

# COVID-19 AND THE SILENCE IN THE STREET: REGIONAL ECONOMIC IMPACTS OF BRAZIL WITHOUT THE CARNIVAL

Thais Diniz Oliveira<sup>1</sup>  
Cláudio Eurico Seibert Fernandes da Silva<sup>2</sup>  
Rayan Wolf<sup>3</sup>  
Victor Eduardo de Mello Valerio<sup>4</sup>  
Luiz Carlos de Santana Ribeiro<sup>5</sup>

## ABSTRACT

Carnival is one of the most important cultural celebrations in Brazil. By bringing together a multitude of people, it positively affects the local economy. The sanitary restrictions due to the COVID-19 pandemic culminated in the first cancellation of Carnival in its history. In recognition of the importance of tourism events for local development and income distribution, this paper estimates the economic impacts of Brazil without Carnival in 2021. Its contribution to the tourism literature is twofold: it explores the interplay between COVID-19 and Carnival tourism in Brazil and quantifies the magnitude of the effects using the input-output approach. The six main state hosts of Carnival are considered in the analysis (Bahia, Ceará, Minas Gerais, Pernambuco, Rio de Janeiro, and São Paulo). Results show that the Carnival cancellation for sanitary purposes led to economic costs for the hosting states given the decreased number of tourists, R\$650 million in tax income and 200 thousand employment opportunities. The results also indicate that tourism activities are directly affected and incur the largest impacts, especially the “Accommodation and food services” sector. Formal employment losses predominate over informal job losses, except in São Paulo. Among the hosting states, Pernambuco experiences the largest negative economic impacts, highlighting the importance of Carnival for its economy. Public policies could be used as tools to promote a multitude of tourism events thereby encouraging the tourism value-chain.

**Keywords:** COVID-19; Carnival tourism; Input-Output analysis

**JEL classification:** D57, I19, Z30

**Submission area:** Cultura, lazer, turismo e desenvolvimento regional

## RESUMO

O Carnaval é uma das celebrações culturais mais importantes no Brasil. Ao reunir uma multidão de pessoas, afeta positivamente a economia local. As restrições sanitárias devido à pandemia do COVID-19 culminaram no cancelamento do Carnaval pela primeira vez em sua história. Em reconhecimento da importância do turismo de evento para o desenvolvimento local

---

<sup>1</sup> Postdoctoral researcher at School of Economics, Business and Accounting (FEA/USP) and Center for Epidemiological Research in Nutrition and Health (NUPENS/USP), Brazil.

<sup>2</sup> PhD student of economics at Federal University of Juiz de Fora (Minas Gerais), Brazil.

<sup>3</sup> Collaborating Researcher at the Department of Public Policy and Social Development Institute at the Federal University of Viçosa (Minas Gerais), Brazil.

<sup>4</sup> Professor at Federal University of Itajubá (Minas Gerais), Brazil.

<sup>5</sup> Professor at Department of Economics at Federal University of Sergipe, Brazil.

e distribuição de renda, este artigo estima os impactos econômicos de um Brasil sem Carnaval em 2021. São duas as suas contribuições à literatura sobre o turismo: o estudo explora a interação entre a COVID-19 e o turismo de Carnaval no Brasil e quantifica a magnitude dos efeitos utilizando a abordagem de insumo-produto. Os seis principais organizadores do Carnaval são considerados na análise (Bahia, Ceará, Minas Gerais, Pernambuco, Rio de Janeiro, and São Paulo). Os resultados mostram que o cancelamento do Carnaval por fins sanitários acarretou custos econômicos para os estados anfitriões, dada a diminuição do número de turistas, R\$650 milhões de renda tributária e 200 mil oportunidades de emprego. Os resultados também indicam que as atividades características do turismo são diretamente afetadas e sofrem os maiores impactos, especialmente o setor de "Acomodação e serviços de alimentação". As perdas de emprego formal predominam sobre as de emprego informal, exceto em São Paulo. Entre os estados anfitriões, Pernambuco experimenta os maiores impactos econômicos negativos, destacando a importância do Carnaval para sua economia. Políticas públicas poderiam ser usadas como ferramentas para promover uma multiplicidade de eventos turísticos, incentivando assim a cadeia de valor do turismo.

**Palavras-chave:** COVID-19; Turismo de Carnaval; Análise insumo-produto

## 1. Introduction

The outbreak of pathogenic viruses and their interactions with humans and animals have resulted in severe acute respiratory syndromes over time (Gorbalenya et al., 2020). The emergence and rapid spread of Coronavirus disease (COVID-19) has posed major public health and governance challenges worldwide. The new SARSCoV-2 infection was first reported in Wuhan (China) but quickly reached a global pandemic status due to its high transmissibility characteristic (Cheng et al., 2020). The COVID-19 pandemic has led to numerous sanitary restrictions that affected both the economy and individuals. The primary measure commonly adopted to prevent the transmission of the virus involves restricted global mobility alongside social distancing (Gössling et al., 2021).

As a non-essential industry, the tourism sector was by far the hardest hit, with negative impacts spread on both the demand and supply of tourism activities (Mohanty et al., 2020). This is due to postponements and cancellations of previously scheduled travels and public events to avoid large gatherings of people, thereby the spread of the virus. The sector lost approximately US\$ 4.5 trillion in 2020, which translated into a 49.1% drop in its contribution to global Gross Domestic Product (GDP) compared to 2019 (WTTC, 2021). This means that while travel and tourism GDP accounted for 10.4% of global economy GDP in 2019, it responded to only 5.5% in 2020. These negative effects on tourism activities persisted more than those on other economic activities since recovery required a massive vaccination to safely reopen external borders and re-establish its services.

This movement has been progressing since 2021 when vaccination started across countries worldwide. Yet, in most Least Development Countries (LDC), access and distribution of vaccines is a limiting factor, threatening to hinder the efforts to control the spread of the virus and the return of tourism safely (UNCTAD, 2021). In addition, the discovery of variants of higher transmissibility raises concerns about how safe it is to fully remove sanitary restrictions for travels in the short term. As a result, it may take longer for travel and tourism activities to recover, particularly those related to tourism events.

The tourism sector is predominantly a service activity, notably labour-intensive, with a high potential for creating formal and informal jobs, especially in developing countries (Rabahy, 2020; Ribeiro et al., 2018). According to Haddad et al. (2013), besides being often seasonal, employment in tourism is relatively low paid. By triggering a decrease in tourism flows, the COVID-19 pandemic generated a loss of 62 million jobs throughout the global sector

in 2020 (WTTC, 2021). This indicates that failing to contain the pandemic also threatens the employment generation, has significant consequences for different supply chains and may undermine the economic growth of regions where conditions to develop tourism exist.

