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Methodology for measuring tourism characteristics activities: an application for Brazil and its Federal Units

Metodologia para Mensuração das Atividades Características do Turismo: uma aplicação para o Brasil e suas Unidades da Federação

Metodología de medición de las actividades características del turismo: una aplicación para Brasil y sus unidades de la Federación

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Keywords:

Economy and tourism;
Tourism production;
Economic indicators of tourism

Abstract

The purpose of this article is to propose a methodology to measure the size of tourism characterisitic activities. The proposal is based on the principle of measurement on the supply side, using the same techniques used to measure activities within the scope of National and Regional Accounts. Using data from Brazil and its Federal Units, from 2010 to 2015, the findings suggest that as far as the contribution of tourism characteristic activities to the national value added is concerned, coastal states tend to stand out, the South and Southeast regions are hegemonic in nominal terms, and it was possible to observe a real decrease in tourism in 2015.

Palavras-chave:

Economia e turismo;
Produção turística;
Indicadores econômicos do turismo.

Resumo

O objetivo desse artigo é propor uma metodologia para mensurar o tamanho das atividades características do turismo. A proposta parte do princípio da mensuração pelo lado da oferta utilizando as mesmas técnicas empregadas para mensuração das atividades no âmbito das Contas Nacionais e Regionais. Utilizando dados do Brasil e de suas Unidades da Federação, entre os anos de 2010 a 2015, os resultados encontrados apontaram que quanto a contribuição das atividades características do turismo no valor adicionado nacional, os estados litorâneos tendem a se destacar, as regiões Sul e Sudeste são hegemônicas em termos nominais e foi possível observar um decrescimento real no turismo em 2015.

Palabras clave:

Economía y turismo;
Producción turística;
Indicadores económicos del turismo.

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Resumen

El propósito de este documento es presentar una metodología para medir el tamaño de las actividades características del turismo. La propuesta se basa en el principio de medición del lado de la oferta utilizando las mismas técnicas utilizadas para medir las actividades de las Cuentas Nacionales y Regionales. Utilizando datos de Brasil y sus Unidades Federativas, en el periodo de 2010 a 2015, los resultados encontrados señalaron que, en cuanto a la contribución de las actividades características del turismo, los estados costeros tienden a destacarse, las regiones del Sur y Sudeste tienen gran importancia en términos nominales y se ha verificado una disminución real del turismo en 2015.

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1 INTRODUCTION

Tourism can be conceptualized and analyzed in different ways due to its characteristics and intrinsic multi-disciplinary nature. From an economic perspective, its impacts are multiple on different economic sectors and instigate one of the main questions in the area: what is the size of the tourism economy? The search for quantitative information on tourism becomes even more relevant given that studies such as those by Casimiro Filho (2002) and Takasago, Guilhoto, Mollo and Andrade (2010) pointed out that tourism can play a prominent role in generating employment and income and thus help to reduce inequality and poverty in Brazil.

The measurement of tourism activity is the object of study and has a set of international recommendations for this (UNStats, 2008a; UNStats, 2008b). However, these recommendations advocate the use of a number of information on the demand side that many countries, such as Brazil, do not have or are in the process of elaborating. On the other hand, information on the supply side can be used for this measurement, mainly because it is the central perspective that Brazil has developed in recent years in its National Account System.

Not only is this challenge related to the lack of information in tourism studies, but also its definition. Economic activity can serve both tourists and residents, and the tourist product "is classified by the condition of the tourist who consumes it," that is, the tourist product is any and all products, as long as it is consumed by a tourist" (Santos & Kadota, 2012, p. 24).

The certainty about this is that there is hardly an exact measurement. In this context, carrying out the measurement of tourism activity using the so-called Tourism Characteristic Activities (TCA) allows an approximation of what is known as tourism and becomes crucial to understand how the set of sectors that make up this activity behaves, even admitting a certain degree of overestimation.

Santos (2016) described the landscape of tourism research in Brazil and showed that, about the evolution of economic dimensioning within official bodies, the Brazilian Institute of Geography and Statistics (IBGE) focused until 2012 on studies measuring the production of TCA (IBGE, 2012), not addressing the differentiation of consumption of residents and non-residents, in line with the present study. In turn, the Institute for Applied Economic Research (Ipea) acted from 2003 onwards in the construction of the Integrated Information System on the Labor Market in the Tourism Sector (SIMT) to measure employment in tourism and distinguishes the type of consumer when using the tourist service coefficient (Ipea, 2006).

The objective of this article is to propose a methodology to measure the size of Tourism Characteristic Activities (TCA) as well as their evolution applying to the Brazilian economy and its Federal Units from 2010 to 2015.

The article contributes to the regionalized discussion of the size of the tourism economy, by expanding the studies carried out by IBGE that concentrated on a national scale, as we will investigate the differentiation of TCA between the Federal Units. Until then, no study in the Brazilian literature calculates a measure for tourism production consistent with the National Accounts and with a comparability of results over time, space and between sectors at the regional level. Only isolated initiatives by regional public statistics bodies, for example, studies by the Economics and Statistics Foundation (2016) for the Rio Grande do Sul, João Pinheiro Foundation (2017) for Minas Gerais, among others.

The new series of the System of National and Regional Accounts of the Brazilian Institute of Geography and Statistics (IBGE) started to use the National Classification of Economic Activities (CNAE) 2.0 as a reference,

adopting the year 2010 as a base, which allowed for a higher breakdown of tourist activities at the subclass level[1], as well as the possibility of working with information sources that already used CNAE's, such as the Ministry of Tourism, the Institute for Applied Economic Research (Ipea) in the Labor Market Information System in the Tourism Sector (SIMT) and the João Pinheiro Foundation (FJP), contributed to a better analysis of the economy of the tourism sector.

The methodology to meet the proposed objective was quantitative. First, data were collected on the TCA wage bill, at the CNAE subclass level, available in the Ministry of Economy's Annual Social Information List (RAIS), making it possible to estimate a weight structure, which was subsequently applied to the value added of the activity groups. Economic data provided by IBGE's National and Regional Accounts. Finally, the value added (VA) of the TCA was obtained by adding the VA of each TCA, for all Federal Units (FU). At the Brazilian level, we opted for a bottom-up approach in the sense that the VA result of the national TCA is obtained from the sum of the VAs and UFs results.

In addition to this introduction, this article discusses the second section on tourism economics and the classification of economic activities adopted in the present study. The third section deals with the literature review about the measurement of tourism activity in Brazil. The fourth section addresses the methodology used in this work to measure TCA. The fifth section presents the results of the value added for the Federal Units and Brazil discussing the role of TCA at geographic levels and presents the real growth rates calculated for the set of tourist activities, together with the control used in the methodology, ending, in the sixth section, with some concluding remarks.

2 TOURISM ECONOMICS

According to Nodari (2007), the characterization of tourism as an economic activity is due to several reasons, among them is the fact that the displacement comprises expenses and revenues, and mainly because tourist activities generate wealth through a productive process, a typical characteristic of economic activity. However, tourism cannot be considered an industry, because it is composed of a set of operations of various economic sectors.

There are numerous relations between tourism and the economy. The fact that tourism is an economic activity makes its dynamics directly conditioned to the logic that governs economic activities in general. "From this perspective, it is evident the need of the tourism researcher to know the functioning of the markets, being able to understand how the behaviour of economic agents determines the production and consumption of this activity" (Santos & Kadota, 2012, p. 13).

