Brazil. The main advantage of the methodology was the significant reduction of cost and time in the decision-making process. An important conclusion was the understanding of tourism as an option for regional economic diversification.

Keywords: Regional Airport, Analytic Hierarchical Process (AHP), Tourism, Development.

JEL Classification: O180, R4, R580

1. INTRODUCTION

The significant increase in domestic and international demand for air transport services has been an outstanding issue over the last ten years. Deregulation of services planning and air fares and increased concern for time-saving have produced controversial effects such as the concentration of services offers in airports with greater demand and more operational infrastructure. The effects stemming from the deregulation model, which has already been applied in many countries, have to some extent stimulated competition on the most profitable routes and in some cases fares have come down. Another consequence, however, has been that some countries have had to subsidize less profitable routes or routes of interest to their governments.

The reason for government interventions like those in Canada (Metrass-Mendes, Neufville & Costa, 2011) and the United States of America (Grubesic & Matisziw, 2011) has been to foster accessibility of isolated regions and promote national integration. Considering that Brazil has also deregulated fares and the services offer, and that the routes are increasingly concentrated in certain cities, it is now necessary to implement measures to ensure access to

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civil aviation for places that government considers to be essential (Queiroz, 2014). However, there are few tools available to support decision-making processes and the definition of priority locations for investment and, furthermore, government administrators are not very familiar with the tourism sector's nuances or its indicators.

Against that background this study set out to address a demand of the Brazilian government which, starting in 2007, intensified its investments in access infrastructure for tourism destinations. In that year the International Football Federation announced that Brazil would be hosting the 2014 World Cup, a mega sports event that aroused great expectations of investment and foreign currency gains for the country. After the announcement, government began to invest more financial resources in actions designed to improve regional airports.

It must be underscored that air transport affects and contributes to development in Brazil just as it does in the world at large (Prideaux, 2000; Kunz, 2013; Silva, 2014). Transport, in its aspect as a driver of development, when associated to tourism activities boosts the effective achievement of planning goals and objectives (Silva, Sobrinho & Fortes, 2015; Gazoni, Silva & Fortes, 2017). In that case, airport infrastructure is seen as an important mediating element of the transformation of tourism regions.

To invest in regional airports it was necessary to select, from a list of 174, those that met the criterion of "greater importance" for the tourism sector. Roughly speaking, the government needed to establish a methodology for determining a priority hierarchical for investments in regional airports, considering tourism-related indicators. That methodology also needed to consider airport planning in the face of overall demands from society, bearing in mind the role transport plays in social and economic development. Thus, the overriding objective of this study was to develop an indicator for the hierarchical classification of regional airports in order of priority for investment in infrastructure and capacity expansion, based on tourism development criteria.

In the tourism programs, plans and policies that Brazil Ministry of Tourism elaborated in the periods 2004 to 2012 (MTur, 2007; 2009a; 2009b), the criterion for defining the tourism destinations was their capacity to induce regional development among the municipalities that were part of the tourism itineraries. That included improvements in conditions of accessibility to transport infrastructure and services (Silva, 2014). Accordingly, those documents have been taken as references for identifying and defining indicators capable of representing the relation between airports and tourism for the purposes of this study.

The methodology was developed by means of a cooperation agreement involving the Ministry of Tourism, the Brazilian Association of Regional Air Transport Companies/ Associação Brasileira das Empresas de Transporte Aéreo Regional - ABETAR, the University of Brasília (UnB) and the Technological Institute of the Airforce (Instituto Tecnológico de Aeronáutica - ITA), who took responsibility for the conception of a hierarchical for investments in regional airports considering economic criteria and the aspect of airport infrastructure.

This article presents a methodology for establishing a hierarchical classification of regional airports according to tourism interests and it is divided in six sections, namely: the introduction, followed by a contextualization of the importance of regional airports, especially those in regions with great tourism potential. The third section describes the methodology that the study developed and applied. The fourth section describes the study method. The actual application and the analysis of the results are described in the fifth section and that is followed by the final remarks, concluding the article.

2. AIPORTS IN THE REGIONAL TOURISM CONTEXT

2.1. Regional concept and hierarchical – theoretical discussion

According to Pires (2004) the analytical approach to regional territories is quite different from that to national ones. In the regions there are few barriers to the circulation and migration of goods, services and capital. However, that greater mobility of resources among regions may mean that a given area exercises considerable influence over the others in terms of attracting production resources or dominating markets. That may be because it is allocated more financial resources, has more material resources, has a bigger consumer market or a more specialized work force or other factors.

Schumpeter and Perroux's (1935) were critical of the Euclidean spatial approach and, instead, viewed the region as being a set of abstract relations, not directly related to geographic location but represented by their typical economic vectors and delimited as the field that encompasses the activities of its institutions or public bodies. Another concept of region that Pires (2004) indicates is based on the hypothesis of the Central Place Theory originally elaborated by Walter Christaller (Eaton & Lipsey, 1982), whereby regions naturally tend to organize themselves according to the principle of centrality. That means it should be feasible to establish a hierarchical of various regions according to their position in a network of economic interdependencies involving various other places.

Using Christaller and Perroux's (Schumpeter & Perroux, 1935; Eaton & Lipsey, 1982) theoretical models, it is possible to determine a region's degree of centrality and its interconnecting functional network based on: the populations served by the less central nuclei; the proportions of residents and non-residents and their production; and, consequently, how they are positioned and articulated in a functional manner. The third concept of a region is that of a homogeneous space in which, by using one or more pertinent indicators, a relation of identity can be established among areas whose parameters are similar but at the same time distinct from those of other regions.

Thus, based on the capacity of each nucleus to provide a central offer of goods and services, it is possible to establish a hierarchical among the places; the characteristics of the goods and services offered by each location can be used to position them in comparison to the others. The goods and services concentration is not determined by geographic factors alone. Far more important than the geographic distances involved are the economic distances separating the centers. These are represented by the respective costs of freight, packaging and storage and, in the case of services, by the costs associated to transportation, trip time and the quality standards involved in transporting passengers.

The traditional localization and regional growth theories are insufficient to explain the development of a given region but they can be reinforced by adding the concept elaborated by Douglas North (Oliveira, Nóbrega & Medeiros, 2013). He reverses the direction of determination whereby, classically, reduced transport costs lead to a concentration of the activity. He shows how some regional pioneers, as in the case of the United States of America and Canada, have achieved their development by specializing in certain exportable products and diversifying their export portfolios. The concept that is worth underscoring here is that of an exportation base, because it fosters a redefinition of the 'region' concept. It aggregates areas that have the same export base, articulating them in an interdependent development to address the external economies that condition them.

It is understood that the exportation base will also generate multiplying effects and stimulate increased investment, not only in exportation activities but also in other economic activities in the region. Another important inference based on this approach is that the growth in regional income will increase the savings rate of the local population and make

other kinds of activity feasible, initially directed at satisfying local demands but eventually tending to enter external markets as well, thereby expanding the region's exports as a whole.

One of the fundamental elements determining regional development is the existence of a demand for its goods on the part of other regions or countries. Furthermore, according to Lemos (1993) and Silva (2006), regionalization is also marked by heterogeneous social and economic factors in a given locality and by the economic domination of one place over the others. That definition presupposes a characterization of the regions' production processes or specializations. In the case of tourism flows, it refers to differentiation of the places according to their greater or lesser attractiveness for tourists and their capacity to attract investors. These would be places with possibilities for intervention and super-structural modifications such as providing or enhancing airport infrastructure.

2.2. Regional airports and tourism

Regional airports are notable elements of transport infrastructure in general not just because of the size of their installations but also because of the pressure they exert in their areas of implantation with their demand for urban services and infrastructure. That naturally leads to new growth in other directions or consolidates existent growth tendencies (Kawamoto, 1994; Linhares, 2012).