The economic literature understands the tourism sector from its direct and indirect impacts and effects in terms of income generation and distribution, a strategy of local economic development and sectoral production and employment. Among the positive impacts of touristic activities on local economies, there are the increase in income and revenues as well as tax collection, the diversification of productive structure (Freitas Cabral et al., 2020) and other multiplier effects through supply chain linkages to other productive sectors. The generation of multiplier effects is a key feature of tourism, which contribute to the reduction of regional and personal inequalities (Meliani and Gomes, 2010; Ribeiro et al., 2017; Santos et al., 2018) by promoting regional and national development.

Developing economies perceive the expansion of the tourism sector as an opportunity to improve the economic conditions of the population. In these regions, the income generated usually results from a mix of formal and informal activities and workers and helps shield important economic and social indicators. This is the case in Brazil, where tourism activities represented 8.2% of the total domestic employment and 7.7% of GDP (WTTC, 2021) before the COVID-19 pandemic. Compared to 2019, it was estimated an economic loss of 32.6% and a 19% reduction in employment in 2020 (WTTC, 2021). The study of FGV (2020) indicated that the negative effects propagated to 2021 when revenues of the tourism sector decreased by approximately 39%. Ribeiro et al. (2021), using the method of partial hypothetical extraction, showed a potential decline of 31% of tourist activities' GDP due to the COVID-19 pandemic in 2020. This downsizing in the tourism sector reflects a decline in both domestic and international tourism.

Events play an important role in the development of the tourism industry by attracting tourists across the globe and being a great motivation for travel. In this sense, instead of being linked to the value nature offers (sun, beaches, mountains, landscapes etc.), the search for culture is the basis of event tourism. Planned events in tourism are also created for the purpose of business, entertainment and sports (Getz and Page, 2016). On the other hand, events are among the largest sources of the transmission of infectious diseases such as COVID-19 (Ishola and Phin, 2011). This explains why cancelling or postponing were necessary measures to face the pandemic accordingly. Examples of postponement during the pandemic crisis include the Summer Olympics in Tokyo and the Cannes Film Festival or the cancellation of Wimbledon in the UK and the Metropolitan Opera in New York.

Another example is the Carnival in Brazil, which was cancelled for the first time in its history in 2021. Carnival is one of the most important and well-known tourism and cultural event in Brazil. This popular 5-day cultural celebration occurs annually, bringing together people from different Brazilian regions and several parts of the world. Carnival is regionally adapted to express the local history and culture. Also, it is multifaceted since it consists of different types of events such as samba, school parades, masquerade balls and street parades.

This research aims to estimate the regional, macroeconomic, and sectoral impact of Brazil without the Carnival due to COVID-19 in 2021. This year has a unique characteristic of being the year when all Carnival events were cancelled in locations over the country. In 2022, many municipalities suspended celebrations in their traditional mode but allowed private parties to occur, which tend to attract more residents than tourists and be inaccessible to the overall people. The last Carnival before the first case of COVID-19 generated approximately US\$ 1.5 billion from tourism activities (CNC, 2020) such as restaurants, accommodation, transportation, artistic and leisure activities and travel agencies. Those are the activities directed affected due to the absence of the Brazilian Carnival in 2021. Moreover, there are also indirect effects linked to the trade relations of tourism-related sectors.

The analysis is focused on the six most important states when it comes to organising Carnival, namely Rio de Janeiro<sup>6</sup>, São Paulo, Bahia, Minas Gerais, Pernambuco and Ceará, which are geographically located in the Northeast and Southeast regions of Brazil. The literature identifies in those regions the more diverse tourism attractiveness and the greatest potential to absorb Carnival-related labour (Guimarães and Silva, 2017). Considering the total spending on tourism realised in the Northeast region, Bahia, Ceará and Pernambuco stand out (Silva, 2015).

In this economic exercise applied to tourism, the effects of Carnival cancellation in each of the above-mentioned states are quantified through the lens of demand. In other words, it simulates the COVID-driven contraction in touristic domestic demand. It uses an unprecedented interregional input-output modelling for the population arrangements of each state calibrated for 2015 (Haddad et al., 2020a). This is the most recent and available data. It is worth highlighting that the official statistics office in Brazil does not publish interregional matrices.

Previous studies have focused on understanding the economic relevance of the tourism sector, whether from a nationwide perspective (Haddad et al., 2013; Rabahy, 2020; Ribeiro and Andrade, 2015), regional perspective (Freitas Cabral et al., 2020; Ribeiro et al., 2017; Silva, 2015), emphasising tourism and employment (Guimarães and Silva, 2017; Ribeiro et al., 2018), or the economic impacts of Carnival (Cruvinel, 2019). The literature concerning the effects of the COVID-19 pandemic on domestic tourism in Brazil is also plenty (Corbari and Grimm, 2020; Leite et al., 2020; Neves et al., 2021; Ribeiro et al., 2021). However, the implications of COVID-19 on various events have been understudied (Mohanty et al., 2020).

At least to our knowledge, the literature to date has not yet explored the interplay between COVID-19 and event tourism from the perspective of Carnival and employment based on input-output analysis. This is the gap this paper aims to fill. Furthermore, our regional analysis could be applied to any other country in the world. The remainder of the paper is organised as follows. Section 2 describes the methodology employed in the analysis and outlines the database and treatment of variables. Section 3 presents and interprets the main results whereas Section 4 draws some conclusions, highlighting potential policy recommendations for the post-Covid.

## **2. Methodological framework**

Several methods are available to quantify the increase in economic activity due to an event. The impacts of Carnival tourism on regional employment in the context of its cancellation are quantified using the input-output analysis. This method allows for tracking interrelationships between sectors and can assist policymakers (Haddad et al., 2013). The basic model, its applications and terminologies are provided in Miller and Blair (2009).

### **2.1. Impact analysis and database**

Among the input-output applications to national and international real-world problems, there is impact analysis. This analysis is relevant to understanding how the economy and its productive sectors respond to policy-driven or behaviour-driven changes. It involves an ex-ante and ex-post comparison of the input-output matrix results which evidence the impacts of those changes.

Following Miller and Blair (2009) specification, the model solution is represented through equation 1 and the impact analysis is described in equation 2.