Consequently, the field of tourism that approaches the impacts of tourism from an economic perspective, i.e., understands how tourism impacts a locality, a region or country from theories and knowledge coming from the economic sciences, receives the name of Tourism Economics.

The calculation and measurement of these impacts become challenging for researchers, since, in addition to the lack of information that permeates the entire service sector in general, the tourist activity is constituted by several sectors. Thus, it is necessary to define the activities that make up this segment, the so-called Tourism Characteristics Activities (TCA).

For the classification of economic activity as characteristic of tourism, it is used the identification by-products defined as a characteristic of tourism. The United Nations World Tourism Organization (UNWTO) has developed the Standard International Classification of Tourism Activities (SICTA) to create uniform international comparisons of statistics.

In Brazil, the classification of economic activity officially adopted by the National Statistical System and the registers and records of the Public Administration is the National Classification of Economic Activities – CNAE. The Brazilian Institute of Geography and Statistics, in its study on tourism in Brazil, compatible the Tourism Characteristics Activities with the CNAE in its latest version (2.0) (IBGE, 2012).

[1] For example: Section I: Accommodation and Food -> Division 55: Accommodation -> Group 551: Hotels and similars; Class 55108: Hotels and similars; Subclass 5510801: Hotels

With this compatibilization, it becomes possible to measure the dimension of the Tourism Economics and work with other sources of information such as the Ministry of Tourism, the Institute of Applied Economic Research (Ipea) in the Information System on the Labour Market in the Tourism Sector (SIMT) and the João Pinheiro Foundation (FJP), which used CNAE previously. Chart 1 lists the activities considered as TCA in this work with their respective CNAE 2.0 subclass codes.

Within the group transports, were considered TCA basically those involving passenger transport in short and long distances, excluding the parts related to freight transport and displacements typical of the local population.

In the group accommodation and food, the hotels, aparthotels, inns, hostels, camping sites, pensions, other lodgings and services that have as characteristic the preparation of food for immediate consumption were considered, excluding motels, the provision of food prepared for businesses, events and receptions, private canteen services and food services prepared for home consumption.

For administrative and complementary services, rents of mobile goods such as the rental of cars without drivers and the rental of recreational and sports equipment were considered characteristic of tourism. Other services that are also contained under this heading are travel agencies, tour operators and reservation services and other tourism services such as assistance to visitors and promotion of local tourism.

Regarding the activities of arts, culture, sport and recreation, there are many services considered characteristic of the tourism, among them: theatre production; musical production; production of dance shows; production of circus, puppet and similar shows; production of rodeo shows, cowboys and the like; the performing arts; and others.

Chart 1 - Classification of Tourism Characteristics Activities by Activity Group (Continue)

Activity Group	Characteristic Activities CNAE 2.0 subclass (7 digits)
Transport	4912401: rail transport of inter-municipal and interstate passengers
	4922101: collective passenger transportation, with fixed itinerary, inter-municipal, except in metropolitan region
	4922102: collective road transport with fixed itinerary, interstate
	4922103: collective road transport with fixed itinerary, international
	4923001: taxi service
	4929902: collective transport of passengers, under charters, inter-municipal, interstate, and international
	4929904: organization of excursions on own, inter-municipal, interstate, and international road vehicles
	4950700: tourist trains, cable cars and similar
	5011402: coastal shipping – passengers
	5012202: long sea shipping – passengers
	5022002: transport by inland navigation of passengers in regular, inter-municipal, interstate, and international lines, except traverse
	5091202: transportation by intercity, interstate, and international crossing navigation
	5099801: water transportation for touring
	5111100: regular passenger air transport
	5112901: air taxi service and crewed aircraft rental
	5112999: other non-regular air passenger transport services
	5222200: road and rail terminals
	5229001: support services for taxi transportation, including call centres
	5229099: other ancillary ground-handling activities, not elsewhere classified
	5240101: operation of airports and landing fields
	5240199: support activities for air transport, except the operation of airports and landing fields
Accommodation and Food	5510801: hotels
	5510802: apart-hotels
	5590601: hostels, except assistance
	5590602: camping sites
	5590603: accommodation (pensions)
	5590699: other accommodations not specified previously
	5611201: restaurants and similar

Chart 1 - Classification of Tourism Characteristics Activities by Activity Group (Conclusion)

Activity Group	Characteristic Activities CNAE 2.0 subclass (7 digits)
	5611202: bars and other establishments specializing in serving beverages
	5611203: snack bars, tea houses, juices and similar
	5612100: street food vendors
Administrative and supplementary services	7711000: rent of cars without driver
	7721700: recreational and sporting equipment rental
	7911200: travel agencies
	7912100: tour operators
	7990200: reservation and tourism services other than specified
Arts, culture, sport and recreation	9001901: theatre production
	9001902: music production
	9001903: production of dance shows
	9001904: production of circus, puppets and similar shows
	9001905: production of rodeo, cowgirl and similar shows
	9001999: performing arts, shows and complementary activities not specified previously
	9002701: activities of visual artists, freelance journalists and writers
	9102301: activities of museums and exploration of historical places and buildings and similar attractions
	9103100: botanical gardens activities, zoos, national parks, ecological reserves and environmental protection areas
	9200301: bingo houses
	9200302: exploring bets on horse racing
	9200399: exploration for gambling and betting not specified previously
	9319199: other sports activities not specified previously
	9321200: amusement parks and theme parks
	9329801: discotheques, dance clubs, dance halls and similar
	9329802: bowling businesses
	9329803: operation of snooker, billiards, and pool games
	9329804: operation of recreational video games
	9329899: other recreation activities not specified previously

Source: Adapted from Fundação João Pinheiro (2017), p. 10.

3 MEASUREMENT OF TOURISM ECONOMICS

The size of the tourism economy is indicated by the value added of Tourism Characteristics Activities (TCA), and its contribution is the comparison of this value added with the total value added of the economy or in relation to the Gross Domestic Product (GDP).

In 2017, tourism was responsible for approximately 10.4% of world GDP according to the World Travel & Tourism Council (WTTC, 2018) data. Concerning employment, 9.9% of the total of employees in the world carried out activities in tourism sectors (WTTC, 2018). As for Brazil, this contribution was 3.17% in 2015 and compared to Latin American countries; the country ranked 14th in relation to the direct impact of tourism on the economy (WTTC, 2019).

It is worth noting that there are different approaches for measuring the tourism economy, the main ones found in the literature being the input-output model, social accounting matrix, computable general equilibrium model and the tourism satellite account.

Leontief (1986) introduced the input-output model, which consists of a method of representing economic relations between sectors. Using a matrix, the rows and columns have the meanings of purchases and sales, respectively, making it possible to obtain information on the interdependence between sectors, the technical relationship between production and inputs, in addition to the primary equilibrium relationship of the economy, the supply needs to match demand and these balances happen at the product level. The amount of information required is one of the main challenges for the preparation of information on an input-output matrix, and its structural character means that the official bodies do not build annual matrices. The input-output model allows the calculation of multipliers and with that, not only can it be used in tourism to obtain a value for the tourism economy, but also allows to calculate direct, indirect, and induced impacts of tourism

(Frechtling & Horvath, 1999). The main input needed to obtain an input-output matrix is the table of resources and uses, another instrument of numerical representation of the economy.