Prideaux (2000) states that in tourism regions transport drives: technological development, infrastructure and services availability; higher quality and efficiency of transport systems and the integration of the local networks to regional, national and international ones. In that sense, the national integration fostered by regional aviation stimulates the community's economic development, enhances accessibility, induces and expands business and trade relations and boosts tourism and leisure activities (McKinsey & Company, 2010; EMBRAER, 2012). Such airports are visibly associated to greater interaction among regions and the maturing and development of tourism destinations (Portugal & Torres, 2012; Lohmann, Fraga & Castro, 2013).

In their aspect as gateways for the entry of passenger flows, especially visitors, regional airports have a preponderant influence on regional economic development, especially tourism. The operational characteristics attributed to these airports, especially their spatial dimension, centrality and intermediation role in the air transport network, enhances operational efficiency within the overall transport system (Lohmann & Pearce, 2012; Lohmann, Fraga & Castro, 2013). That is because regional airports establish equilibrium between demand and supply in the airlines network helping to meet the needs for the circulation of goods, merchandise and people.

Prideaux (2000) studied the impact of transport on tourism regions and showed how transport infrastructure influences the volumes of passengers by attracting different tourism flows motivated by the ease of access associated to land or air transport provision. In turn, Silva (2014), analyzing a case study conducted in Brazil, corroborated Prideaux's findings. He singled out those elements of transport and tourism systems whose combination expresses the relations of complementarity between tourism destinations and transport provision in fostering regional development.

Both studies delineate the explicit relations between transport and regional development and further contribute by defining the explanatory elements of the object of analysis. In the view of Gazoni, Silva and Fortes (2017), the various aspects of transport systems related to the tourism demand are highly correlated within the respective territory. Actually, tourism activity expansion occurs concomitantly with the formation of a more complex and hierarchic transport network. Transport to meet tourism needs depends on the viability and power of attraction of the destination and the destination, in turn, depends on transport

to provide tourists with access. In short, transport is constituted as a structure that drives tourism development.

2.3. Airports in regional tourism development in Brazil

In Brazil, the importance of airports in regional development was formally tested by Gazoni, Silva and Fortes (2017) using simple linear regression in a principle component analysis. It was found that a 100% increase in airport capacity generates an 18.4% increase in the number of tourists. That number lies in a range of 95% reliability from 14.9% to 21.8%. Increases in the service offer at more well-structured gateways to tourism destinations have a greater influence on the activities of regional services than others precisely because they amplify tourism production and dynamics.

Those results corroborate the conclusions of other studies conducted in Brazil (Kunz, 2013; Silva, Sobrinho & Fortes, 2015) which reported that the air transport network configuration influences the volume and direction of tourism flows and, consequently, the territorial dynamics involved. It must be remembered that the flows presume the existence of networks articulated in central and auxiliary nodes. That being so, the passenger (tourist) air transport network becomes an instrument of transformation insofar as it has a strong influence on the regions, including those with a vocation for tourism.

Regional airports meet the specific demand associated to tourism but also the demands of other economic activities and to do so they need to be fitted with the elements of supply, namely, terminals and operational roads and equipment. In the sphere of Brazil's Regional Aviation Development Plan (Brazil, 2014) they are defined as all those airports that do not serve the great metropolitan regions, state capitals or the Federal District. The Brazilian National Development Bank (BNDES, 2001) defines regional air transport as that which meets the needs of locations with low to medium traffic potential. Thus regions where such airports are located are considered to be those determined on the basis of physical and economic criteria and by attempts made to create homogeneity among places they embrace. They are sometimes also characterized by social-environmental, economic, cultural and political relations (Beni & Cury, 2012) and above all by the discontinuity of structures, so that transport infrastructure is what ensures the circulation of goods, merchandise and people.

In Brazil, geo-economic regionalization and de-concentration processes began in the 1970s, reinforcing the national urban network, making its integration more complex and engendering new forms of articulation among its spatial structures. Production integration and functional articulation processes among the regions and/or urban centers took the form of two distinct but complementary movements. There was also an amplification and diversification of the functions performed by the urban centers, making their activities more complex while, on the other, there were increasing demands for integration and articulation among them. The two movements presented themselves simultaneously as a reflection of, and a support for the de-concentration of economic activities and diffusion of development to the interior. However, it was development with a pattern of urbanization that had previously been restricted to the great national urban centers.

The Institute of Applied Economic Research/Instituto de Pesquisa Econômica Aplicada – IPEA (2001) reported that in recent years there has been increased population growth in areas that were once peripheral in national economic terms (North and Northeast macro-regions) and in the medium-sized urban centers. That has led to a spreading out of urbanization, especially towards the west of the country – a phenomenon completely different from the previous tendency for urbanization to only occur in the country's coastlands. Furthermore, various other urban agglomerations have formed and amplified their role in the cities

network, making the configuration of the Brazilian urban network all the more complex and poorly integrated by the transport networks.

Nevertheless, up until recently in Brazil there has been no evidence of any guiding standard in regard to airport infrastructure planning to address the increased demand associated to the new national dynamics. The growth of the Brazilian economy in the period from 1990 to 2000 and the increase in average income created favorable conditions for the expansion of the market but the expansion of infrastructure in terms of handling aircraft and passengers has been widely identified as entirely insufficient (Palhares & Espírito Santo Jr., 2001; Salgado, 2009; Jesus Jr. & Ferreira Jr., 2010).

The Brazilian Aeronautical Corporation (EMBRAER, 2012) predicted that within 20 years (2012 to 2031) the Brazilian domestic demand for aviation services, especially regional ones, would expand significantly. That was due to the mega-events that were to be held in Brazil starting in 2014 (Football Confederations Cup, Football World Cup, Olympic Games and Para-Olympic Games), to the expansion of the middle class (54% of the population) ad also due to the precarious terrestrial transport conditions at the time. The ANAC (National Civil Aviation Agency/Agência Nacional da Aviação Civil – ANAC, 2017) statistical yearbook for 2007 reported 59.675,248 passengers transported by airlines of whom 47,366,034 were on domestic flights and 12,309,214 on international flights. In the first half of 2017, the air transport sector in Brazil carried 109,609,463 passengers of whom 88,677,618 were on domestic flights and 20,931,845 on international flights. That represents an overall increase in passenger demand for the period of 87.7% (87.2% in internal demand and 70% in external demand).

Lastly, it is important to realize the important role played by regional airports in developing regions with a vocation for tourism. Their influence has a considerable outreach and the more they incorporate available techniques and technology and effectively engage in the air transport network associated to tourism, the more they tend to occupy the top echelons in the hierarchical. That network is undergoing a globalization process insofar as it articulates regional, national, international and global air transport networks (Kunz, 2013). Regional airports also influence institutions and entrepreneurs' decisions regarding where to invest, production decisions and goods, merchandise and services flows. That means airport infrastructure plays an outstanding role in the economy and that government can stimulate its performance by implanting public policies embodying measures to that end.

3. ANALYTIC HIERARCHICAL PROCESS AND INDICATORS TO DETERMINE REGIONAL AIRPORT HIERARCHIES

3.1 Analytic Hierarchical Process

The main feature of Multi Criteria Decision-Making (MCDM) methods is their flexibility because they permit strong iteration of the model to be constructed together with the decision-makers and their perceptions of the set of problems being studied. The participation of all decision-makers in constructing the model is of fundamental importance to ensure in-depth discussion and generate better understanding of the decision context (Pereira, 2001). The MCDM premise is that there should be: (a) consensus regarding the fact that any decision-making process needs to satisfy multiple criteria; and (b) consensus regarding the fact that that the quest is for a solution that best addresses the needs of the "decider" in the context of the decision" (Dutra *et al.,* 2007).