---

<sup>6</sup> It is the main international touristic destination in Brazil, and one of the most important domestic destinations (Ribeiro and Andrade, 2015).

$$x = (I - A)^{-1}y \quad (1)$$

$$\Delta x = (I - A)^{-1}\Delta y \quad (2)$$

Where  $x$  is the sectorial output;  $I$  is the Identity matrix;  $(I - A)^{-1}$  is the Leontief Inverse matrix;  $A$  is the Technological Coefficient matrix defined as  $= \frac{z_{ij}}{x_j}$ ;  $z_{ij}$  is the trade relation between sectors  $i$  and  $j$ ; and  $y$  is the final demand vector.

According to equation 2, the increase in output ( $x$ ) is due to the exogenous variation in final demand ( $y$ ), which, in this paper, is based on the spending of Brazilian tourists on Carnival. Through equation 3 we can derive the sectoral impact on other economic variables such as GDP, employment, taxes etc.

$$\Delta v = \hat{v}\Delta x \quad (3)$$

where  $\hat{v}$  is a diagonal matrix formed by coefficients of the selected variable.

It is the basis of an economic impact study to estimate the magnitude of tourist spending that is added to the economy due to hosting the event. In general, they are implemented through survey methods, enabling to identify the flow of money from tourists to the local economy (the source and the destination of event-related expenditures) (Tyrrell and Johnston, 2001). Direct impacts are linked to the initial spending stimulus whereas indirect impacts are due to intersectoral transactions flowing from the tourist expenditure. In this paper, we use information obtained from multiple sources given the limited data availability, and the lack of a public and integrated database (of surveys) on Carnival<sup>7</sup>. Different from previous studies, this study uses the data to simulate a contraction of spending that takes place annually for a specific period due to the cancellation of the event. The accuracy of this impact assessment is, thus, highly dependent on the quality of this collected data.

For instance, we use the Carnival data of São Paulo collected through the survey of the Tourism Observatory and provided by the municipality of São Paulo (Capital, 2020). This is a proxy for the state as it is the main city that hosts the Carnival festivities, but similar proxies have also been adopted for all states under scrutiny. The state of São Paulo concentrates 32.6% of the national GDP, and the tourism sector represents 12.3% of its GDP. Rio de Janeiro is the state where the tourism sector plays the most important economic role; it accounts for 13.2% of the state's GDP. For the other states, the contribution of tourism to the national GDP varies between 9.9% (Minas Gerais and Pernambuco) and 11.2% (Bahia). From the economic perspective, the chosen states are responsible altogether for 60.15% of the GDP, as depicted in Table 1. Services are significant for their economy since they contribute to at least 50% of the region-specific value-added. While in São Paulo the relative share of services in the value-added is 67%, in Pernambuco and Bahia it corresponds to 50%.

---

<sup>7</sup> See Capital (2020), FGV (2021), Observatório do turismo (2021), JC (2020), Diário do Comércio (2020), Prefeitura de Fortaleza (2020).

**Table 1**– Contribution to Brazilian GDP and the relative share of services in the value-added of each state

State	Regional GDP/Brazilian GDP	Services/Value added
Ceará	2.23%	53%
Pernambuco	2.66%	50%
Bahia	4.09%	50%
Minas Gerais	8.78%	51%
Rio de Janeiro	10.83%	56%
São Paulo	31.56%	67%

**Source:** developed by the authors based on Haddad et al.(2020a).

To calculate the average expenditure of tourists during the Carnival we collected information on the number of tourists, the average permanence in days and the average daily expenditure by region. The type of Carnival festivity that takes place in the state is a factor influencing the decision of tourists to join it. In 2020, the number of tourists in the Carnival of São Paulo was estimated at approximately 4 million and 2 million in Rio de Janeiro and Pernambuco. Residents have notable participation in the Carnival of Bahia (0.6 million), Minas Gerais (0.2 million) and Ceará (0.2 million), rendering a lower number of tourists. Since the available data do not distinguish between street parades and school parades, as well as domestic and foreign tourists, this number can be over or underestimated. On average, tourists stay longer in Pernambuco and have a shorter stay in São Paulo. Differences in purchasing power across states may influence the average spending per day. This Carnival-related tourist characterization is depicted in Table 2.

**Table 2** - Carnival-related touristic characterization in 2020

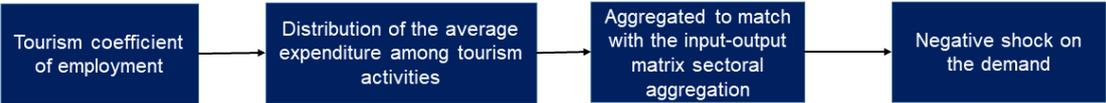
Region	Average permanence (days)	Average daily expenditure (R\$)
São Paulo	2.0	324
Rio de Janeiro	6.6	280
Bahia	5.7	344
Pernambuco	8.0	293
Minas Gerais	3.7	200
Ceará	6.0	431

This quantitative analysis applies an exogenous (negative) shock in the final demand, which starts with the average tourist expenditure during the average days spent celebrating Carnival 2020. Figure 1 describes how the shock was designed. To distribute the calculated tourist expenditure with Carnival across tourism characteristics activities, we used a coefficient of employment specific to the tourism sector. It has been calculated from data from the tourism labour market information system, publicly available in the IPEA extractor (IPEA, 2022); and aggregated to match the sectors of the input-output matrix. The regional and sectoral distribution of the amount herewith adopted in the impact analysis is depicted in Figure 2 and

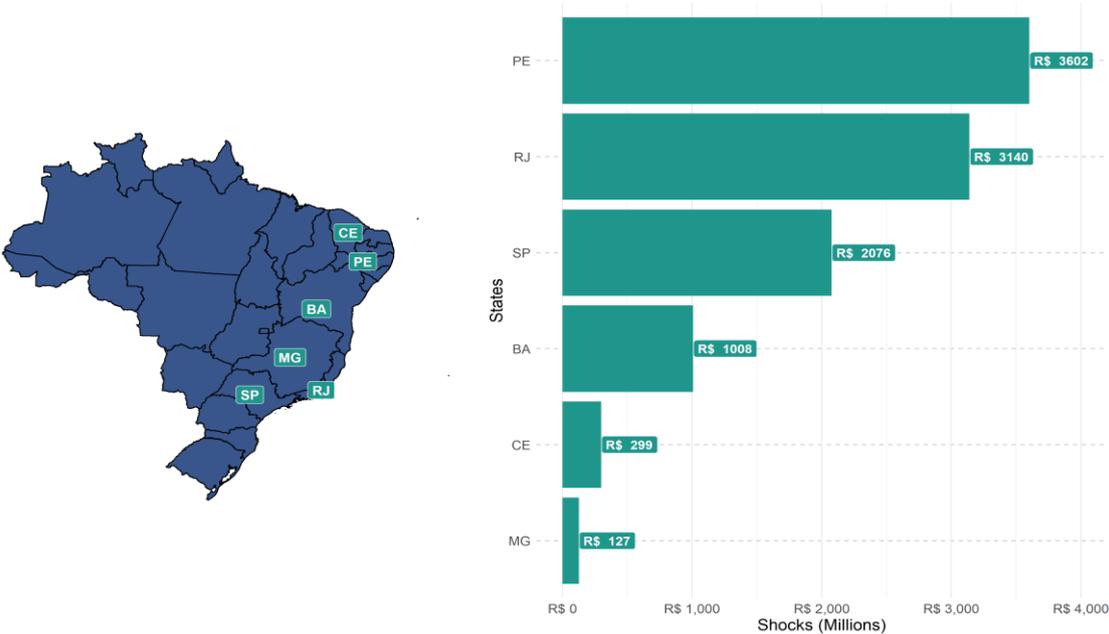
Figure 3, respectively. They have been deflated to express 2015 values, homogenised with the input-output matrix<sup>8</sup>. The total values range from R\$127 million to R\$3602 million.