The social accounting matrix is an extension of the input-output matrix, considering the flow of resources generated in the productive sectors for consumption and investment, allowing calculate not only the size of tourism but also the redistribution effects of tourist spending (Akkemik, 2012).

For measurement and impact studies, general equilibrium models have been widely used, and the relevance of this type of modelling has been reaffirmed in several studies in the field of tourism (Dwyer, 2015; Faria, 2017). These models consist of simulation models with a system of equations of the relations of economic agents with calibrated functional forms.

The Tourism Satellite Account (TSA) is a set of tables developed by international organizations (WTO, OECD, Eurostat, Statistical Division of the UN) as a way of standardizing tourism statistics. Among one of its uses, the measurement and economic impacts of tourism are present (Frechtling, 2010). It should be noted that the availability of the information required for the consistent development of the TSA is not uniform across countries.

3.1 Measurement in Brazil

With the evolution of tourism measurement surveys in Brazil, several studies have become a reference over time.

Rabahy and Rejowski (2001) showed the main results of a project developed in Brazil, still in 1989/90, which estimated a Tourism System of National Accounts (TSNA). This TSNA contained the accounts of production, income, entries and expenditure on tourism in the domestic economy, gross capital formation, of the rest of the world account and also calculated product, income and employment multipliers. Focusing on TCA and using the 1980 input-output matrix, the study estimated that tourism was responsible for 2.5% of Brazilian production in 1989.

The study by Cassimiro Filho (2002) became one of the main studies in Brazil and a reference for all subsequent studies on the impact of tourism. When working with TCA, the author characterized intersectoral relations and measured the impacts of variation in final demand on product, employment and income at the national level. using the input-output matrix, he applied the methods of identifying key sectors: Hirschman-Rasmussen[2] bond indices, field of influence and pure bond indices, in addition to calculating the multipliers. The study revealed that the participation of tourism represented 7.54% of GDP in 1999.

The work of Kadota and Rabahy (2003) developed the concepts and methods for building a Tourism Satellite Account in Brazil and, according to Santos (2006), it can be classified as the first version of a TSA in the country. When differentiating between residents and non-residents, the authors identified that activities that cater to tourist consumption directly generated R$19.1 billion in 1999, which represented the participation of tourism in the economy of 2% of GDP that year.

IBGE also developed several studies from the macroeconomic perspective of Brazilian tourism, the last one being published in 2012, addressing the tourism economy for the years 2003 to 2009. Tourism Characteristics Activities (TCA) present in the System of National Accounts, the study concluded that, for the year 2003, TCA "accounted for 3.6% of the gross value added of the Brazilian economy and 5.6% of the services sector. In 2009, these participations increased to 3.7% and 5.5%, respectively" (IBGE, 2012, p. 25).

The study by Araújo, Lino and Feitosa (2015) measured the economic impacts of tourist activities in six municipalities in the Metropolitan Region of Vitória-Espírito Santo, using the estimation of demand coefficients. The study followed the methodology developed by the Institute of Applied Economic Research (Ipea, 2006), which suggests "the construction of a tourist service coefficient or demand coefficient, as a way of identifying the percentage of the establishment's production that results from the activity of consumption to tourists" (Araújo, Lino & Feitosa, 2015, p. 520). The results revealed that the estimated tourist demand generated

[2] "The link index of Hirschman and Rasmussen (HR) measures the degree of chain of a given sector with the rest of the economy. From this algebraic model, it is possible to determine which sectors have the greatest chain power within an economy" (Camargo, Takasago, Guilhoto, Farias, Imori, Mollo & Andrade, 2008, p. 9).

around 4,382 formal jobs, representing a percentage of 1.31% of the total employment in the six locations studied.

When using the input-output model developed by Guilhoto, Oliveira and Grameiro (2001) for Brazil in 1999, Casimiro Filho and Guilhoto (2003) identified, by sector, the products considered as tourism and their share in the total produced by the sector, to then perform a data breakdown. This disaggregation allowed to group only the sectors of tourism and, finally, to build an input-output matrix for the Brazilian tourist economy for the year 1999. In possession of the matrix that contained the tourism sector, it was possible to carry out sectoral analyses. The authors concluded that the products of the tourist segmentation are little used by other sectors in the production process, being, therefore, destined mainly to the final demand.

Six years later, Camargo et al. (2008) went back to discussing the tourism input-output matrix in Brazil, based on the year 2004. From the data provided by the employment in tourism survey of Ipea (2006), the authors found the percentage of employees in tourism compared to the national scope and revealed that the investments made in the tourism sector would produce a great induced multiplier effect, which would correspond to the 11th place in the generation of jobs in the country, for the year 2002. This result implies that the benefits generated by the investment in tourism would extend to other economic sectors and not only those directly linked to tourism.

Takasago et al. (2010) also showed the potential for generating employment and income from tourism in Brazil. The methodology used was the estimation of an input-output matrix for tourism for the year 2006. "The estimates made of the generating effects showed a good potential for generating jobs, but mainly income, when compared to the potential average generators of the Brazilian economy" (Takasago et al., 2010, p. 458).

Takasago and Mollo (2011) carried out a new study whose main objective was to measure the potential employment and income generator, this time for the Distrito Federal. As in the previous one, this study also used the input-output matrix and the employment coefficients provided by Ipea (2006) as a methodological approach. The results indicated that the sectors of food, accommodation, and recreational and cultural activities were the ones that stood out the most, both in production, as in the generation of jobs and income. The authors indicated that these sectors should be prioritized in public policies in the Distrito Federal.

Souza, Guilhoto and Silveira Neto (2015) used the input-output matrix for the northeastern region of Brazil with data from 2009. In the study, they sought to quantify and list the measures and impacts on tourism in this Brazilian region, since it was observed that tourism is configured as the most important sector for the Northeastern economy, in addition to the evidence of economic specialization in the region. "The results found show participation of the tourism sector equivalent to 2.77% of the GDP of the Northeast, while in Brazil this participation was 2.27%" (Souza, Guilhoto & Silveira Neto, 2015, p. 434).

Takasago and Andrade (2008) used the computable general equilibrium (CGE) model for the Brazilian economy in 2002. The authors identified that "the increase in domestic tourism demand reduces the Brazilian GDP, but has an inequality-reducing role more significant, because it increases the income of the three lowest income brackets, and all the more the lower they are, in all scenarios, reducing the income of the richest bracket of the population "(Andrade & Takasago, 2008, p. 79).

The Foundation Institute of Economic Research (Fipe) also used CGE to estimate the economic impacts of the Tourism Economic Development Program (Prodetur) in the state of Rio de Janeiro. This study concluded that "the tourism characteristic activities are characterized, in relative terms, by activities of low value added for the regions, with a high potential for generating jobs with lower average remuneration" (Fipe, 2010, p. 89).

In order to discover the contribution of cultural tourism to regional development, Faria (2014) carried out a study of the economic impact of the Minas Gerais museum Inhotim, located in the municipality of Brumadinho, in the metropolitan region of Belo Horizonte. In this study, she used a general equilibrium model called Imagem-B (Integrated Multi-regional Applied General Equilibrium Model - Brazil), which has an integrated

multiregional specification, to determine the economic impacts generated by visiting the museum. The results indicated positive impacts; however, the greatest impact on GDP occurred in the metropolis (Belo Horizonte) with 0.07%, compared to Brumadinho, 0.06%.