The Analytic Hierarchical Process – AHP (Saaty, 1991) is a multi-criteria method that has proved to be most appropriate for establishing investment priority hierarchies among regional airports because the respective decisions involve aspects of a socio-economic,

environmental and political nature. Various transport studies (Gartner, Rocha & Granemann, 2012; Cruvinel & Fortes, 2015) have underscored the suitability and assertiveness of AHP as it permits the analysis of complex and sometimes even qualitative indicators.

In that light, the method was selected for this study because it propitiates the generation of indicator weightings in decision-making to address the problem and the incorporation of qualitative considerations to the quantitative perspective. Its application is associated to solving problems of practical interest as it simultaneously analyzes various criteria in interactions among various elements, thereby providing a more global vision. According to Saaty (1991) the method has four advantages:

a. The hierarchic representation of a system can be used to describe how changes in priority ratings among the higher levels affect the lower levels;
b. Hierarchically structured natural systems develop more efficiently than those structured in other ways;
c. Hierarchies provide detailed information on a system's structure and functions in its lower levels thereby providing an overall vision of the actors in the higher levels and their purposes; and
d. The hierarchical model is stable and flexible; stable because slight modifications only bring about slight effects and flexible because eventual additions to a well-structured hierarchical do not upset its performance.

The weight factor attributed to an indicator by a group of experts provides an expression of its relative importance in a multiple criteria decision-making process. It makes it possible to take social, cultural and other non-economic aspects into consideration and incorporate them to the hierarchic classification process.

After comparing AHP to other multiple criteria methods to support decision-making, namely: Fuzzy Decision Approach – FDA; Measuring Attractiveness by a Categorical Based Evaluation Technique -MACBETH); Technique for Order Preference by Similarity to Ideal Solution - TOPSIS; and Analytic Network Process - ANP, Salomon, Montevechi and Pamplona (1999) reported good results for AHP and recommended it. They corroborated Cruvinel and Fortes (2015) conclusions but with the proviso that there should be no more than nine alternatives and all alternatives and decision-making criteria should be totally independent. Gartner, Rocha and Granemann (2012), however, identified limitations inherent to the use of AHP because of the considerable degree of subjectivity incorporated to the model. Those limitations could be overcome by the additional use of other multiple criteria methods.

3.2. Indicators

In the wake of the popularization of planning in various public and private contexts, in different strategic, tactical and operational decision-making spheres and the emergence of information management seeking to the generate necessary information for those who need it when they need it, the use of the term 'indicator' has become widespread. The Organization for Economic Co-operation and Development (OECD, 2009) define indexes and indicators in this specific context as qualitative or quantitative measurements derived from a set of observed facts that are capable of revealing the relative positions of the regional airports in a given area. When assessment is made periodically, the indicator can identify the direction of changes in different units over the course of time. That being so, the indicator is any *datum* that signals something important about a broader system.

Indicators are concise, easy to interpret, representative parameters used to illustrate the main characteristics of a given object of analysis (Cities Environment Reports on the Internet - CEROI, 2004). In another version, indicators are socially endowed with additional meaning to that stemming from their own scientific configuration; they synthetically mirror social concern and insert it coherently into the decision-making process (MMA-Spain *apud* Royuela, 2001).

Royuela (2001) states that an indicator's functions are to: (i) provide information on the problem in hand; (ii) subsidize the development of policies and the establishment of priorities by identifying key factors; (iii) contribute to enabling the accompaniment of given actions, especially integration actions; and (iv) perform as a tool for the diffusion of information at all levels. An index is expressed in real numbers and is derived from a set of components that make up the indicators by a method that may involve aggregation or, more simply, indexes are a set of aggregated parameters or indicators (Saisana & Tarantola, 2002; OECD, 2003; OECD, 2007; Grupp & Schubert, 2010).

A hierarchical is established by attributing a value and consequently a weighting to indicators that have been identified and grouped by affinities in distinct sets and according to their mutual influences and, consequently, they make it possible to: i) define discussed and accepted criteria through the process of constructing a consensus among the main stakeholders; ii) reduce monitoring process costs; iii) automate the process, given its predictability and the scope of the data and the gathering procedures; and iv) reapply the experience obtained in the process of standardizing procedures and equipment.

To sum up, indicators condense information and make it possible to address complex problems by simplifying them. They also serve to diffuse information. The purpose of establishing a methodology is to create an index and rationalize the classification of regional airports, thereby helping to establish priorities for allocating public investments as well as establishing their relation with the regional tourism development process. Consequently, the method that was defined and is presented in the next section investigates the Brazilian federal tourism plans, programs and policies and regional tourism's structuring parameters, thereby making it possible to define the indicators and the criteria to be used for classification, and, following that, the establishment of a hierarchical of the airports.

4. METHODOLOGY

Based on the plans and programs formulated by the Brazilian Ministry of Tourism in the period 2004 to 2012, this study selected five indicators to establish a hierarchy of regional airports according to their priority for airport infrastructure investments in the tourism development. These indicators were: Tourism Region, Tourism Inducing Destination, Host for 2014 World Cup Games, Client Choice Destination and Tourist Attraction Potential. The main reason for choosing these indicators was there were no readily available disaggregated quantitative data for tourism that could satisfy the demands of the study objectives.

Given the subjectivity inherent to the qualitative registrations considered as references to elaborate the indicators, each indicator was weighted and combined according to the Analytic Hierarchical Process (Saaty, 1991). This procedure obtained the following results: it generated a homogeneous indicator; it established a hierarchy between airports; it defined an index representing their investment priority. The Geographic Information System (GIS) techniques generated thematic maps, representing regional airports according to the selected indicators.

4.1 Hierarchical Index

Based on the bibliographic references and on empirical studies, the six activities of methodology used to develop indicators that could represent tourism regions sufficiently significant to justify the existence and allocation of investments in airport infrastructure were:

1. Definition of the tourism region: it is to define the conceptual approach for the tourism region and influence of the airports on this approach and to select the public policy guidelines for the development of these regions;
2. Selection of indicators: this step defines the criteria for the selection of the indicators that resulted in the hierarchical index. This index informs the potential of each airport to generate changes in the dynamics of the tourist flows in its region;
3. Validation of indicators: selected indicators are evaluated and validated by experts in transportation and tourism. These experts should also validate the established metrics for the indicators;
4. Simulation of indicators: this step evaluates the selected indicators and their conformity with the methodological options of standardization and aggregation;
5. Normalization of the indicators: this normalization is performed for comparison and susceptibility of indicators to aggregation. The evaluation of each locality through the selected indicators should be performed considering intervals (for example, scale from 0 to 4) according to each of the characteristics;
6. Analysis of results: this step generates the Hierarchical Index and it also identifies and corrects any flaws and distortions found in the results of the indicators.