The impact analysis represents the effects of cancelling Carnival on the following tourism activities: i) restaurants, ii) accommodation, iii) transportation, iv) artistic and leisure activities, and v) travel agencies, which belong to different sectors in the input-output matrix. For instance, travel agencies are classified into “Administrative activities and complementary services”. As observed in Figure 3, when compared to the magnitude of the shock on other tourism activities, cultural and recreational activities are the least affected albeit it differs across states. On the other hand, the imposed sanitary restrictions of COVID-19 have forced hotels and restaurants within the “Accommodation and food services” sector to drastically reduce or stop their activities. In the Carnival tourism chain, this sector ranks at the top, which is reflected in the implemented shock. Transportation ranks second, with prominent relevance in São Paulo, Rio de Janeiro, and Minas Gerais.

**Figure 1 – Shock description**

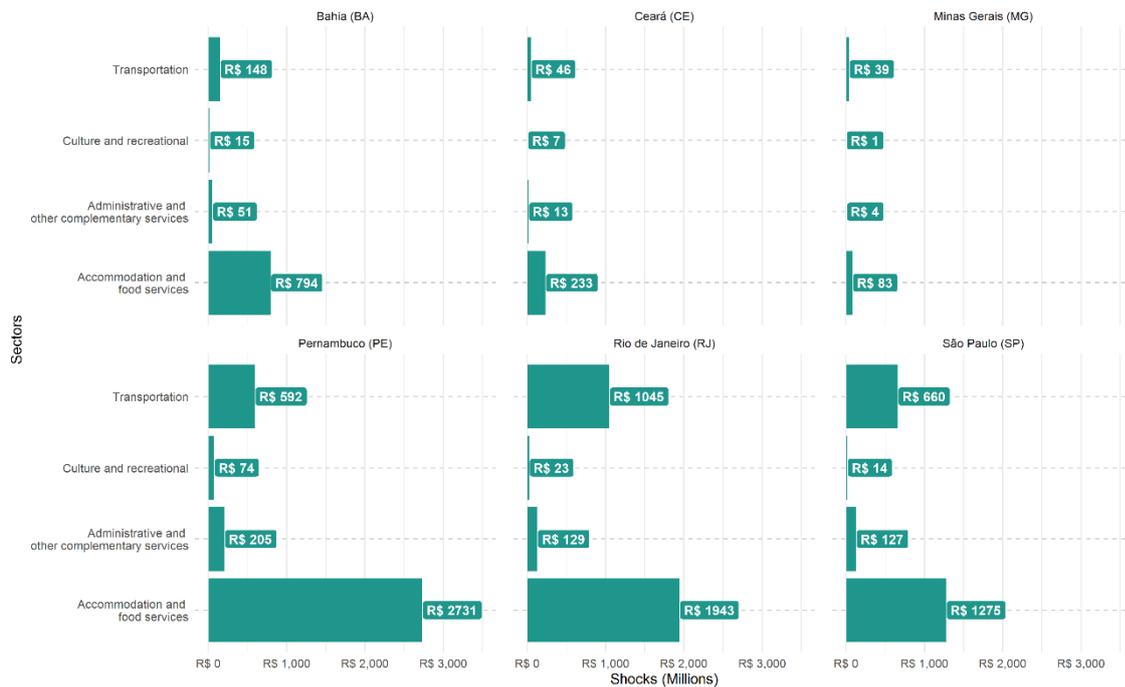


**Figure 2 - Regional distribution of the average Carnival expenditures in 2015 (in R\$ million)**



<sup>8</sup> Price deflation is based on the IGP-M.

**Figure 3 - Sectoral distribution of the shock across touristic activity**



This economic analysis uses interregional input-output matrices separately for each state, being the interpretation state-specific. These interregional matrices are originally aggregated into 22 productive sectors and four regions, where three of them refer to the population arrangements of the corresponding Brazilian state for the year 2015 (Haddad et al., 2020b). To this study, however, the matrices have been modified to display two regions, that is, the state itself and the rest of Brazil as to better frame the effects of Carnival cancellation at the state level.

We selected to explore some economic variables in this analysis, such as formal and informal employment and taxes, in addition to output and GDP. These are relevant given the tourism-driven economic dynamics and its capacity to generate jobs and public revenues. For that purpose, the variable of total employment has been disaggregated into formal and informal occupations across the 22 productive sectors based on the Continuous National Household Sample Survey (“PNADC” in Portuguese) of 2015 (IBGE, 2021), which allows for maintaining the original data for the states and the rest of Brazil. The PNADC is useful to obtain the relative share of formal and informal occupations by economic activity in the total employment that is being applied to the input-output matrix. As formal employment, it alludes to workers who had worked at the reference week under the securement of wage and labour rights. In contrast, informal employment corresponds to the lack of a formal contract. Concerning the labour market, the following aspects are considered:

- i) people aged between 18 and 70 years old, inclusive;
- ii) individuals with positive income, who had worked during the reference week;
- iii) only the person responsible for the household and the respective spouse;
- iv) exclusion of those with more than one job in the reference week (the only main job is prioritised);
- v) exclusion of military personnel, public servants, self-employed workers and unpaid workers;

vi) the sectors are classified according to the CNAE 2.0 code<sup>9</sup>.

Given the total number of workers in the national labour market of Brazil, the total employment in the individual matrices is equal. In other words, the employment of the state varies while total employment remains unchanged since only two regions are represented, i.e., the state and the rest of Brazil. The resulting impacts of this input-output impact analysis are provided in the next section.