Finally, it is worth mentioning the study by Rabahy (2019) that highlighted the relevance of tourism in Brazil and its great value for the distribution of regional income through a synthesis of tourism statistics until the year 2018. The data included the movement of tourists, the expenses of international tourists in the country, the account of international travel (income and expenses from trips taken from the Balance of Payments) and the expenses of Brazilian tourists inside and outside the country. The estimate presented by Rabahy (2019) was that the direct impact of tourism in Brazil represented 2.98% of GDP in 2011.

4 METHODOLOGY AND DATA

The measurement methodology can be explained in two stages. In the first stage, we used the database of the Annual List of Social Information (RAIS), from 2010 to 2015, concerning the employees' earnings of the following groups of economic activities of interest in these studies: i) transportation, storage and mail; ii) accommodation and food services; iii) professional, scientific and technical activities, administrative and complementary services; iv) arts, culture, sport and recreation and other service activities. Naming the variable relative to these groups of *M* activity, we have that *M* varies from one to four.

The earnings were used as a proxy for the production of tourism activities, and thus, a criterion for disaggregate the activities to approximate the definition of TCA. For example, it allows the exclusion of activities such as motels within the accommodation services. It is an advantage of using this variable due to the high degree of CNAE breakdown. This activity opening procedure is widely used by official statistical bodies, mainly when it comes to regional breakdowns as adopted by IBGE (2015) from the state level to the municipal level and even using employment variables such as earnings and total occupancy as one of the criteria for sharing. A second advantage comes from the availability of information and a third of the high weight and correlation of compensation of employees (wage account plus total social contributions) with GDP[3].

It is also worth highlighting the hypothesis behind the utilization of this variable, which is the intensity of the labour factor in the production of tourist activities. Plausible for economies like the Brazilian that, according to Rabahy (2019, p. 11) to highlight the potential of job creation, tourism "since it is predominantly an activity of the service sector, which notably uses labour intensively, the potential generator of tourism jobs is very relevant".

Then, the values of the earnings found for the economic activities of these groups were selected, at the subclass level, belonging to the TCA. This means that, for example, in the accommodation and food group, the earnings for the activities of hotels, apart-hotels, hostels, camping sites, among others, will be considered, as previously listed in Chart 1. These activities will be denominated here by *m*. As the size of *m* will vary according to the activity group in the subclass level, there is also the variable *k*, which relates to the size of the variable *m*.

The values obtained in this step are related to the employees' earnings variable for TCA, at subclass level, in each Federal Unit for the analysed period, and denominated *j*.

Then, aiming to know the participation of the TCA in each respective group, the weight of each TCA was estimated in their *M* group. The α weight of the *m* activity within the *M* group can be represented as:

$$\alpha_{mj}^{M} = E_{mj}^{M} \Big/ \sum_{m=1}^{k} E_{mj}^{M}$$

in which α_{mj}^{M} is the weight of the activity at the lowest aggregation level (CNAE Subclass) of the *j* region, *k* is the size of *m* that varies according to the activity at the level of disclosure *M*, E_{mj}^{M} is the employees' earnings at the lowest aggregation level (CNAE Subclass) of a *j* region. As an example, in the accommodation and food

[3] Data from IBGE (2019) for Brazil of the components of Gross Domestic Product from the perspective of income revealed that in 2015 compensation of employees corresponded to 44,6%, gross operating surplus represented 32,1%, taxes, net of subsidies, on production and import 15.0% and gross mixed income 8.3%.

services group, the weight found for the hotels was of 0.169[4], for 2015. It is equivalent to say that the hotels constitute approximately 16.9% of the employees' earnings of the accommodation and food services group. This weights structure will later be used as the value added (VA) apportionment rule.

With the weight of all TCA in a lower level (subclass), it is possible to group the economic activities into four new groups (g): tourist transport; tourist accommodation and food services; administrative and complementary tourist services; arts, culture and tourist leisure. Again, to exemplify, adding all TCA of the accommodation and food services group, the weight found was 0.8201, on average. It means that the employees' earnings of the tourist accommodation and food services correspond to 82% of the total employees' earnings of the initial group of accommodation and food services for the year in question. It can be represented by:

$$\alpha_{mj}^{g} = \sum_{m=1}^{n} \alpha_{mj}^{M}$$

where α_{mj}^{g} is the weight of the tourist *g* groups in the *j* region and *n* is the size of each of the *g* groups.

In the second stage, in order to determine the size of the tourism economy via the TCA in each Federal Unit (FU), the database of the Brazilian National and Regional Accounts was used, using the value added of each economic group and applying the corresponding TCA weights obtained in the first stage.

For example, the value added in 2015 for the accommodation and food group was approximately R$124,932 million, applying the weight of 82.01% for the group for the year in question, the value added of the accommodation and food group is R$102,456.2 million.

That is, the value added of a tourist group g of a region *j* VA_{gj}^{*}) will be the product between the weight of the tourist groups *g* in a region j (α_{mj}^{g}) and the value added to the highest level of aggregation (VA_{j}^{M}). Thus, it can be represented as:

$$VA_{gj}^{*} = \alpha_{mj}^{g} * VA_{j}^{M},\ m = 1, \dots, n$$

Adding the result found for the four groups *g*, by Federal Unit, it has what is called Value Added of TCA for each FU.

Aiming at determining the value added of TCA for the country, a bottom-up approach was chosen, in the sense that the sum of the calculation performed for each FU constitutes as the value added of TCA for Brazil.

It is noteworthy that the procedure reported above was applied at current values, with no information on constant values, volume and price indices. Assuming that the behaviour of the volume of the tourist activity group *(g)* is the same as that of the group of activity of the highest level of aggregation that generated it *(M)*, it will be possible to obtain the constant values and the price indices, as follows:

$$IV_{t,t-1}^{gj} = IV_{t,t-1}^{Mj}$$

$IV_{t,t-1}^{gj}$ is the factor of the volume index of time *t* in relation to the time *t-1* of a group *g* of a region *j* and $IV_{t,t-1}^{Mj}$ is the factor of the volume index of time *t-1* of the activity of the major aggregation *M* that originated it from a region *j*.

By this hypothesis on volume indices, VAT_{j} can be obtained at constant price and the price index can be implicitly obtained:

$$VA_{gj,t\ pcons}^{*} = \left(IV_{t,t-1}^{gj}\right) \cdot VA_{gj,t-1\ pcurr}^{*}$$

$$VAT_{j,t\ pcons} = \sum_{g=1}^{n} VA_{gj,t\ pcons}^{*}$$

where $VA_{gj,t\ pcons}^{*}$ is the value added of a specific group *g* of a region *j* in time *t* at constant price;

$VA_{gj,t-1\ pcurr}^{*}$ is the value added of a specific group *g* of a region *j* in time *t-1* at the current price;

$VAT_{j,t\ pcons}$ is the value added of the TCA of a region *j* in time *t* at constant price;

[4] In this example, E_{mj}^{M} = R$ 417.630.253,10 and $\sum_{m=1}^{k} E_{mj}^{M}$= R$ 2.464.954.348,90.

Thus, the factors of the volume index of TCA $\left(IVT_{t,t-1}^{j}\right)$ and price $\left(IPT_{t}^{j}\right)$ will be given for the ratios:

$$IVT_{t,t-1}^{j} = \frac{VAT_{j,t\ pcons}}{VAT_{j,t-1\ pcurr}}, \quad IPT_{t}^{j} = \frac{VAT_{j,t\ pcurr}}{VAT_{j,t\ pcons}}$$

where $VAT_{j,t\ pcurr}$ is the value added of the TCA of a region j at time t at current price and n is the total numbers of groups.