The selected indicators are showed in Table 1 below. The Hierarchical Index (CI) is obtained by adding together the values of the indicators shown in Table 1 and is expressed by equation:

$$CI = RT + DI + SEDE + DECA + PAR$$

Table 1. Indicators to establish a hierarchical among airports according to their importance for tourism

Description	Metrics and Weights
Tourism Region (RT) - Obtained from the Brazilian Ministry of Tourism's definition and classification of the country's 276 Tourism Regions (MTur, 2009b). Indicates whether or not a city Belongs to a tourism region.	4 – Yes 0 – No If a given destination does not belong to any of the classified tourism regions what is its distance from the main city of the nearest tourism region in Km? 4 – to 100 3 – from 101 to 200 2 – from 201 to 300 1 – from 301 to 400 0 – more than 401

Description	Metrics and Weights
Tourism Inducing Destination (DI) - This indicator was used to orientate the National Tourism Plan for the period 2007-2010 (MTur, 2007). The MTur, using its own specific methodology, defined 65 destinations with international quality standards which were tourism municipalities and their associated regions and considered to be priorities for technical and financial investments on the part of the Ministry. Those municipalities were endowed with strong tourism propensity for their economic development and were viewed in the light of a system of articulations and partnership arrangements with other ministries, state and municipal public bodies and private institutions. According to the MTur (2009b) the purpose of that National Plan was to identify and select municipalities capable of inducing regional development among the municipalities that integrate tourism routes.	If the destination is at a distance from the Priority Inductive Destination of the Federal Government in Km? 4 – to 100 3 – from 101 to 200 2 – from 201 to 300 1 – from 301 to 400 0 – more than 401
City hosting mega-events in the period 2013 to 2016 (SEDE) - The "SEDE" indicator is related to the cities that would be hosting mega-events in the period from 2013 to 2014. Although it did not specifically derive from an MTur study it was decided to include the Mega-event indicator associated to the 12 cities involved because it represented the kind of event that stimulates regional development, especially tourism, leisure and sport, on a grand scale, leveraging various investments.	0 – Yes 4 – No If the destination is not hosting a mega event, how far is it from the nearest host city in km? 4 – more than 401 3 – from 301 to 400 2 – from 201 to 300 1 – from 101 to 200 0 – to 100
Destination Chosen by the Client (DECA) - DECA was obtained from a poll conducted by the Vox Populi Institute contracted by the Ministry of Tourism to investigate Brazilians' tourism consumption habits (MTur, 2009a). The qualitative survey interviewed a sample of 2,322 persons between the dates of 17/06 and 07/07/2009, targeting Brazilian tourists over 18 belonging to the social classes A, B, C or D and with the following profiles: present day clients, that is tourists that had purchased tourism services in package deals or in part during the preceding two-year period, and potential clients who were consumers that could possibly purchase tourism services or products in packages or in parts in the next two years. The indicator in question took into account the places visited by the person being interviewed in the preceding two years. The information was elicited by asking the question "The last time you travelled in Brazil, which state did you go to?"	What is the percentage of interest among present day clients in the micro-region where the destination is? 4 – over 10% 3 – from 7.1% to 9.9% 2 – from 4% to 7% 1 – from 1.1% to 3.9% 0 – less than 1%
Regional Power of Attraction (PAR) - The PAR is an indicator of the power to attract (local, regional, national or international) tourist flows according to the classification released by Embratur since 1990 (as explained in Section 4.2).	What is the degree of power to attract (local, regional, national or international) tourist flows? 4 – Varies from 3.26-4.00 3 – Varies from 2.51-3.25 2 – Varies from 1.76-2.50 1 – Varies from 1.00-1.75

Source: Own Elaboration

4.2 Classification and Hierarchic Position

The AHP method was used to analyze, evaluate and classify the RT, DI, SEDE, DECA and PAR indicators, determining the value and consequently the weightings, grouped in distinct sets with influence over one another, and done in such a way as to make comparisons among peers feasible. Five tourism and transport experts attributed weightings from 0 to 4 to each indicator. The experts selected all held a Masters degree or a Ph.D. in the fields of either tourism or transportation and had with renowned experience in their respective areas. They

were the means of attributing relative importance to the indicators in the ambit of a multi-criteria decision-making process.

For classification purposes, the experts considered the fundamental criteria for the regional development of tourism such: as what were the preponderant tourism segments; the incorporation of the population to the tourism activities; the importance of tourism in the economies of the respective municipalities; and the existing set of natural and cultural attractions. Table 1 above shows the metrics attributed to the indicators and the respective weightings used in the classification process.

To classify the RT, DI, SEDE and DECA indicators associated to the spatial and policy data it was decided to use an ordinal metric scale from 0 to 4. The hierarchic classification of the indicators is cited below. In that way the 174 airports were classified in a hierarchical order.

- Hierarchic level 0: unimportant;
- Hierarchic level 1: slightly important;
- Hierarchic level 2: essentially or important;
- Hierarchic level 3: of well-proven importance;
- Hierarchic level 4: very important.

In the PAR analysis of the power to attract (local, regional, national and international) tourism, the classification adopted and disseminated by the EMBRATUR ever since 1990 was used:

- Hierarchic level 4 (Variation from 3.26 to 4.00): corresponds to tourism regions of exceptional value and great significance for the international tourism market being capable, on their own, of motivating important potential or actual flows of visitors, both national and international;
- Hierarchic level 3 (Variation from 2.51-3.25): applicable to very important tourism regions, in national terms, capable of motivating, on their own or together with other tourist attractions, important potential or actual flows of visitors, both national and international;
- Hierarchic level 2 (Variation from 1.76 to 2.50): applicable to tourism regions with some degree of interest, capable of stimulating potential or actual local and regional tourist flows and of interesting national and international visitors arriving for other tourism reasons.
- Hierarchic level 1 (Variation from 1.00 to 1.75): applicable to tourism regions merely complementary to others of greater interest, capable of stimulating local tourist flows. In that way, the 59 tourism regions were classified according to their potential for attracting demand.

The criteria adopted in regard to weighting the PR indicator were in accordance with principle of tourism attractiveness. First the data was sequenced according to the degree of preference and the score obtained for the region. Secondly, the least preferred was identified and attributed the lowest score for the region.

The SEDE, DECA, DI, RT and PAR indicators adopted for the study of regional airports all have weightings varying from 0 to 4. It must be underscored that for the SEDE indicator specifically, the causality relation of the distance parameter occurs as an inverse relation because, in the cities that hosted the mega-events, very big airports already exist. It must be pointed out that prioritizing regional airports that are a long way off from those host-cities

helps towards achieving a better spatial distribution of regional tourism development and of other socio-economic activities, as well as fostering a better distribution of visitor flows.

The hierarchic position of the airports is calculated by adding up the weightings attributed to the indicators. The totals vary from 0 to 20. The results are then classified into 4 categories of priority whereby figures in the 0 to 5 range represent the lowest priorities; in the 6 to 10 range, low priority; in the 11 to 15 range, priority; and those in 16 to 20 range are the highest priority. Lastly each range of values was classified on an ordinal scale from 1 to 4 with 1 being the lowest priority and 4 the highest. This last classification provided the priority index for investments in regional airport infrastructure according to their importance for tourism.

4.3 Sensitivity Analysis

A sensitivity analysis was carried out to see whether there were any effects stemming from a variation in the given indicator weighting. To that end, all the municipalities with a zero score for the RT indicator were discounted because the Ministry of Tourism considers that only the others have any tourism development potential. Accordingly, it follows that the RT indicator only classified those others, not those discounted.

In the case of the inverse relation between PAR and DI – PARM MOD 1, if PAR is inversely proportional to DI, then any values less than 2 will mean that there will an increase in PAR (DI<=2; PAR*1,5; PAR). The result was that the PAR indicator was found to be sensitive only for the municipalities of Fernando de Noronha (PE) and Coari (AM). None of the others experienced any influence in this test. That analysis did not lead to any great changes in the hierarchies deriving from the changes in the weightings. From the mathematical standpoint, an analysis of sensitivity of the indicators involved in the proposed hierarchic classification would probably not reveal any important information for decision-making purposes because, in principle, they continue to have the same weighting.

5. RESULTS AND DISCUSSION

The spatial configuration of transport in Brazil reveals a structure that is highly concentrated in the country's coastal lands, in the great metropolitan areas and in the medium-sized cities. That fact has been largely responsible for the notable increase in tourism's presence and concentration in the same locations. The concentration of tourism activities mirrors the concentration of economic activities themselves in the Brazil's South and Southeast macro regions and along the coast. That geographic concentration is due to the availability of technical, informational, financial and human resources.