### 3. Regional economic impacts of a Brazil without the Carnival

Due to the COVID-19 pandemic, 2021 was the first year in the history of Carnival without its traditional festivities across Brazilian regions. Recognising the importance of the festival for celebrants but also to the regional economies, this study assumes that the Carnival cancellation negatively affects tourism activities. Table 3 shows the regional impact of carnival cancellation on economic variables among Brazilian states. These results should be interpreted as the percentage growth in relation to the input-output baseline.

**Table 3** - Carnival's cancellation impacts on economic variables, 2015 (%)

Regions	Output	GDP	Formal employment	Informal employment	Taxes
SP	-0.05	-0.09	-0.01	-0.17	-0.11
RJ	-0.20	-0.37	-0.72	-0.72	-0.47
BA	-0.17	-0.27	-0.42	-0.27	-0.40
PE	-1.15	-1.78	-2.84	-2.60	-2.65
MG	-0.01	-0.02	-0.03	-0.02	-0.02
CE	-0.13	-0.18	-0.28	-0.19	-0.26

**Source:** calculated by the authors

The economic impacts on a given hosting state depend upon its productive structure and the spending of a determined number of tourists participating in the event. This is captured in our results. From a regional perspective, suspending Carnival had an immediate effect on GDP, with losses that range from 0.02% to 1.78%. Among the six regions analysed, the negative economic impacts are the largest in Pernambuco (PE) and Rio de Janeiro (RJ). In the context of COVID-19, the reduction in tax collection has substantial implications for pandemic management. In Pernambuco (PE), for instance, it decreases by 2.65%.

Despite having one of the biggest Carnivals in the country, São Paulo shows a drop of only 0.09% in GDP and the total employment remains virtually unchanged. This can be explained, in part, by having one of the most diversified economies in the country. Rio de Janeiro (RJ), on the other hand, among the analysed states, has the largest share of tourism in GDP (14.2%) and Minas Gerais (MG) has the lowest share (9.9%). In Minas Gerais, GDP losses are virtually null. Since Carnival celebrations in the countryside of Minas Gerais are also popular, but disregarded in the data collected, this result may underestimate the real magnitude of the negative effects. In Pernambuco, a drop in the monetary inflow from Carnival represents a fall in the output of 1.2%, the largest economic cost observed among the states evaluated. This number should be interpreted with caution, as it seems small but considering the temporary status (i.e., its short duration) of Carnival, it is significant.

The negative economic effects of COVID-19 have been found in previous studies within different scopes of analysis and geographical coverage (Gierczak-Korzeniowska et al., 2021;

<sup>9</sup> National Classification of Economic Activities, version 2.0.

Škare et al., 2021). The primary and direct impact of cancelling the Carnival of 2021 was to waive the spending of tourists, which also leads to a decline in job creation. The tourism sector is intensive in labour so reductions in production cause additional decreases in employment levels. More than 200 thousand direct jobs (formal and informal) would have been created if Carnival had not been cancelled in the hosting states. Compared to the one-day Comrades Marathon, in Pietermaritzburg (South Africa), which creates approximately 630 job opportunities (Saayman and Saayman, 2012), this evidence demonstrates the importance of Carnival in terms of employment generation. The region experiencing the most significant drop, in absolute terms, is Pernambuco, with a total of approximately 110 thousand and 14 thousand formal and informal jobs, respectively. Carnival-driven tourist expenditures in Pernambuco are greater than in the other states. As a result, losses in local financial revenues accruing to the local economy of Pernambuco are substantial, especially in light of existing levels of regional development.

Considering the differences in terms of formal and informal employment, the case of São Paulo is unique as informal employment is the most affected by the cancelling of Carnival, falling 0.2% in relation to the baseline. At this time, COVID-19 data reported an average of 230 deaths per day, and several non-essential activities had been suspended in the state. The necessary sanitary measures imposed an economic cost on informal workers who usually monetize their activities during Carnival. Additionally, tax collection reduced R\$140 million in São Paulo. In contrast, formal jobs respond to the largest share of job opportunities related to Carnival (85%) that have been cancelled in Rio de Janeiro. The school parade of Rio de Janeiro is well-known worldwide for its traditional performances; it has an established infrastructure to receive tourists and the Carnival labour market has been increasingly following this formalisation.

As stated in Škare et al. (2021), in the case of the global tourism sector, changes in employment occur directly in the local touristic activities but also in other sectors and regions. Employment effects are found in the rest of Brazil, and between 557 and 13798 jobs could have been created. This effect is associated with the pre-existing sectoral inter-regional flows as a demand contraction driven by the cancellation of Carnival during the COVID-19 pandemic affects negatively other productive sectors across the country. This is translated into a drop in the sectoral GDP, particularly for the “Other manufacturing industries”, “Agriculture” and “Food manufacturing”. There are interlinkages between those sectors and the Carnival-related tourism activities of the input-output framework. In the absence of Carnival, a decrease in the production levels of hosting states prompts a decrease in the demand for inputs from other sectors located in the rest of Brazil.

The economic cost of cancelling Carnival in 2021 is the largest in the Carnival-related sectors of the analysis, as indicated in Table 4. The impacts on these sectors are in line with the findings of other studies that quantified the economic impacts of event tourism. For example, in Sánchez et al. (2017), the hotel and restaurant sectors benefit the most from the Holy Week celebrations, an evaluation of a positive demand shock. Pedauga et al. (2022) quantified the economic impacts of the disappearance of sports tourism events, which is considered a hypothetical scenario that could only occur under certain circumstances such as pandemics. This would cause a fall in GDP, and the most significantly impacted sector would be accommodation services.

A similar impact is observed in the case of Carnival, albeit with varying magnitudes across its hosting states. In Pernambuco, the sector responded with a 35% decrease in GDP while artistic and entertainment activities and transportation suffered an 11% and 6% loss, respectively. Although investigating the inflow to the economy from a small-scale event, Kim and Dombrosky (2016) found that recreational activities rank second in terms of direct impacts. For Lu et al. (2019), tourism events hosted in capital cities tend to generate stronger impacts on

the economic development of the hosting cities, with greater implications for the tertiary economy. The direct economic impact of cancelling Carnival emanates from the initial expenditure loss specified at the capital level and amplified for the state under the assumption of being the central point of celebration. From this perspective, COVID-19 may have hindered efforts to promote local economic development.

