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THE ECOLOGICAL FOOTPRINT METHOD - EFM: a study of indicators of the Foz do Iguaçu Eduardo Hotel Ecological Footprint

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ABSTRACT

A growing number of studies have attempted to assess the environmental impacts of industries and cities. However, there is lack of substantial data on the ecological footprint from the Tourism Industry. To address this gap, this study specifically aims to identify EFM of a hotel in relation to electricity, mobility, water, waste and land use items (triggers) for the twelve months of 2013, and to establish the Holiday EFM of potential tourists. The method outlined adopts quantitative research techniques with an exploratory basis. The research used documents, spreadsheets and polls conducted in two of the most popular tourist attractions of Foz do Iguaçu (Iguaçu Falls and Itaipu Binacional) among potential clients of the hotel. The results demonstrate that among the EFM triggers identified, the main one was water consumption. Nevertheless, there is a simple way to compensate EFM by following the tips from environmental seals and pamphlets.

Keywords: Ecological Footprint Method. Holiday EFM. Indicators.

INTRODUCTION

According to Embratur (2014), Brazil has 6th largest tourism industry worldwide, since the country hosted 2014 World Cup and 2016 Summer Olympics. Consequently, the country had about 700,000 international arrivals during that period (Folha de São Paulo, 2014), and profited by $ 1.4 billion from it (Ministério do Turismo, 2014).

Tourist destinations, besides tourism companies themselves, are in the spotlight of the tourism industry. Foz do Iguaçu is one of the top tourist destinations, making it the second most visited Brazilian city by foreign tourists for leisure trips (Abeoc, 2014). The Iguaçu Falls are recognized by the New 7 Wonders Foundation as one of the seven new natural wonders of the world, and the nearby hydroelectric dam, Itaipu Binacional, is considered one of the Seven Wonders of the Modern World (Sebrae, 2014).

According to the Secretaria Municipal de Turismo [Municipal Tourism Administration] (2014), the 161 accommodation establishments in the city, ranging from hostels and budget hotels to luxury resorts, represent the fourth largest hotel complex in Brazil, with approximately 22,000 beds. Of these establishments, 44.95% are one or two-star hotels, which include the hotel studied in this research.

There is intense competition among two-star hotels in the city, as according to the managers of the hotel studied in this research, guests are searching for competitive prices. To mitigate this problem, the implementation of Environmental Management System elements could provide a factor of competitive advantage for accommodation establishments in this category. However, an in-depth study would be needed, focusing on its indicators and compensatory possibilities, to demonstrate the possibility of implementing such elements. Thus, the researchers sought to understand and apply the concepts of EFM and Holiday EFM in the hotel venture in question.

Ecological Footprint Method & Holiday EFM:

Since Tourism is an industry that has its share on environmental impact, it is necessary to find ways to minimize its environmental consequences. EFM is, therefore, a helpful procedure. According to Parente (2007, p. 22) "EFM was born with the purpose of estimating the impacts on the natural environment, to show the amount of productive area of land and water used to provide products to supply the population". Within this context, a calculation was created to identify the ecological footprint. For Sebastião (2010, p. 30) "the ecological footprint is an indicator of ecological sustainability focused on the environmental dimension of sustainable development". Thus, the calculation is a criterion for diagnosing the impact caused by humans on a destination.

According to Furtado, Hourneaux Junior & Hrdlicka (2008, p. 2) "ecological footprint is expressed by a metric indicator, characterized by the number of hectares of productive land needed to provided renewable natural resources that sustain the consumption pattern". In this respect, EFM is an instrument that is used to measure the environmental impact caused by humans.

According to Wackernagel & Ress (1996) apud Parente (2007, p. 24) EFM "is a tool designed for measuring environmental sustainability, focusing on global concerns, ecological deterioration and social injustices". In other words, EFM enables dependency relationships to be established between the individual, their activities, and the natural resources needed to carry them out and to absorb the waste generated by them, in order to estimate the amount of land areas (hag) and visitors that would it would support, while maintaining the ecosystem (Dias, 2007, apud Sebastião, 2010).

Understanding population consumption patterns in each locality is important to learn how the method works. Considering the direct influences of high consumption on the natural resources, this feature was created to point out the impacts caused by human beings.