Finally, it is presented that the databases necessary for the calculation of the value added of TCA are: the basis of the earnings extracted from the Annual List of Social Information (RAIS) of the Ministry of Economy and National and Regional Accounts from 2010 to 2015 of the Brazilian Institute of Geography and Statistics (IBGE).

5 ANALYSIS OF RESULTS

Table 1 presents the weights from the earnings variable for the breakdown of economic activities presented in Chart 1. For instance, the results are presented for Brazil. In 2015, for example, 82.01% of the total earnings of the accommodation and food services were considered TCA.

Table 1 - Weights for disaggregating tourism activities - Brazil - 2010-2015 (%)

Economic activities	2010	2011	2012	2013	2014	2015
Tourist accommodation and food	80.62	80.41	81.00	81.19	81.37	82.01
Tourist transport	16.21	16.48	15.86	15.15	14.91	14.93
Tourist administrative and complementary services	2.52	2.47	2.59	2.62	2.60	2.61
Tourist arts, culture and leisure	32.52	29.74	29.35	29.26	27.44	25.34

Source: The authors.

In the case of Brazil, the weights showed a tiny variation over the years. It should be highlighted that the tourist part of the accommodation and food activity is quite significant, an average of 81.10% from 2010 to 2015, followed by the part related to arts, culture, sports and leisure (average of 28.94% in the period), following transport (average of 15.59% in the period). The same is not true of administrative and complementary services; only 2.57% of them are considered to be tourists using employees' earnings.

In the case of Federal Units, in general, there is a certain stability in the weights with a few exceptions. The tourist transport weight in Roraima was highlighted, with approximately 29% in 2015. Regarding accommodation and tourist food, Alagoas and Tocantins stood out, both with approximately 90%. The states of the Southeast region presented results close to that obtained by Brazil.

Table 2 presents the results for the Value Added (VA) of TCA, obtained after the application of the weights in descending order according to the year 2015.

In 2010, the VA of TCA in Brazil was R$106,186 million, followed by R$120,797 in 2011. In 2012, the VA of TCA reached R$136,049 million and R$152,318 million the following year. For 2014 and 2015, the values of the VA were R$171,638 million and R$168,459 million, respectively. São Paulo, Rio de Janeiro, and Minas Gerais appeared as the states that most collaborated for these results in all six years.

Table 2 - Value Added of TCA - Brazil and Federal Units - 2010-2015 (R$ million at current prices) (Continue)

Specification	2010	2011	2012	2013	2014	2015
Brazil	106.186	120.797	136.049	152.318	171.638	168.459
São Paulo	35,564	40,240	43,866	51,418	59,493	54,015
Rio de Janeiro	15,102	17,080	18,765	21,758	22,998	23,170
Minas Gerais	9,168	10,384	11,828	12,355	14,899	14,095
Rio Grande do Sul	5,253	5,705	6,787	6,689	7,685	9,105
Bahia	5,109	6,081	6,462	7,668	8,435	8,706
Paraná	4,677	5,734	7,178	7,835	8,312	8,447
Santa Catarina	3,681	4,516	5,668	5,873	5,820	6,592
Goiás	2,611	3,052	3,678	3,868	5,017	5,363
Ceará	3,010	3,288	3,738	4,402	5,141	5,002
Pernambuco	2,944	3,282	3,527	4,242	4,750	4,756

Table 2 - Value Added of TCA - Brazil and Federal Units - 2010-2015 (R$ million at current prices) (Conclusion)

Specification	2010	2011	2012	2013	2014	2015
Distrito Federal	3,419	3,274	3,379	4,130	4,530	4,487
Pará	2,058	2,285	2,704	2,755	3,186	3,256
Espírito Santo	2,298	2,701	2,768	2,760	2,920	2,875
Rio Grande do Norte	1,397	1,647	1,711	2,059	2,434	2,409
Mato Grosso	1,362	1,674	1,874	1,870	2,316	2,346
Maranhão	1,289	1,494	2,131	1,664	2,163	2,016
Mato Grosso do Sul	1,253	1,493	2,093	2,014	2,090	1,947
Amazonas	1,185	1,358	1,531	1,985	1,935	1,845
Paraíba	1,059	1,170	1,353	1,383	1,696	1,661
Alagoas	735	882	1,110	1,242	1,250	1,437
Piauí	683	827	931	1,124	1,215	1,309
Sergipe	744	853	874	945	982	1,042
Rondônia	547	634	750	766	685	694
Tocantins	340	365	493	507	574	644
Acre	246	270	275	369	352	487
Amapá	300	326	374	397	435	426
Roraima	152	183	201	241	326	326

Source: The authors.

The first three ranked represented approximately 55% of the total VA of TCA in the analysed period, indicating that the big centres are also those that offer more tourist services and with this record higher values added to their economy. Paraná, which occupied the sixth position in 2010, appeared as the 4th largest VA in 2012 and 2013 but returned to the 6th position in 2015. The state of Bahia and the Rio Grande do Sul, together with Paraná, took turns in the fourth, fifth, and sixth positions in the years analysed. Roraima, Amapá, and Acre are the least expressive in terms of VA of TCA relative to the total of the country.

It is noteworthy that almost 60% of the value added of TCA concentrated in São Paulo, Rio de Janeiro, Minas Gerais, and Rio Grande do Sul as shown in Table 3. Moreover, all states of the North never had participation higher than 2.0% in the analysed period. In 2015, the set of these states represented 4.56% of Brazil. In the Northeast, Bahia, Ceará, and Pernambuco are the states with the most significant value added.

Table 3 - Weight of value added of TCA in the total value added of TCA in Brazil - Federal Units - 2010-2015 (%)

Specification	2010	2011	2012	2013	2014	2015
São Paulo	33.49	33.31	32.24	33.76	34.66	32.06
Rio de Janeiro	14.22	14.14	13.79	14.28	13.40	13.75
Minas Gerais	8.63	8.60	8.69	8.11	8.68	8.37
Rio Grande do Sul	4.95	4.72	4.99	4.39	4.48	5.40
Bahia	4.81	5.03	4.75	5.03	4.91	5.17
Paraná	4.40	4.75	5.28	5.14	4.84	5.01
Santa Catarina	3.47	3.74	4.17	3.86	3.39	3.91
Goiás	2.46	2.53	2.70	2.54	2.92	3.18
Ceará	2.83	2.72	2.75	2.89	3.00	2.97
Pernambuco	2.77	2.72	2.59	2.79	2.77	2.82
Distrito Federal	3.22	2.71	2.48	2.71	2.64	2.66
Pará	1.94	1.89	1.99	1.81	1.86	1.93
Espírito Santo	2.16	2.24	2.03	1.81	1.70	1.71
Rio Grande do Norte	1.32	1.36	1.26	1.35	1.42	1.43
Mato Grosso	1.28	1.39	1.38	1.23	1.35	1.39
Maranhão	1.21	1.24	1.57	1.09	1.26	1.20
Mato Grosso do Sul	1.18	1.24	1.54	1.32	1.22	1.16
Amazonas	1.12	1.12	1.13	1.30	1.13	1.10
Paraíba	1.00	0.97	0.99	0.91	0.99	0.99
Alagoas	0.69	0.73	0.82	0.82	0.73	0.85
Piauí	0.64	0.68	0.68	0.74	0.71	0.78
Sergipe	0.70	0.71	0.64	0.62	0.57	0.62
Rondônia	0.52	0.53	0.55	0.50	0.40	0.41
Tocantins	0.32	0.30	0.36	0.33	0.33	0.38
Acre	0.23	0.22	0.20	0.24	0.20	0.29
Amapá	0.28	0.27	0.27	0.26	0.25	0.25
Roraima	0.14	0.15	0.15	0.16	0.19	0.19

Source: The authors.