**Table 4** - Sectoral GDP effects by state

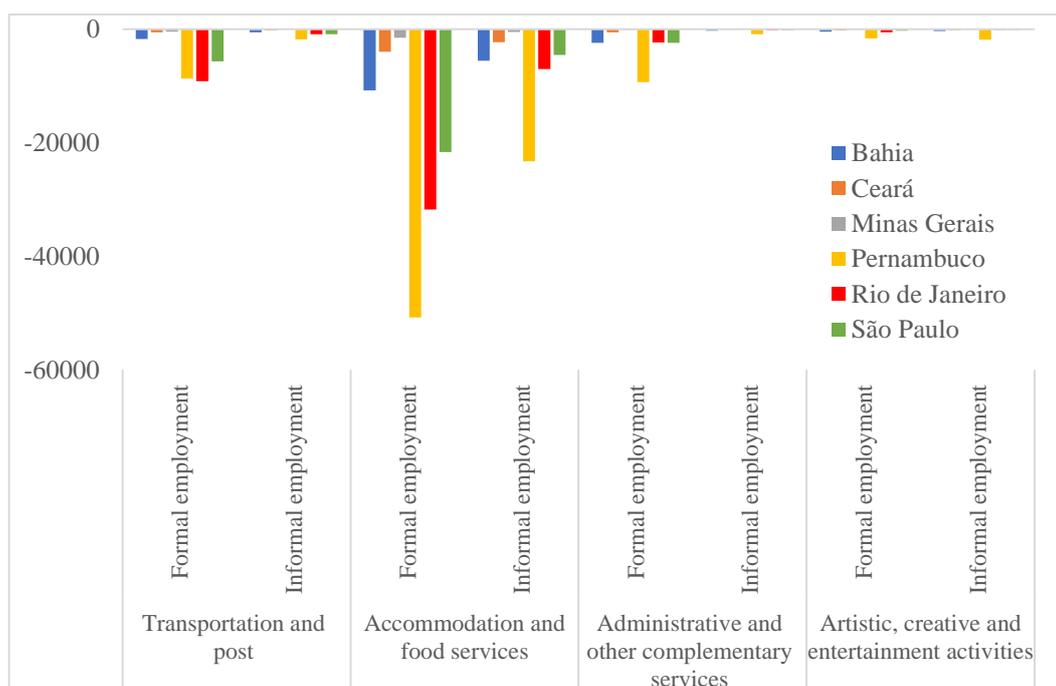
Sectors	BA	CE	MG	PE	RJ	SP
Agriculture	-0.05%	-0.03%	0.00%	-0.39%	-0.13%	-0.04%
Extractive industry	-0.06%	-0.03%	0.00%	-0.27%	-0.06%	-0.02%
Food manufacturing	-0.19%	-0.11%	-0.01%	-0.80%	-0.30%	-0.06%
Machinery and equipment manufacturing	-0.02%	-0.02%	0.00%	-0.12%	-0.03%	-0.01%
Other manufacturing industries	-0.10%	-0.09%	0.00%	-0.91%	-0.17%	-0.05%
Electricity and gas supply	-0.11%	-0.05%	0.00%	-0.53%	-0.11%	-0.04%
Water supply and waste management activities	-0.15%	-0.08%	-0.01%	-0.86%	-0.14%	-0.06%
Construction	-0.01%	-0.01%	0.00%	-0.09%	-0.02%	-0.01%
Trade	-0.13%	-0.07%	-0.01%	-0.77%	-0.19%	-0.04%
Transportation and post	-0.83%	-0.71%	-0.10%	-6.44%	-1.98%	-0.49%
Accommodation and food services	-5.00%	-3.65%	-0.38%	-35.19%	-5.78%	-1.68%
Telecommunications	-0.06%	-0.04%	0.00%	-0.36%	-0.06%	-0.02%
Financial, insurance and related services activities	-0.10%	-0.06%	-0.01%	-0.58%	-0.13%	-0.02%
Real estate activities	-0.06%	-0.03%	0.00%	-0.33%	-0.07%	-0.02%
Scientific and technical activities	-0.17%	-0.10%	-0.01%	-0.83%	-0.14%	-0.04%
Administrative and other complementary services	-0.83%	-0.29%	-0.03%	-4.66%	-0.49%	-0.15%
Public Administration and defence, social security	-0.01%	0.00%	0.00%	-0.03%	-0.01%	0.00%
Education	0.00%	0.00%	0.00%	-0.03%	-0.01%	0.00%
Health and social work	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Artistic, creative and entertainment activities	-1.54%	-1.10%	-0.02%	-10.51%	-0.44%	-0.12%
Other services activities	-0.03%	-0.01%	0.00%	-0.19%	-0.03%	-0.01%
Domestic services	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

The economy of Pernambuco is particularly more sensitive to the cancelling of Carnival celebrations since the negative effects on GDP propagate significantly to non-Carnival sectors, which also produce to satisfy the Carnival tourism demand. It is worth noting that the production of a given sector is set up to meet the demand of the whole economy, therefore, it is not limited to the Carnival value chain. Other sectors absorb the effects differently. There are important productive linkages between the “Accommodation and food services” being reflected in the indirect effects the “Food manufacturing” sector faces in all hosting states.

Considering the tourism activities associated with the Carnival festivities, Figure 4 displays the sectoral direct effects on employment expressed in absolute terms. These are mostly concentrated in the “Accommodation and food services”, with losses of job opportunities particularly high in the case of formal employment. For Pernambuco, Rio de Janeiro, and São Paulo, this reduction corresponds to approximately 50 thousand, 31 thousand and 21 thousand, respectively. The number of formal jobs that would have been created in the transportation sector of Rio de Janeiro exceeds that of the other states. In Minas Gerais and Ceará, the employment effects are relatively lower, given the size of their Carnival celebration. This small magnitude is also reflected in the amount of taxes the government would have collected had the Carnival occurred in 2021, R\$4.5 million in Minas Gerais and R\$11 million in Ceará. Ultimately, the benefits of recycling the tourist expenditures on Carnival through the local economy have not been realised in the hosting states, limiting the potential for helping shield important economic and social indicators in that year.

**Figure 4** - Sectoral direct effects on employment by type and region



#### 4. Conclusions

This paper is proposed to quantify the negative economic impact of cancelling Carnival tourism during the COVID-19 pandemic. Its results constitute the first attempt to combine Carnival tourism and economics in Brazil in the context of a global pandemic. Brazilian Carnival tourism is a social phenomenon of high economic relevance for the states where it is culturally more vibrant. However, the COVID-19 pandemic has disrupted the annual celebrations and for the first time, a silence echoed in the streets.