The tool calculates the consumption of humans as well as companies, cities, provinces, countries, or even on a global scale. For Parente (2007, p. 23), EFM "is a mechanism that provides conditions for policy makers in designing activities to minimize the impacts resulting from human activities against the natural capital". This calculation makes use of five indicators of consumption that use the largest amounts of natural resources: food (vegetables and meat), housing (built area), transportation (public or private), consumer goods (equipment, clothes, paper and others) and services (banks, hotels, restaurants and others) (Andrade, 2006; Sebastião, 2010; Parente, 2007).

These are the factors used in the calculation of the ecological footprint. It is noticeable that the categories cited are calculated in hectares of land (Feitosa & Gómez, 2013). Based on this, EFM becomes an ally for Tourism, as it measures the use of land area to support the consumption patterns of the tourists. The tourist is the crucial point for a hotel venture to measure its ecological footprint and set strategies to minimize environmental impacts, as it is the main cause of environmental impact.

For this purpose, Andrade (2006), Sebastião (2010) and Parente (2007) refer to Holiday EFM (HEFM) - a tool applied to calculate the environmental impacts of tourism/tourists in a region. This tool can also be used to measure and compare the features of different types of behaviors and choices of tourists (Sebastião, 2010). Having calculated the EFM, organizations should establish parameters of measurement to obtain environmental certification, which, in Tourism Industry, certifies companies such as accommodation establishments, travel agencies, natural parks, restaurants, and others (Neiman, 2010).

METHODOLOGY

This research adopts quantitative and qualitative techniques (Roesch, 2011) with an exploratory basis. The research sources included surveys with open and closed questions (Dencker 2001) and documents, such as the National Guest Registration Form (Ficha

Nacional do Hóspede - FNH), water and energy bills, as well as other internal registration documents and bibliographical references.

To set boundaries for the variables of the first goal, the variables used were as follows: electricity, mobility, waste, water and land use (Parente, 2007; Silva, Silva & Enders, 2012; Quercus, 2014), as these are the most commonly used variables, especially in studies on means of accommodation, considering that the prerogative of claiming the sector is carbon free is almost null, the multiple interrelations within the sector, and the high costs involved.

Tourist transportation variables were defined to achieve the second goal (Parente, 2007; Green Nation, 2014), such as type of means of transport, origin, duration and stopovers/connections. Ultimately, liabilities of tourists can also be directly or indirectly part of the environmental footprint of hosting.

As compensatory measures adapted to the reality of the enterprise that is the focus of this study, we opted for environmental education, tree planting and the 3Rs (reduce, recycle and reuse) (Ministry of the Environment, SOS Mata Atlântica, Green Passport, Green Initiative and Guests of Nature). These actions are listed in the main pamphlets of environmental organizations.

The selection of target audience for the survey was based on probability sampling (Barbetta, 2011). Considering the total number of visitors to the Itaipu Binacional dam and Iguaçu Falls in 2013, we found a sub-population of 237 people for Iguaçu Falls and 112 people for the Itaipu Binacional. This data was used to calculate the probability sampling.

The data collection procedure is characterized by the use of multiple methodologies (Dencker, 2001). To analyze the results of the indicators, the statistical methods of frequency and association (Andrade, 2009) and content analysis (Marconi & Lakatos, 1999) were used.

A pre-test was launched at the enterprise from August 2nd to August 18th, 2014, at the guest check-in desk (initially, it was intended to research the actual clients of the hotel) and virtually through guest's emails (at the Fan page of the hotel and using Google Docs Forms). However, due to the fact that it was the low season, and lack of interest of the guests, the survey did not have a significant number of respondents (only 22). Despite this, these initial respondents were helpful for adjusting the language and focus of the research to potential demands such as marketing studies, focusing green marketing as a competitive advantage for client attraction (suggestion for future studies).

After making these changes, 348 polls were applied from August 23rd to 24th, 2014, in at Itaipu Binacional and Iguaçu Falls, with 150 and 198 polls, respectively (following the pattern of percentage stratification).

RESULTS AND ANALYSIS: IDENTIFICATION OF EFM

EFM is a tool to calculate the environmental impact caused by an individual. As presented in the Methodology section, the first objective is to calculate the main triggers in the environmental footprint of the studied organization.