To illustrate the composition of the results of the VA of TCA, Table 4 presents the participation of the four groups of activities that compose the TCA, for the year 2015 and confirm the high relevance of the housing and food sector, followed by tourist transport activities. In the Brazilian case, approximately 60% of the VA of the TCA of 2015 represented the activity of tourist accommodation and food, 20% the transport, 14% the activities of arts, culture and recreation, remaining 6% of the administrative and complementary tourist activities. This same pattern is observed for the Federal Units except for some states that present a percentage of tourist cultural activities is more significant than that relating to the transport, mostly in the Northeast region.

Other findings taken from Table 4 are that the Southeast region tends to present greater participation in the transport in its internal structure of the TCA, unlike the Northeast, which presents smaller participations, except for Bahia. As much as accommodation and food always surpass 50% in all Federal Units, the states of the Northeast and North tend to present larger shares of this group. There is no regional standard for administrative and complementary tourist services or arts and culture and leisure tourism. However, it is valid to highlight the importance of the cultural group for Ceará, Pará, and Mato Grosso do Sul in which all registered participation around 27%, in the year 2015.

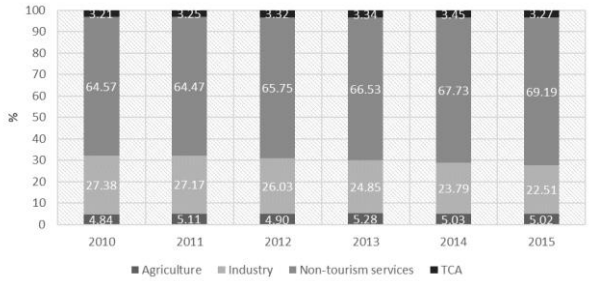
Table 4 - Weight of groups of tourist activities in the total value added of TCA - Brazil and Federal Units - 2015 (%)

Specification	Tourist transport	Tourist accommodation and food	Tourist administrative and complementary services	Tourist arts, culture and leisure
Brazil	19.76	59.69	6.43	14.13
São Paulo	24.93	55.20	7.79	12.08
Rio de Janeiro	27.57	56.86	5.13	10.44
Minas Gerais	21.08	59.45	7.02	12.45
Rio Grande do Sul	16.73	64.01	7.34	11.92
Bahia	18.90	63.56	4.49	13.05
Paraná	17.52	55.52	8.23	18.73
Santa Catarina	8.97	64.33	4.66	22.04
Goiás	11.49	68.00	3.33	17.18
Ceará	9.98	57.94	4.52	27.57
Pernambuco	10.41	68.19	7.74	13.66
Distrito Federal	12.46	63.73	7.29	16.52
Pará	11.85	56.58	4.18	27.39
Espírito Santo	19.60	63.13	4.66	12.61
Rio Grande do Norte	9.18	73.03	5.09	12.71
Mato Grosso	15.36	60.75	7.25	16.64
Maranhão	8.93	66.63	4.82	19.62
Mato Grosso do Sul	13.23	52.18	7.38	27.21
Amazonas	16.85	70.65	5.89	6.61
Paraíba	5.78	69.85	4.10	20.27
Alagoas	8.05	72.54	5.77	13.65
Piauí	8.66	78.92	3.02	9.40
Sergipe	10.27	70.66	5.80	13.27
Rondônia	20.84	59.02	5.14	14.99
Tocantins	11.77	70.15	6.73	11.35
Acre	2.98	77.29	0.98	18.75
Amapá	11.10	78.07	3.07	7.76
Roraima	16.68	60.07	5.42	17.83

Source: The authors.

By comparing TCA with other activities (agriculture, industry and non-tourist services), in the case of Brazil, the TCA represented 3.21% of the total VA in 2010 and grew every year, reaching 3.45% in 2014. However, it had a fall, and in 2015 represented 3.27% VA the country. Figure 1 illustrates this behaviour of the participation of TCA and also of the non-tourist services, while the industry loses space in the Brazilian economy.

Figure 1 - Share of economic activities in total value added - Brazil – 2010-2015 (%)



Source: The authors.

Table 5 shows the participation of the VA of TCA in the total VA of all Federal Units for the years 2010 to 2015.

The relevance of TCA in the value added, mainly in the northeastern states, stood out. Rio Grande do Norte, for example, presented the most significant participation in 2015, 4.71%, with an average of 4.54% in the analysed period. Ceará stood out in second place, and the states of Bahia, Rio de Janeiro, Piauí, Amapá, and Paraíba were the other Brazilian states that had an average of 3.50% or more. In contrast, the state of Tocantins presented the lowest average in the period in question, 2,39%. Amazonas, Rondônia, Rio Grande do Sul, and Mato Grosso also presented the lowest averages in the period. The mean participation of VA of TCA in Brazil was 3.31% (Table 5).

Table 5 - Participation of VA of TCA in total VA - Brazil and Federal Units - 2010-2015 (%)

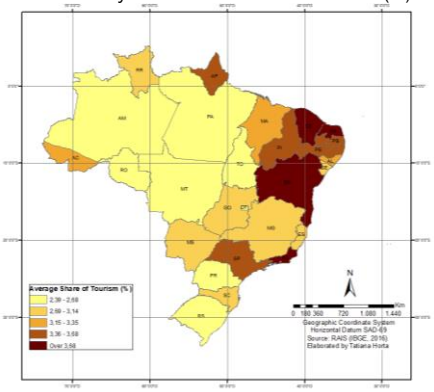
Specification	2010	2011	2012	2013	2014	2015	Average
Brazil	3.21	3.25	3.32	3.34	3.45	3.27	3.31
Rio Grande do Norte	4.35	4.52	4.15	4.49	5.05	4.71	4.54
Ceará	4.35	4.20	4.45	4.64	4.64	4.36	4.44
Bahia	3.77	4.17	4.06	4.30	4.30	4.03	4.11
Rio de Janeiro	3.98	3.91	3.83	4.07	3.97	4.16	3.99
Piauí	3.47	3.57	3.66	4.04	3.58	3.73	3.68
Amapá	3.95	3.74	3.65	3.37	3.52	3.31	3.59
Paraíba	3.55	3.55	3.59	3.38	3.61	3.32	3.50
São Paulo	3.32	3.40	3.41	3.62	3.83	3.32	3.48
Pernambuco	3.55	3.51	3.25	3.51	3.56	3.54	3.48
Alagoas	3.02	3.09	3.55	3.68	3.35	3.40	3.35
Acre	3.25	3.31	3.00	3.52	2.85	3.91	3.31
Maranhão	3.14	3.25	4.02	2.77	3.16	2.89	3.20
Mato Grosso do Sul	3.02	3.09	3.83	3.29	2.97	2.62	3.14
Santa Catarina	2.82	3.07	3.50	3.25	2.84	3.14	3.10
Goiás	2.80	2.90	3.00	2.89	3.42	3.47	3.08
Minas Gerais	3.00	2.97	3.06	2.88	3.28	3.08	3.05
Sergipe	3.14	3.28	2.98	2.99	2.92	3.02	3.05
Roraima	2.51	2.72	2.85	2.89	3.62	3.41	3.00
Espírito Santo	3.29	3.14	2.88	2.83	2.66	2.86	2.94
Pará	2.73	2.52	2.78	2.50	2.82	2.75	2.68
Paraná	2.42	2.62	2.95	2.72	2.76	2.59	2.68
Distrito Federal	2.81	2.49	2.44	2.74	2.65	2.41	2.59
Mato Grosso	2.74	2.72	2.66	2.38	2.55	2.40	2.58
Amazonas	2.35	2.30	2.57	2.89	2.69	2.54	2.56
Rio Grande do Sul	2.55	2.52	2.76	2.33	2.48	2.73	2.56
Rondônia	2.61	2.62	2.82	2.77	2.26	2.13	2.53
Tocantins	2.29	2.21	2.63	2.34	2.42	2.45	2.39

Source: The authors.