The Carnival cancellation in 2021 led to economic costs for the hosting states given the decreased number of tourists, tax income and employment opportunities generated for the purpose of the Carnival celebration. The implications of this contraction in the Carnival demand are derived from an input-output impact analysis. Each hosting state responds to the reduction in the average expenditure of tourists differently, following its pre-existing productive structure. The estimations indicate that Pernambuco was by far the hardest hit, with negative impacts spread over Carnival-related sectors and across the supply chain linkages to other productive sectors. Overall, the GDP loss amounted to R\$6.8 million for an event that usually lasts 5 days per year. More than 200 thousand direct jobs (formal and informal) would have been created if Carnival had not been cancelled in the hosting states. For most of the states, these employment opportunities are largely attributed to formal positions, except for São Paulo, where informal job losses predominate.

The evidence suggests that tourism activities are the most affected, even if the impacts are relatively small. The “Accommodation and food services” sector experiences the largest reduction in terms of GDP, employment, and tax generation. This is in line with previous studies in the literature on event tourism. The government could have collected approximately R\$650 million in taxes. A decline in the Carnival-related tax generation is problematic from an economic and social perspective as taxes can be recycled and used for regional development purposes. In 2021, it could have supported the COVID-19 crisis management. Other sectors in the indirect Carnival chain have also been undermined by the cancellation of Carnival in 2021, such as the “Other manufacturing industries” but the scale of the effects varies across sectors. This effect propagated to sectors with productive activities in other regions of Brazil.

Despite the extensive literature on the impact of COVID-19 on tourism, few studies are focused on event tourism, and more specifically Carnival tourism. The lack of official Carnival statistics at both state and national levels impairs obtaining a more realistic quantification of the economic impacts caused by the cancellation of Carnival during the pandemic. Therefore, there might be some under or overestimation of the average tourist spending considered as an initial withdrawal from the hosting economies. Given the substantial economic relevance of tourism and Carnival as well, public policies could be used as tools to promote a multitude of tourism events thereby encouraging the tourism value chain to develop. This strategy would protect states more dependent on the tourism sector and where Carnival plays a more significant role.

Despite the relevant contribution of this paper and its adherence to the basic principles of impact analysis, it remains to provide the best estimates available. Also, it involves a few limitations such as measurement errors and incompatibility of the Carnival tourist expenditure data. In this case, it is not explicitly specified whether Carnival-related tourist expenditures refer to domestic, foreign or both types of tourists. In addition, the study fails to account for the interregional spillover effects since it uses separated interregional matrices. To advance in this research agenda, future contributions should focus on assessing such spillover effects on the rest of Brazil while understanding how to strengthen domestic tourism, including through promoting event tourism and seize its economic potential. An integrated database comprising surveys applied annually during Carnival in all states can also improve economic impact

analysis of event tourism. Important lessons emerge from atypical moments. This research has highlighted those linked to the Carnival cancellation in the context of COVID-19.

## References

Capital, 2020. Carnaval 2020 movimentada cerca de R\$ 3 bilhões em São Paulo. URL <https://www.capital.sp.gov.br/noticia/carnaval-de-rua-2020-movimentada-r-2-75-bilhoes-em-sao-paulo> (accessed 1.22.22).

Cheng, H.Y., Jian, S.W., Liu, D.P., Ng, T.C., Huang, W.T., Lin, H.H., 2020. High transmissibility of COVID-19 near symptom onset. medRxiv.

Corbari, S.D., Grimm, I.J., 2020. A pandemia de COVID-19 e os impactos no setor do turismo em Curitiba (PR): uma análise preliminar. *Ateliê do Tur.* 1–26.

Cruvinel, E.H. de P., 2019. Estudo do impacto econômico do Carnaval de 2018 em Belo Horizonte. *Rev. Tur. Contemp.* 7, 69–84.

Diário do Comércio, 2020. Carnaval contou com 4,45 milhões de foliões em Belo Horizonte URL <https://diariodocomercio.com.br/negocios/carnaval-de-bh-contou-com-445-mi-de-folhoes/#:~:text=O%20n%C3%BAmero%20de%20turistas%20na,56%20durante%20todo%20o%20evento> (accessed 1.27.22).

FGV, 2021. Rio perde R\$ 5,5 bilhões sem carnaval, segundo FGV IBRE. URL <https://portalibre.fgv.br/noticias/rio-perde-r-55-bilhoes-sem-carnaval-segundo-fgv-ibre> (accessed 1.22.22).

FGV, 2020. Impacto Econômico do Covid-19 Propostas para o Turismo Brasileiro.

Freitas Cabral, M.V., Cabral, J.A., Oliveira, D.G.B., Lima, P.V.S., 2020. Análise da estrutura produtiva do setor de turismo do estado do Rio de Janeiro, in: *Anais Do XVIII Encontro Nacional Da Associação Brasileira de Estudos Regionais e Urbanos – XVII ENABER.*

Getz, D., Page, S.J., 2016. Progress and prospects for event tourism research. *Tour. Manag.* 52, 593–631.

Gorbalenya, A.E., Baker, S.C., Baric, R.S., de Groot, R.J., Drosten, C., Gulyaeva, A.A., Haagmans, B.L., Lauber, C., Leontovich, A.M., Neuman, B.W., Penzar, D., Perlman, S., Poon, L.L.M., Samborskiy, D. V., Sidorov, I.A., Sola, I., Ziebuhr, J., 2020. The species Severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nat. Microbiol.* 5, 536–544.

Gössling, S., Scott, D., Hall, C.M., 2021. Pandemics, tourism and global change: a rapid assessment of COVID-19. *J. Sustain. Tour.* 29, 1–20.

Guimarães, C.R.F.F., Silva, J.R., 2017. Turismo e geração de empregos formais : Um estudo sobre o Brasil e suas regiões Tourism and formal job creation : A study on Brazil and its regions. *Rev. Tur. Desenvolv.* 27/28, 1273–1286.

Haddad, E.A., Araújo, I.F., Perobelli, F.S., 2020a. Estrutura das Matrizes de Insumo-Produto dos Arranjos Populacionais do Brasil , 2015 ( Nota Técnica ). São Paulo.