To answer this question, the first objective was to conduct a comprehensive literature review on the subject, given that it is recent subject. The main sources of information were scientific articles, Master's thesis and Doctoral dissertations. It was seen that there was a need for dialogue between researchers from other fields, to complement the theme of this study. These other researchers include: Aparecido Parente - Master in Business Administration, Cláudio Evaldo-Environmental Engineer, Bere Adams – Apoema Project, Felipe Marques -Environmental Engineer, Rodrigo Felismino - Consvita Director, Nuno Forner-member of Quercus Group, and others. These academics all made significant contributions, with suggestions and information of relevance to this research, as well as to applicability of this project.

To further enrich the study, several well-known environmental institutions were contacted, such as: SOS Mata Atlântica, Green Initiative, Eco-Conservation, Earthday Water Project, Calouste Gulbenkian Foundation UFMG, IEMinho, WWF, ESALQ and USP, information obtained from these sources replicated or reinforced the information within their respective websites.

Among all those study, the one that is most appropriate for this study was a paper given by the engineer Felipe Marques of the Canadian Ministry of the Environment (2014), with a study of the "Best Methodology for quantifying gas emissions focused on accommodation means". Five properties were rated in that study (2 in Vancouver, 1 in Edmonton, 1 in Victoria and 1 in Prince George). These properties in Western Canada provide a spatial sampling of sites in different climates to represent different patterns of energy consumption, with sizes ranging from 132 to 299 rooms.

Based on the study, the emission factor for a night's stay was calculated according to total emissions of Greenhouse Gases - GHG for the sample of hotels, divided by the number of overnight stays, assuming full occupation, as stated in Table 01.

The formula generated the result of carbon emissions per type of accommodation as shown below, a steady amount, regardless of the type of accommodation. This is due to the fact that the study did not obtain relevant data to measure CO2 from some types of accommodation. Therefore, the survey compared all elements and developed a single parameter, as shown in Table 02.

Thus, both the national emission value of CN (11.90 kg CO2 and night) and the national/international value of emissions (CO2 and 20.78 night) were derived. The national/international value is a conservative estimate, as it incorporates data from electric power generation, resulting in a significantly higher number of emissions per kilowatt -hour than in the rest of Canada, as its primary source of energy is coal, which differs from other types of energy.

Based on 2012 data from SMARTTEC Accommodation, 94.03% of central government accommodation stays were domestic in BC and 5.97% were national or international. Based on these data, as shown in table 03, a weighted average could be calculated for an individual accommodation factor of 12.43kg CO2/night, which is the equivalent to 2.30 trees.

For a better understanding of calculus, 10,000m² equals 1 hag, which in turn, corresponds to 5.4 tons, i.e. 5,400 kg of CO2. The division of the CO2 value by the number of trees (1000) results in how much CO2 each tree absorbs. Using the reference of 12.43 Kg of CO2, divided by Kg of CO2, the result is 2.3 trees to offset the carbon generated by one accommodation room per overnight stay. The calculation of EFM was based on Study of the Canadian Ministry of the Environment (2013), therefore Table 04 presents the calculation of the EFM of the studied hotel.

For this calculation, assuming the hotel has 20 AUs with capacity for 70 beds, and considering 12.43 is the number of kilograms of CO2, the result is 3.55 trees per day. Notice that the calculation is complex, covering the entire life cycle and considering all the inputs needed to generate the service, making the outcome impossible to reach, due to the high number of trees required to neutralize the CO2. Based on the SOS Mata Atlântica calculator, the it costs R$12.00 (legal entity) to plant a tree, whereas the hotel rate is R$90.00 per single room in high season (and R$ 60.00 low season), therefore, the value to neutralize the accommodation is equivalent to 47.33% of the room price, resulting in an unfeasible practice.

Analyzing the result, it was necessary to find other means of calculation, therefore we searched calculators on the following websites: SOS Mata Atlântica, Green Initiative, WWF, Global Footprint Network and Green Steps. These sites feature calculators for individual persons, taking into account the following indicators: water, energy, food, consumption, transport, waste. Through these means, it was noticed that some of them were suitable for the research, however not all of them, compromising the outcome.