The economic development model Brazil has adopted has generated, and continues to generate, glaring disparities and contradictions. In a continental-sized country, historically marked by regional discrepancies, which by their very nature limit the development of tourism, air transport has taken on a strategic role in consolidating the process of national integration. Operating an integrated system of regional airport terminals is an essential step towards ensuring the provision of services capable of boosting the power to attract tourist flows.

The method proposed here helps to change the direction of investment and accordingly, to favorably intervene in regional development through the installation of infrastructure in regional airports located in areas with poor economic dynamics but recognized tourism potential. The 174 cities are distributed in Brazil's five macro regions in this way: 27 in the Central-west, 27 in the Northeast, 54 in the North, 41 in the Southeast, and 25 in the South. The results obtained by analyzing, evaluating and establishing a hierarchical

of the 50 major municipalities that are home to regional airports are set out in Table 1. The classifications of the remaining 124 municipalities are displayed in Table 2 attached below. The columns display the Cities and their respective States and the lines display the indicators created on this study (SEDE, DECA, DI, RT, PAR) and the Hierarchical Index (CI). The result of hierarchical index shows that in a political and geographic perspective, among those at the top of the list, (with a classification score of 4 in Table 1) are 18 cities in isolated areas or in areas that are difficult to access by other means of transport but which, nevertheless, have great tourism potential (Figure 1).

Figure 1 displays those regions with the highest potential for attracting local, regional, national and international tourist flows. The greatest concentrations of attractions of the greatest interest and capable of motivating greater tourism flows are in the North and Central-west of Brazil. The figure identifies a change in the direction of the vector associated to investments in airports, towards the west, where the sport angling segment of ecotourism is preponderant but where access is still merely incipient. That is a counterpoint to the traditional logic whereby concentration is associated to a consolidated transport network and the predominance of the sun and beach segment in the coastal regions.

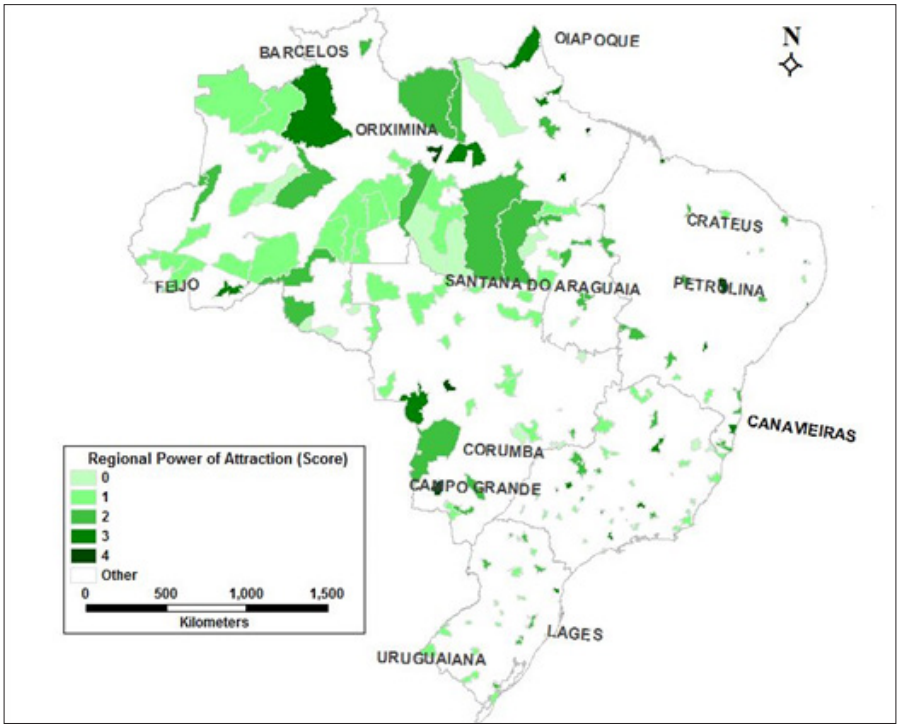
Table 2. Hierarchy of the top 50 regional airports associated to tourism interests (CI)

City/State	RT	DI	SEDE	DECA	PAR	CI
Lençóis/BA	4	4	3	4	3	18
Porto Seguro/BA	4	4	3	4	3	18
Foz do Iguaçu/PR	4	4	4	2	4	18
Juazeiro do Norte/CE	4	4	3	3	2	16
São Luís/MA	4	4	4	1	3	16
Bonito/MS	4	4	4	0	4	16
Belém/PA	4	4	4	0	4	16
Florianópolis/SC	4	4	2	3	3	16
Rio Branco/AC	4	4	4	0	3	15
Parintins/AM	4	4	3	0	4	15
Macapá/AP	4	4	4	0	3	15
Vitoria/ES	4	4	3	1	3	15
Diamantina/MG	4	4	1	3	3	15
São Joao Del Rei/MG	4	4	1	3	3	15
Santarém/PA	4	4	4	0	3	15
Cascavel/PR	4	3	4	2	2	15
Lages/SC	4	4	2	3	2	15
São Jose dos Campos/SP	4	4	0	4	3	15
Barcelos/AM	4	4	3	0	3	14
Caldas Novas/GO	4	4	2	2	2	14
Campo Grande/MS	4	4	4	0	2	14
Corumbá/MS	4	4	4	0	2	14
São Raimundo Nonato/PI	4	4	4	0	2	14
Teresina/PI	4	4	4	0	2	14
Cabo Frio/RJ	4	4	1	3	2	14

City/State	RT	DI	SEDE	DECA	PAR	CI
Porto Velho/RO	4	4	4	0	2	14
Navegantes/SC	4	4	1	3	2	14
Aracaju/SE	4	4	2	1	3	14
Porto Nacional/TO	4	4	4	0	2	14
Canavieiras/BA	0	4	3	4	2	13
Caravelas/BA	0	3	4	4	2	13
Teixeira De Freitas/BA	0	3	4	4	2	13
Catalão/GO	4	4	2	2	1	13
Goiânia/GO	4	4	1	2	2	13
Itumbiara/GO	4	4	3	2	0	13
Cáceres/MT	4	4	1	1	3	13
Cuiabá/MT	4	4	0	1	4	13
Óbidos/PA	4	3	4	0	2	13
Joao Pessoa/PB	4	4	1	1	3	13
Parnaíba/PI	4	4	3	0	2	13
Macaé/RJ	4	4	1	3	1	13
Natal/RN	4	4	0	1	4	13
Barreiras/BA	0	2	4	4	2	12
Bom Jesus da Lapa/BA	0	2	4	4	2	12
Ilhéus/BA	0	4	2	4	2	12
Mucuri/BA	0	3	4	4	1	12
Fernando de Noronha/PE	4	1	3	2	2	12
Petrolina/PE	0	2	4	2	4	12
Caxias Do Sul/RS	4	4	0	2	2	12
São Jose do Rio Preto/SP	0	1	4	4	3	12

Legend ; AC = Acre; AL = Alagoas; AP = Amapá; AM = Amazonas; BA = Bahia; CE = Ceará; ES = Espírito Santo; GO = Goiás; MA = Maranhão; MG = Minas Gerais; MS = Mato Grosso do Sul; MT = Mato Grosso; PA = Pará; PB = Paraíba; PE = Pernambuco; PI = Piauí; PR = Paraná; RJ = Rio de Janeiro; RN = Rio Grande do Norte; RO = Rondônia; RR = Roraima; RS = Rio Grande do Sul; SC = Santa Catarina; SE = Sergipe; SP = São Paulo; TO = Tocantins.