Haddad, E.A., Araújo, I.F., Perobelli, F.S., 2020b. Matriz Inter-regional de Insumo-Produto para o Arranjo Populacional de Salvador, 2015. Núcleo Econ. Reg. e Urbana da USP - NEREUS e Fundação Inst. Pesqui. Econômicas - FIPE. URL <http://www.usp.br/nereus/?txtdiscussao=estrutura-das-matrizes-de-insumo-produto-dos-arranjos-populacionais-do-brasil-2015-nota-tecnica>

- Haddad, E.A., Porsse, A.A., Rabahy, W., 2013. Domestic tourism and regional inequality in Brazil. *Tour. Econ.* 19, 173–186.
- IBGE, 2021. Catálogo. Indicadores IBGE Pesqui. Nac. por amostra domicílios contínua [mensal]. URL <https://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=73086> (accessed 3.23.21).
- IPEA, 2022. Sistema de informações sobre o mercado de trabalho no setor turismo – SIMT. URL <https://www.ipea.gov.br/extrator/simt.html> (accessed 4.9.22).
- Ishola, D.A., Phin, N., 2011. Could influenza transmission be reduced by restricting mass gatherings? Towards an evidence-based policy framework. *J. Epidemiol. Glob. Health* 1, 33–60.
- JC, 2020. Receita turística de Pernambuco atinge R\$ 2,3 bilhões durante o Carnaval 2020. URL <https://jc.ne10.uol.com.br/pernambuco/2020/03/5601310-receita-turistica-de-pernambuco-atinge-r-2-3-bilhoes-durante-o-carnaval.html> (accessed 4.9.22).
- Kim, S., Dombrosky, J., 2016. Economic impact of small-scale event to the local economy: Case of Canfield Fair. *Journal of Tourism Insights*, 7(1), 7.
- Leite, J.C.L., Santos, S.R. dos, Leite, Â.R.L., 2020. Os impactos econômicos da COVID-19 no setor de turismo no Maranhão. *Rev. Tur. Cid.* 2, 104–122.
- Meliani, P.F., Gomes, E.T., 2010. Contradições entre a importância do trabalhador e a precarização das relações de trabalho no turismo: notas primeiras de uma pesquisa de tese para doutoramento. *Rev. Tur. Desenvolv.* 1, 117–126.
- Miller, R., Blair, P., 2009. *Input-Output analysis: foundations and extensions*, 2nd ed. Cambridge University Press, Cambridge.
- Mohanty, P., Dhoundiyal, H., Choudhury, R., 2020. Events Tourism in the Eye of the COVID-19 Storm: Impacts and Implications. *SSRN Electron. J.*
- Neves, C.S.B., Carvalho, I.D.S., Souza, W.F.L. De, Filippim, M.L., 2021. Os impactos da COVID-19 nas viagens de turistas brasileiros: conjuntura e perspectivas na eclosão e na expansão da pandemia no Brasil. *Tur. - Visão e Ação* 23, 2–25.
- Observatório do turismo, 2020. Pesquisa de caracterização e dimensionamento do turismo receptivo e avaliação de serviços durante o Carnaval de Salvador – 2020. URL [http://www.observatorio.turismo.ba.gov.br/wp-content/uploads/2020/03/Relatorio\\_Pesquisa\\_Carnaval\\_2020.pdf](http://www.observatorio.turismo.ba.gov.br/wp-content/uploads/2020/03/Relatorio_Pesquisa_Carnaval_2020.pdf) (accessed 4.9.22).
- Pedauga, L. E., Pardo-Fanjul, A., Redondo, J. C., Izquierdo, J. M., 2022. Assessing the economic contribution of sports tourism events: A regional social accounting matrix analysis approach. *Tourism economics*, 28(3), 599-620.
- Pratt, S., 2015. The economic impact of tourism in SIDS. *Ann. Tour. Res.* 52, 148–160.
- Prefeitura de Fortaleza, 2020. Observatório do Turismo de Fortaleza pesquisa sobre o Ciclo Carnavalesco 2020. URL <https://www.fortaleza.ce.gov.br/noticias/observatorio-do-turismo-de-fortaleza-divulga-pesquisa-sobre-o-ciclo-carnavalesco-2020> (accessed 3.2.22).
- Rabahy, W.A., 2020. Tourism analysis and perspectives in Brazil TT - Análisis y perspectivas del turismo en Brasil TT - Análise e perspectivas do turismo no Brasil. *Rev. Bras. Pesqui. em Tur.* 14, 1–13.
- Ribeiro, L.C.S., Andrade, J.R.D.L., 2015. Characterization of tourism clusters in Brazil. *Tour. Econ.* 21, 957–976.

- Ribeiro, L.C.S., Lopes, T.H.C.R., Montenegro, R.L.G., Andrade, J.R.D.L., 2018. Employment dynamics in the Brazilian tourism sector (2006–2015). *Tour. Econ.* 24, 418–433.
- Ribeiro, L. C. S., Santos, G. F., Cerqueira, R. B., Souza, K. B., 2021. Do income policy mitigate the economic impacts of Covid-19 on tourism in Brazil? *Economics Bulletin*, Vol. 0 No. 0 p.A222.
- Ribeiro, L.C.S., Silva, E.O.V. da, Andrade, J.R.D.L., Souza, K.B. De, 2017. Tourism and regional development in the Brazilian Northeast. *Tour. Econ.* 23, 717–727.
- Sánchez, V. L., Fernández, M. D., Lara, J. Á. S., 2017. Economic impact of a religious and tourist event: A Holy Week celebration. *Tourism Economics*, 23(6), 1255-1274.
- Santos, F.R. dos, Ribeiro, L.C.S., Silveira, E.J.G. da, 2018. Caracterização das atividades turísticas nos municípios brasileiros em 2015. *Rev. Bras. Pesqui. em Tur.* 12, 65–82.
- Saayman, M., & Saayman, A., 2012. The economic impact of the Comrades Marathon. *International Journal of Event and Festival Management*.
- Škare, M., Soriano, D. R., Porada-Rochoń, M., 2021. Impact of COVID-19 on the travel and tourism industry. *Technological Forecasting and Social Change*, 163, 120469.
- Silva, E.O.V., 2015. Avaliando os gastos turísticos na região Nordeste em 2011: Simulações com um modelo de insumo-produto interregional. *Mestr. em Desenvolv. Reg. e Gestão Empreendimentos Locais*. Universidade Federal de Sergipe.
- Strassert, G., 1968. Zur Bestimmung strategischer Sektoren mit Hilfe von Input-Output-Modellen 182, 211–215.
- Tyrrell, T. J., & Johnston, R. J, 2001. A framework for assessing direct economic impacts of tourist events: Distinguishing origins, destinations, and causes of expenditures. *Journal of travel Research*, 40(1), 94-100.
- UNCTAD, 2021. COVID-19 and Tourism an update: Assessing the Economic Consequences. United Nations Conference on Trade and Development, Geneva.
- WTTC, 2021. Brazil 2021 Annual Research: Key highlights. Available at: <https://wttc.org/Research/Economic-Impact>.
- WTTC, 2021. Travel & Tourism: Economic impact 2021. Available at: <https://wttc.org/Research/Economic-Impact>.