Comparing the TCA with the other economic activities, it can be highlighted that in Rio de Janeiro, Federal District, Amapá, and Rio Grande do Norte, the TCA overcome agriculture. In Roraima and Distrito Federal, TCA is more significant than the manufacturing industry.

All these results found regarding the VA of TCA's participation in the economy of the states were compiled on a map illustrating the economic dimension of the TCA in the country (Map 1).

Map 1 - Average participation of the value added of TCA by Federal Units - 2010-2015 (%)

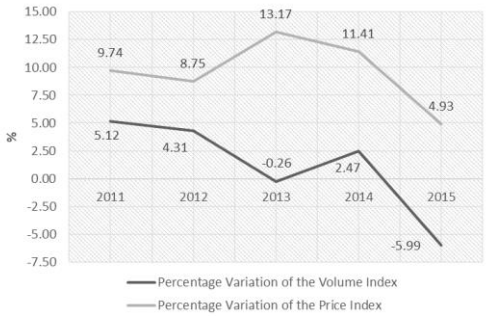


Source: The authors.

Given this, Map 1 illustrates the significant contributions of the TCA to the states of the Northeast region, highlighting Rio Grande do Norte, Ceará, and Bahia. The state of Rio de Janeiro also appears in a prominent position, which highlights the importance of sun and beach tourism to the country.

Other outstanding factors to be analysed for this estimation study of the VA of TCA are the changes in the volume and price indices. The first one examines the actual growth rate of the TCA, and the second, the variations in price levels in the study period. Figure 2 presents the behaviour of the two rates for Brazil.

Figure 2 - Percentage variation of the volume and price indexes of the VA of the TCA – Brazil 2011-2015 (%)



Source: The authors.

In the analysed period, it is possible to observe that tourism in the country grew at considerable rates in 2011 and 2012, 5.12 and 4.31%, respectively. However, it dropped the following year (-0,26) and grew again in 2014, when the FIFA World Cup was held in the country. In contrast, in 2015, a sharp drop of -5,99% reversed the picture. Concerning the price behaviour, the variation was 13.71% for 2013, when compared to the previous year, and since then the trend has been downwards, reaching 4.93% in 2015.

Table 6 shows the variations of the volume indices for the Federal Units in the years 2011-2015. The fall pattern observed in the years 2013 compared to the rate of 2012 and the subsequent recovery in 2014 with a consequent reduction in 2015 observed in all states except the Distrito Federal. Also, the state of Piauí was the only one to show growth in 2015 (1.08%).

Table 6 - Percentage variation in VA volume indices from TCA to Federal Units 2011-2015 (%)

Specification	2011	2012	2013	2014	2015
Brazil	5.12	4.31	-0.26	2.47	-5.99
Piauí	5.68	9.89	1.77	7.17	1.08
Paraíba	7.78	7.88	5.07	5.72	-2.65
Alagoas	7.90	5.29	1.79	8.79	-2.74
Ceará	5.52	8.01	1.94	5.79	-2.95
Maranhão	7.62	12.37	1.71	5.93	-4.23
Rio Grande do Norte	5.00	4.38	-1.56	4.17	-4.37
Mato Grosso do Sul	10.36	10.49	-0.34	3.73	-4.61
Rondônia	11.39	9.79	-0.43	1.94	-4.64
Tocantins	10.82	10.00	-0.15	10.66	-4.75
Sergipe	6.42	6.76	1.03	5.17	-4.94
Santa Catarina	3.34	2.12	0.36	3.37	-5.24
Acre	4.72	9.93	-2.10	6.43	-5.29
Mato Grosso	4.73	6.21	3.38	5.81	-5.36
Pará	3.14	10.57	0.43	4.48	-5.52
Rio de Janeiro	4.89	4.02	-0.81	2.27	-5.57
Bahia	5.32	4.38	-2.04	3.59	-5.82
Goiás	5.40	8.28	2.41	7.72	-5.83
São Paulo	4.55	2.66	-0.73	0.76	-6.05
Paraná	4.16	4.02	0.30	1.46	-6.62
Pernambuco	9.84	8.83	1.44	7.10	-7.03
Rio Grande do Sul	5.81	2.54	-0.85	1.20	-7.15
Minas Gerais	5.20	4.50	-1.68	1.69	-7.42
Espírito Santo	4.42	3.50	-1.19	1.04	-7.54
Distrito Federal	5.39	0.38	4.88	2.33	-7.75
Amazonas	3.53	9.66	-4.27	3.28	-8.00
Roraima	0.72	13.47	2.40	14.07	-12.21
Amapá	9.28	12.35	1.69	3.52	-12.54

Source: The authors

5.1 Control of the methodology

Given that this article adopted the same concept of TCA from the study of João Pinheiro Foundation (2017), which calculated the value added of TCA for the state of Minas Gerais in the years 2010 to 2014, it is possible to compare the results obtained for this specific Federal Unit. It is noteworthy that the difference of the studies lies in the variable of choice for disaggregation. The João Pinheiro Foundation (2017) used the weights of the variables of the value of production (VP) and intermediate consumption (IC) from the sum of the structural surveys of IBGE (Annual Service Survey, Annual Trade Survey, Annual Industrial Research and Annual Construction Industry Survey) applied directly to Gross VP and IC, the value added (VA) being obtained by difference. The present study uses the breakdown weights from the employees' earnings directly employed in the VA.

Table 7 shows the comparison of the value added of TCA, of the four groups that compose it, the actual growth rate and the participation of the value added of TCA in the total VA for the state of Minas Gerais. The results are considerably close between the two studies for the VA of TCA and tourist transport and accommodation and food services groups, except for the year 2013. However, when it comes to tourist complementary administrative services and tourist arts, culture and leisure activities, this article underestimates the first group and overestimates the second. Real growth rates presented approximate values and the same behaviour, except 2013. The participation of the TCA in the state of Minas Gerais tended to exhibit, on average, a higher difference in the study of the João Pinheiro Foundation (3.15%) compared to 3.05% of the 2010-2015 average of this article.

It was also considered the annual results obtained by the volume index of the Services Monthly Survey (PMS) of IBGE in which presents a particular tourism aggregate from 2011. It is noted that the concept of tourism is restricted to the activities present in the PMS and therefore includes a smaller number of activities compared to the concept used by this work, besides the PMS does not contemplate all Federal Units.