Figure 1. Brazil - Regional Power of Attraction



Source: Own Elaboration

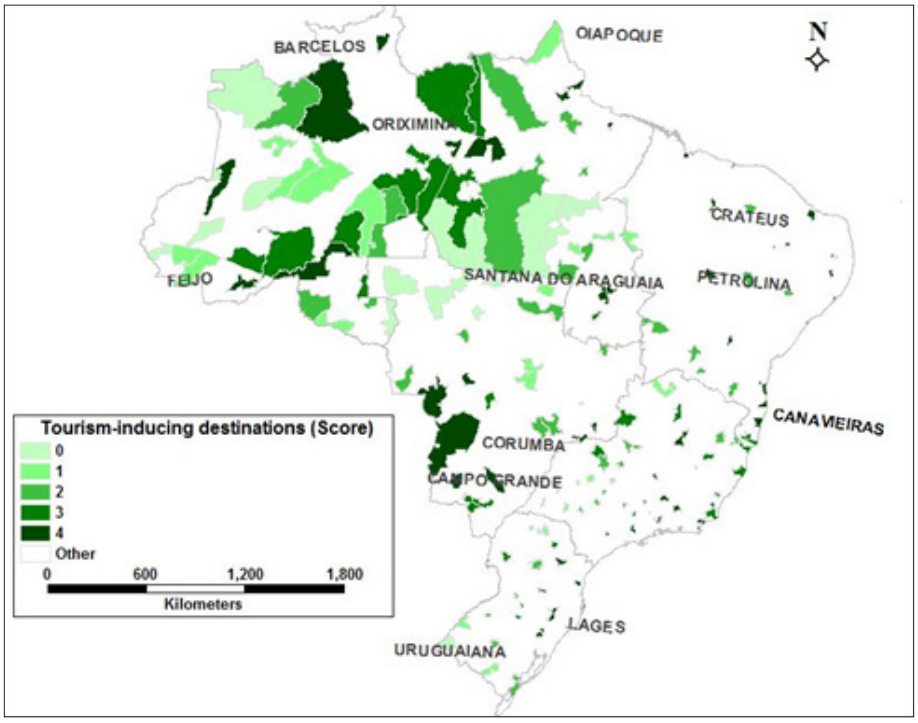
The distribution of tourism-inducing destinations demonstrated the need to set priority on airports located in regions with low concentrations of transport services, as is the case with Barcelos (State of Amazonas), Rio Branco (State of Acre), Parintins (State of Pará), Corumbá (State of Mato Grosso do Sul) and São Raimundo Nonato (State of Piauí) (Figure 2). Equipping those municipalities with airport infrastructure would channel investments to them and could mitigate the effects of the dispersion of public financial resources, stimulating private sector investment in services and equipment needed for regional tourism development. That result is in harmony with the theories of Christaller and Perroux mentioned in section 2 of this article.

Figure 3 displays the spatial distribution of the hierarchical according to the DECA indicator which refers to the destination chosen by clients; the tourists' choices revealed in research survey interviews. On analyzing the most sought-after destinations, the results identify the coastal cities that historically have been furnished with the best transport infrastructure, including air transport infrastructure, as result of the dominant economic cycles in the past and even today. Accordingly, those regions with tourism development potential have merely peripheral status due to their dearth of systems that have a strong influence on tourist flows, particularly transport systems. The municipal airports in the central and southern regions of Brazil are provided with the best infrastructure and consequently greater investments, attracting, in turn, greater interest in destinations located in those regions of Brazil. That is why any public policy directed at fostering more even development among the Brazilian regions must set investment priorities on those regions classified as 2 and 1 in Figure 3; just the opposite of the destinations indicated by the current client-choice analysis.

Figure 4 displays the results obtained by calculating the hierarchical indexes of the municipalities with regional airports associated to a tourism interest. Five airports in the macro-region North were included in the hierarchical, four for the macro-regions South, Southeast and Northeast and just one for the Central-west region. The figure shows that the regional areas covered by those airports located in the North and Central-west are very

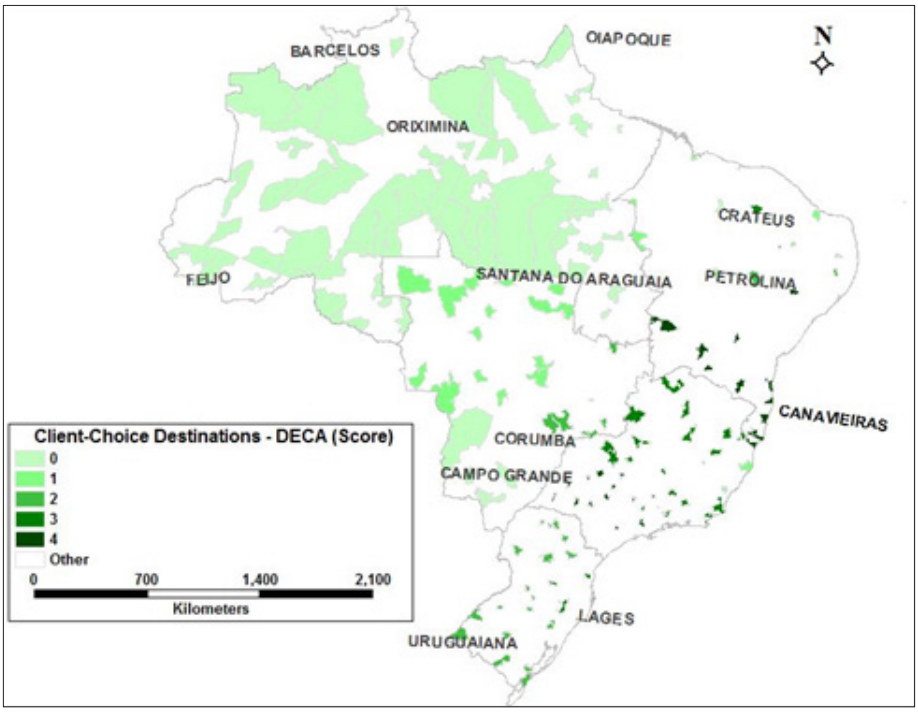
much larger than those in the Northeast, South and Southeast, corroborating the premise of contributing to the endowment of airports where infrastructure is not consolidated and the potential effects on the surrounding territory.

Figure 2. Brazil - Tourism-inducing destinations (DI)



Source: Own Elaboration

Figure 3. Brazil - Client-Choice Destinations (DECA)



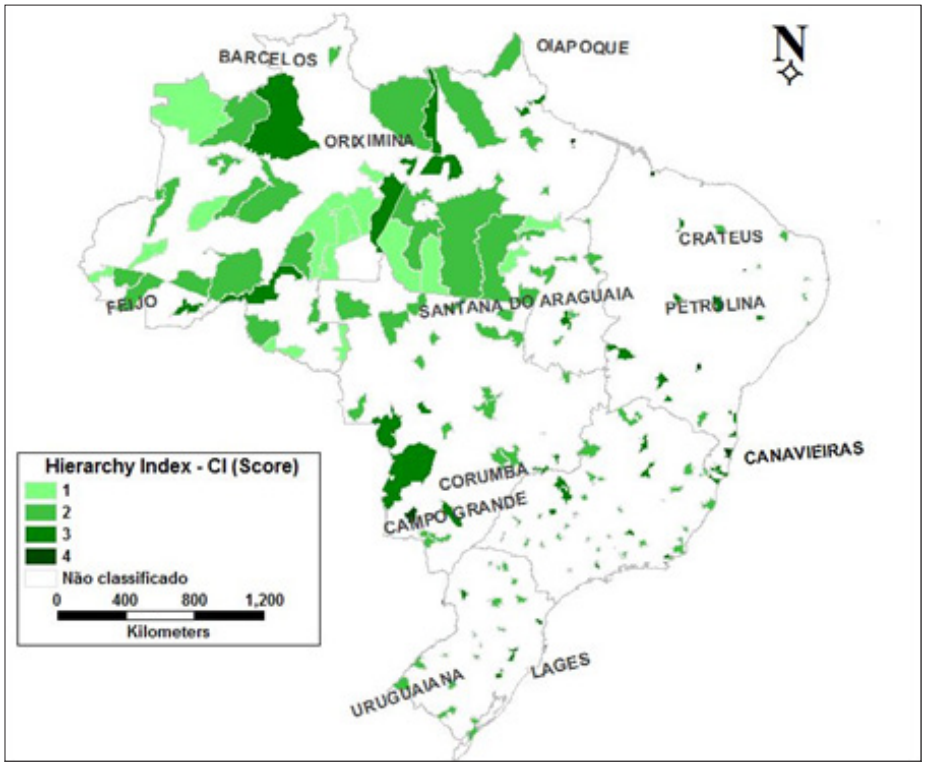
Source: Own Elaboration

The study results indicate that the choice of methodological procedures was correct insofar as they revealed the relative priority for investment of airports associated to tourism interests in regions where tourism is a consolidated activity or in other developing regions like the Brazilian Northeast, or remote regions but with great tourism potential, like the North of Brazil. On the other hand, reinforcing the degree of specialization of locations, whether it is as tourism destinations or as trading, agribusiness or industrial centers in which there is a real relation of complementariness and integration achieved by transport infrastructure, boosts the regional network and makes it more concise.

Accordingly there is a need to encourage the installation of airport infrastructure and to create a mechanism that can induce regional development in Brazil given the country's current state of poor integration of the regions in the country's social and economic dynamics. With that aim of inducing regional development, an effort was made to stimulate greater equanimity in the functioning of the sector that would include a better distribution of local air transport nodes and fostering and leveraging public and private investments that would lead to the creation of more jobs and more business. An airport that is installed to connect with national and international networks expands the respective municipality's radius of action and its capillarity in regard to attracting tourist flows. The sector's importance in regional development, in regard to the geographic aspect, lies in its offshoots and its potential for stimulating the integration of other spatially de-concentrated sectors

In that vein Douglas North (Oliveira, Nóbrega & Medeiros, 2013) states that the region that stands out most is the one companies belong to and where external economies generate local inter-relations that constitute a production chain and which consequently install relations of competitiveness among the internal and external entities contributing to the generation of a base for the exportation of tourism products. That approach to development implies an emphasis on various aspects of the accumulation process, including innovation actions and their incorporation by the agents of production, by the institutions and by society as a whole, as part of the quest for new forms of development. It also includes the participation of social groups and economic agents, investments in capacity building for human resources, institutionalization, quality of life and the self-organization of local resources, in addition to improvements in productivity and competitiveness (Silva, 2006, 2014).

Figure 4. Brazil - Hierarchical of regional airports according to their importance for tourism-Hierarchical Index (CI)



Source: Own Elaboration

6. CONCLUSION

The research method was a response to the various challenges posed by the decision-making process regarding government investments in regional airports of interest to the tourism sector, particularly in the wake of the announcement that Brazil would be hosting the World Cup. Every effort was made to overcome the problem of lack of de-aggregated tourism data and to achieve the study objectives by making use of secondary data and quantitative-qualitative procedures to support decision-making.

The proposed methodology made it possible to establish a priority hierarchical of the regional airports associated to tourism for investment in infrastructure and capacity expansion. The considerable advantage propitiated by using those indicators, with their corresponding data readily available and their simplified formulation, was the reduction of costs and of the time taken up by decision-making processes. In that regard, establishing a hierarchical-forming methodology for airports contributes to the creation of a tool to support decision-making regarding investments in infrastructure and helps to channel political and technical efforts and resources to foster equilibrium in transport supply.

There is a clear need to improve the use of this method in association with administration tools, especially policies and participative tools, with a view to accelerating community relations and performances. Another point is that of understanding tourism to be an option for achieving economic diversification but not as the only alternative. It is important not to stimulate the instauration of monopolistic economic systems with clearly defined life cycles and low levels of social investment, particularly in the aftermath of the installation of infrastructure for the mega-events.

Given that it is a new activity, still at the investigation and testing stage, we understand that any proposed regional tourism development model may appear to be incomplete and precipitate. That, however, does not make it impracticable to conduct an analysis and make a profound reflection on the nuances of tourism development based on the portrait of the reality in Brazilian national territory and using the existing historical, political and economic conceptions of Brazil.

Obviously the definitions and theories that have been discussed above do not represent a single pattern of regional development and there is no reference standard. The performance of subjects who are the agents of territorial transformation processes are what will identify the necessary connotations of regional developments. Even more than the performance of such subjects, the very dynamics of the territories themselves, with their resources, populations and their fixed structures and flows will actually indicate the connotation of regional tourism development in which airport equipment comes to the fore as a strategic structure capable of imparting dynamism to local activities.

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ANNEX

Table 3. Hierarchic positions of 174 regional airports important for tourism

City	RT	DI	SEDE	DECA	PAR	CI
Lençóis/BA	4	4	3	4	3	18
Porto Seguro/BA	4	4	3	4	3	18
Foz Do Iguaçu/PR	4	4	4	2	4	18
Juazeiro Do Norte/CE	4	4	3	3	2	16
São Luís/MA	4	4	4	1	3	16
Bonito/MS	4	4	4	0	4	16
Belém/PA	4	4	4	0	4	16
Florianópolis/SC	4	4	2	3	3	16
Rio Branco/AC	4	4	4	0	3	15
Parintins/AM	4	4	3	0	4	15
Macapá/AP	4	4	4	0	3	15
Vitoria/ES	4	4	3	1	3	15
Diamantina/MG	4	4	1	3	3	15
São Joao Del Rei/MG	4	4	1	3	3	15
Santarém/PA	4	4	4	0	3	15
Cascavel/PR	4	3	4	2	2	15
Lages/SC	4	4	2	3	2	15
São Jose dos Campos/SP	4	4	0	4	3	15
Barcelos/AM	4	4	3	0	3	14
Caldas Novas/GO	4	4	2	2	2	14
Campo Grande/MS	4	4	4	0	2	14
Corumbá/MS	4	4	4	0	2	14
São Raimundo Nonato/PI	4	4	4	0	2	14
Teresina/PI	4	4	4	0	2	14
Cabo Frio/RJ	4	4	1	3	2	14
Porto Velho/RO	4	4	4	0	2	14
Navegantes/SC	4	4	1	3	2	14
Aracaju/SE	4	4	2	1	3	14
Porto Nacional/TO	4	4	4	0	2	14
Canavieiras/BA	0	4	3	4	2	13
Caravelas/BA	0	3	4	4	2	13
Teixeira De Freitas/BA	0	3	4	4	2	13
Catalão/GO	4	4	2	2	1	13
Goiânia/GO	4	4	1	2	2	13
Itumbiara/GO	4	4	3	2	0	13
Cáceres/MT	4	4	1	1	3	13
Cuiabá/MT	4	4	0	1	4	13