As the time series of the IBGE study (2012) presents a broad conceptual approximation of the sets of TCA used in this article, it was continued to estimate the economy of tourism after the period 2004-2009 from the results achieved here. Table 8 shows the exercise performed.

By comparing the sequence of values and mainly the evolution of the participation of the tourism groups, it was already established in IBGE (2012) a progressive decrease of the participation of transport to the detriment of the most significant portion of accommodation and food, as well as a slight progressive increase in administrative and complementary services and a slight tendency to decrease the participation of the group tourist arts, culture and leisure. One crucial point is that the IBGE study (2012) does not use the current 2010 reference of the National Accounts – which this study already uses – thus, comparisons must be made with caution. This may explain the rapid change in the composition of the groups of tourist activities. However, it appears that the trends previously obtained are maintained in the estimated series.

Table 7 - Comparison of results, selected variables - Minas Gerais - 2010-2015

Specification	Study	2010	2011	2012	2013	2014	2015
Tourism VA (R$ million)	Authors' calculations	9,168	10,384	11,828	12,355	14,899	14,095
	João Pinheiro Foundation (2017)	9,539	10,354	12,321	13,701	14,998	-
VA - tourist transportation (R$ million)	Authors' calculations	2,171	2,405	2,515	2,423	2,748	2,972
	João Pinheiro Foundation (2017)	2,213	2,499	2,794	2,965	2,908	-
VA - tourist accommodation and food (R$ million)	Authors' calculations	4,932	5,555	6,685	7,053	9,389	8,380
	João Pinheiro Foundation (2017)	4,933	5,096	6,665	7,084	9,559	-
VA - tourist administrative and complementary services (R$ million)	Authors' calculations	512	632	789	916	929	989
	João Pinheiro Foundation (2017)	1,534	2,077	2,392	2,715	1,718	-
VA - tourist arts, culture and leisure (R$ million)	Authors' calculations	1,552	1,792	1,839	1,963	1,833	1,755
	João Pinheiro Foundation (2017)	860	682	469	936	812	-
Tourism Volume Index (%)	Authors' calculations	-	5.20	4.50	-1.68	1.69	-7.42
	João Pinheiro Foundation (2017)	-	6.38	4.84	-0.41	0.24	-
	Monthly Service Survey	-	-	1.1	-0.3	4.1	-4.0
Total tourism VA Participation (%)	Authors' calculations	3.00	2.97	3.06	2.88	3.28	3.08
	João Pinheiro Foundation (2017)	3.13	2.96	3.18	3.20	3.30	-

Source: The authors.

Table 8 - Estimated value added of TCA to Brazil and its composition 2004-2015

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Value added (R$ million)												
Tourism	59,117	66,044	73,868	82,744	90,473	103,656	106,186	120,797	136,049	152,318	171,638	168,459
Tourist transport	21,797	23,760	25,323	29,416	30,468	33,249	22,522	26,815	28,551	30,512	33,794	33,284
Tourist accommodation and food	22,840	25,669	31,389	34,081	38,470	46,218	56,465	66,149	76,253	87,467	101,487	100,554
Tourist administrative and complementary services	2,758	3,406	3,818	4,486	4,949	5,605	6,212	7,039	8,344	9,583	10,507	10,825
Tourist arts, culture and leisure	11,722	13,209	13,338	14,761	16,585	18,584	20,987	20,794	22,902	24,756	25,849	23,796
Participation (%)												
Tourist transport	36.87	35.98	34.28	35.55	33.68	32.08	21.21	22.20	20.99	20.03	19.69	19.76
Tourist accommodation and food	38.64	38.87	42.49	41.19	42.52	44.59	53.18	54.76	56.05	57.42	59.13	59.69
Tourist administrative and complementary services	4.67	5.16	5.17	5.42	5.47	5.41	5.85	5.83	6.13	6.29	6.12	6.43
Tourist arts, culture and leisure	19.83	20.00	18.06	17.84	18.33	17.93	19.76	17.21	16.83	16.25	15.06	14.13

Note: The period 2004-2009 refers to the study of the Brazilian Institute of Geography and Statistics of Minas Gerais (2012), the period 2010-2015 are results obtained by the authors of this work.

Source: The authors.

6 CONCLUDING REMARKS

The present study aimed to propose a methodology to measure the size of the Tourism Characteristics Activities (TCA). The proposal is based on the principle of offering measurement using the same techniques used for activities in the framework of National and Regional Accounts. Using data from Brazil and its Federal Units between 2010 and 2015, it was possible to measure and evaluate the evolution of TCA from the estimates of value added, volume indices, and prices for the Brazilian tourist economy, introducing the regional view by disaggregating all results by Federal Units.

The main contribution of the article is the possibility of using the methodology proposed in measuring the economic contribution of a set of sectors that make up a given activity, as in the case of tourism, using databases of public institutions and allowing comparability of results at the regional level, which in the case of Brazil represented the measurement of TCA for the 27 Federal Units, for a recent period (2010 to 2015). All this made possible a more comprehensive and standardized analysis allowing to answer one of the main questions that permeate the area of Tourism Economy: what is the contribution of tourism to the economy? Which are the most representative Federal Units and sectors? The method allowed to answer these questions using a methodology on the supply side, given the lack of information at the state level on the demand side.

Brazil recorded a value added of TCA in 2015 of approximately R$168.5 billion. São Paulo, Rio de Janeiro, and Minas Gerais accounted for 54% of this amount. However, when analysing the participation of TCA for the economy, the coastal states tend to stand out as are the cases of Rio Grande do Norte, and Ceará that took turns, in the period 2010 to 2015, in the first and second most important place of TCA within their economy. Of the total of 27 Federal Units, 13 had participation higher than the Brazilian rate in 2015 (3,27%).

Accommodation and food services showed an increasing trend of participation and currently exceed 50% of the value added of TCA of the Federal Units. It was also observed a tendency of the Southeast region to have greater participation in transport in its internal structure of TCA when compared to other states, and the more significant proportion of the cultural group for the states of Ceará, Pará, and Mato Grosso do Sul. It was also possible to notice that in some states, the TCA overcome the agriculture (Rio de Janeiro, among others) and even the manufacturing industry (case of Roraima and Distrito Federal).

The assessment of the measurement method was based on studies that also constructed a time series for the value added of TCA. Using the results found from other studies for the state of Minas Gerais as control of the methodology employed here, it was found that the total value added of TCA showed a positive approximation and the trend analysis of the historical series of the studies of tourism economy of IBGE also converged to the results presented here. However, it revealed that the estimated values are not aligned with those found in the literature for specific groups of arts, culture and leisure and administrative and complementary tourist services.

It is worth noting that the employees' earnings proxy used to estimate the value added can be indicated to use when it comes to tourist transport and especially when it comes to accommodation and food services. However, it still deserves further discussion about its use in other tourism groups. Besides, it is possible to consider for future studies the differentiation between the demand of residents and tourists at the regional level, as the study of Gonçalves (2016), which used the coefficient of tourist service Ipea (2006) to get closer to the actual tourist activity of the state of Minas Gerais. It is possible to expand the present study to all states using this type of coefficient.

It is hoped that this study will make it easier to compare the size of the tourism economy via the TCA in the Federal Units of Brazil, because it is a unified methodology, facilitating, therefore, that they are used and can collaborate with diagnoses, policies, and actions to improve and maximize the benefits of tourism activity to the country, in addition to drawing attention for continuity of this measurement by the official statistical offices, both national and regional.

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