City	RT	DI	SEDE	DECA	PAR	CI
Óbidos/PA	4	3	4	0	2	13
Joao Pessoa/PB	4	4	1	1	3	13
Parnaíba/PI	4	4	3	0	2	13
Macaé/RJ	4	4	1	3	1	13
Natal/RN	4	4	0	1	4	13
Barreiras/BA	0	2	4	4	2	12
Bom Jesus da Lapa/BA	0	2	4	4	2	12
Ilhéus/BA	0	4	2	4	2	12
Mucuri/BA	0	3	4	4	1	12
Fernando de Noronha/PE	4	1	3	2	2	12
Petrolina/PE	0	2	4	2	4	12
Caxias Do Sul/RS	4	4	0	2	2	12
São Jose do Rio Preto/SP	0	1	4	4	3	12
Maués/AM	4	3	2	0	2	11
Guanambi/BA	0	2	4	4	1	11
Paulo Afonso/BA	0	2	3	4	2	11
Montes Claros/MG	0	3	3	3	2	11
Uberaba/MG	0	2	4	3	2	11
Uberlândia/MG	0	3	3	3	2	11
Joinville/SC	0	4	1	3	3	11
Barretos/SP	0	1	3	4	3	11
Santos/SP	0	4	0	4	3	11
Coari/AM	4	1	3	0	2	10
Vitoria da Conquista/BA	0	2	3	4	1	10
Araxá/MG	0	2	3	3	2	10
Juiz de Fora/MG	0	4	1	3	2	10
Poços De Caldas/MG	0	3	1	3	3	10
Boa Vista/RR	0	4	4	0	2	10
Criciúma/SC	0	4	2	3	1	10
Presidente Prudente/SP	0	1	4	4	1	10
Ribeirão Preto/SP	0	2	2	4	2	10
Palmas/TO	0	4	4	0	2	10
Maceió/AL	0	4	1	1	3	9
Tefé/AM	4	1	4	0	0	9
Linhares/ES	0	3	4	1	1	9
Governador Valadares/MG	0	3	2	3	1	9
Nanuque/MG	0	2	4	3	0	9
Patos de Minas/MG	0	2	3	3	1	9
Varginha/MG	0	3	2	3	1	9
Dourados/MS	0	3	4	0	2	9
Oriximiná Trombetas/PA	0	3	4	0	2	9
Tucuruí/PA	0	2	4	0	3	9
Campos dos Goytacazes/RJ	0	3	2	3	1	9
Resende/RJ	0	4	1	3	1	9
Mossoró/RN	0	4	2	1	2	9
Caçador/SC	0	3	2	3	1	9
Chapeco/SC	0	2	3	3	1	9
Araçatuba/SP	0	0	4	4	1	9

City	RT	DI	SEDE	DECA	PAR	CI
Araraquara/SP	0	2	2	4	1	9
Bauru/SP	0	2	2	4	1	9
Franca/SP	0	1	3	4	1	9
Marilia/SP	0	1	3	4	1	9
Sorocaba/SP	0	4	0	4	1	9
Boca do Acre/AM	0	3	4	0	1	8
Humaitá/AM	0	3	4	0	1	8
Labrea/AM	0	3	4	0	1	8
Oiapoque/AP	0	1	4	0	3	8
Crateus/CE	0	2	2	3	1	8
Cachoeira do Itapemirim/ES	0	3	3	1	1	8
Jatai/GO	0	2	4	2	0	8
Rio Verde/GO	0	2	3	2	1	8
Carolina/MA	0	1	4	1	2	8
Divinópolis/MG	0	3	1	3	1	8
Ipatinga/GM	0	3	1	3	1	8
Januária/MG	0	1	3	3	1	8
Paracatu/MG	0	3	1	3	1	8
Pouso Alegre/MG	0	3	1	3	1	8
São Lourenco/MG	0	3	2	3	0	8
Teófilo Otoni/MG	0	2	3	3	0	8
Ponta Porã/MS	0	3	4	0	1	8
São Felix do Araguaia/MT	0	2	4	1	1	8
Altamira/PA	0	2	4	0	2	8
Breves/PA	0	2	4	0	2	8
Conceição do Araguaia/PA	0	2	4	0	2	8
Itaituba/PA	0	3	4	0	1	8
Cajazeiras/PB	0	3	3	1	1	8
Campina Grande/PB	0	3	1	1	3	8
Caruaru/PE	0	4	1	2	1	8
Londrina/PR	0	1	3	2	2	8
Maringá/PR	0	1	3	2	2	8
Ponta Grossa/PR	0	4	0	2	2	8
Guajara-Mirim/RO	0	2	4	0	2	8
Ji-Parana/RO	0	3	4	0	1	8
Erechim/RS	0	3	2	2	1	8
Passo Fundo/RS	0	3	2	2	1	8
Pelotas/RS	0	2	2	2	2	8
Santo Ângelo/RS	0	2	3	2	1	8
São Borja/RS	0	1	4	2	1	8
Gurupi/TO	0	3	4	0	1	8
Santa Isabel do Rio Negro/AM	0	2	4	0	1	7
São Paulo de Olivenca/AM	0	4	1	0	2	7
Imperatriz/MA	0	0	4	1	2	7
Barra do Garcas/MT	0	1	4	1	1	7
Confresa/MT	0	1	4	1	1	7
Nova Xavantina/MT	0	1	4	1	1	7
Pontes e Lacerda/MT	0	2	3	1	1	7

City	RT	DI	SEDE	DECA	PAR	CI
Santana do Araguaia/PA	0	2	4	0	1	7
Apucarana/PR	0	1	3	2	1	7
Guarapuava/PR	0	2	2	2	1	7
Telemaco Borba/PR	0	3	1	2	1	7
Bagé/RS	0	1	3	2	1	7
Rio Grande/RS	0	2	2	2	1	7
Santa Maria/RS	0	2	2	2	1	7
Uruguaiana/RS	0	0	4	2	1	7
Araguaína/TO	0	1	4	0	2	7
Feijó/AC	0	1	4	0	1	6
Tarauacá/AC	0	1	4	0	1	6
Fonte Boa/AM	0	1	4	0	1	6
Tabatinga/AM	0	0	4	0	2	6
Minacu/GO	0	2	2	2	0	6
Alta Floresta/MT	0	0	4	1	1	6
Aripuana/MT	0	0	4	1	1	6
Juara/MT	0	0	4	1	1	6
Juina/MT	0	4	0	1	1	6
Lucas do Rio Verde	0	2	2	1	1	6
Matupa/MG	0	0	4	1	1	6
Rondonópolis/MT	0	3	1	1	1	6
Sinop/MT	0	0	4	1	1	6
Monte Dourado/PA	0	2	4	0	0	6
Parauapebas / Carajas/PA	0	0	4	0	2	6
Redenção/PA	0	1	4	0	1	6
São Felix do Xingu/PA	0	0	4	0	2	6
Cacoal/RO	0	2	4	0	0	6
Cruzeiro Do Sul/AC	0	0	4	0	1	5
Borba/AM	0	3	1	0	1	5
Carauari/AM	0	0	4	0	1	5
Eirunepe/AM	0	0	4	0	1	5
Itacoatiara/AM	0	3	1	0	1	5
Manicore/AM	0	1	3	0	1	5
Novo Aripuana/AM	0	2	2	0	1	5
São Gabriel da Cachoeira/AM	0	0	4	0	1	5
Marabá/PA	0	0	4	0	1	5
Costa Marques/RO	0	1	4	0	0	5
Vilhena/RO	0	0	4	0	1	5
Jacareacanga/PA	0	0	4	0	0	4
Novo Progresso/PA	0	0	4	0	0	4
Ourilandia do Norte/PA	0	0	4	0	0	4

Legend:	1 0 to 5	2 6 to 10	3 11 to 14	4 15 to 19

Legend: AC = Acre; AL = Alagoas; AP = Amapá; AM = Amazonas; BA = Bahia; CE = Ceará; ES = Espírito Santo; GO = Goiás; MA = Maranhão; MG = Minas Gerais; MS = Mato Grosso do Sul; MT = Mato Grosso; PA = Pará; PB = Paraíba; PE = Pernambuco; PI = Piauí; PR = Paraná; RJ = Rio de Janeiro; RN = Rio Grande do Norte; RO = Rondônia; RR = Roraima; RS = Rio Grande do Sul; SC = Santa Catarina; SE = Sergipe; SP = São Paulo; TO = Tocantins.