The international website Quercus, however, was the one that best suited the indicators of this study, presenting values in Euro (€). To overcome this problem, the currency conversion was done through the website of Central Bank of Brazil, using the exchange rate on 9/21/2014. This website was chosen due to the program it has developed, Ecopegada, which is intended to perform the calculation of EFM for corporations, covering the main indicators that a company uses to develop its activities, such as:

- Energy: based on consumption of electricity and natural gas;
- Mobility: gasoline consumption and transportation in general;
- Waste: categorized as recyclable, organic and rejects;
- Water: water consumption; and
- Soil use; the space covering the area occupied by the Company in square meters.

The data were collected through documents related to indicators through the 12 months of 2013. For a better understanding, the result gives an equivalence factor - hag, which means global hectares. According to Forner (2010, p. 6) hag "is equivalent to one hectare of biologically productive space with world average productivity". The size of one hectare is comparable to the size of a soccer field, corresponding to 10,800 sqm, i.e. 1.08 acres.

The EFM Table is made up of triggers such as mobility, electricity, waste, water and soil use. The calculation of monthly hag was divided by the number of guests per month, resulting in hag per capita. Considering that this work aims to calculate the annual amount of the EFM, the amount of hag for the 12 months of 2013 corresponds to 19.59 HAG. As shown in Table 01, water consumption was the most relevant trigger in every month, equivalent to 69.52% average of the year hag, considered a high score.

Three quarters of the Earth's surface is composed of water, formed by oceans, lakes, rivers, swamps, glaciers, mangroves and polar ice caps. And considering that of the total of 1386

km³, only 2.5% is freshwater, and 68.9% of this amount is in the form of glaciers, with only 0.3% of the planet's water being fit for consumption (Souza Filho, 2012).

Is the discrepancy between February 2.07 hag and August 1.17 hag a result of seasonality? According to Cunha (1997, p. 189), seasonality is reflected by the distribution of demand throughout the year, resulting in an uneven concentration, with some months higher than others. Seasonality derives from a number of factors, such as climatic, demographic, economic and other factors.

Climatic conditions are a significant factor, as the city has subtropical climate, reaching an average temperature of 40ºC from December to March, but the temperature also can dip to -1ºC during the winter (data from the Brazilian Meteorology Institute). In the summer months, water and energy consumption are higher than in the other months, due to the amount of time spent in the shower and the constant use of air conditioning.

An item to be considered is the relationship between the number of guests and the number of hag. On January, when there was a higher number of guests (686) in comparison to other months, the number of hag. (1.72) is still considered low but May presented the lowest number of hotel guests (260) of the year. However, its hag is 1.72, very similar to January, when the number of guests more than doubled.

Based on this information, it is believed that the January data are due to the following factors: high season vacation, end-of-year recess, higher purchasing power due to payment of vacation bonus and year-end bonus, directly influencing the travel schedule, or, in other words, guests visiting town in January are more willing to pay for entertainment and spend little time inside the room, directly affecting the January hag. For information purposes, the annual report for Iguaçu Falls portrays January 2013 as the month with most visitors, with 184,784 visitors .

Given that visitors to tourist attractions directly influence hotel occupancy, and thus, hag, accommodation is one of the main sources of negative environmental effects caused by guests (Andrade, Tavares & Valle, 2000). Due to the higher consumption of water and energy, and solid waste production, in 2013 the Eduardo Hotel impacted 19.59 hag.

To minimize the impacts caused by the Eduardo Hotel, the best alternative was carbon compensation. Specialists main recommendations to fight global heating include Tree planting, since trees are responsible for the so-called CO2 (carbon dioxide) sequestration, a greenhouse gas, the engineer Felipe Marques helped to transform the hag. into a CO2 amount, to calculate the number of trees. Table 05 shows the formula

Using the formula, it was possible to calculate how many trees would be needed to offset the impact of the hotel, since the reference is 1000 trees per acre, and the native species of Paraná State "sequesters" 0.0054 tons of CO2 per year, on average. The information was used to obtain the specific calculation of the hotel studied, as shown in Table 06.

With 19,590 trees being needed to offset the impact caused by the 2013 guests (5475), the result is 3.78 trees per guest/day. The number of trees that would need to be planted daily to compensate for the environmental liabilities of each guest should was calculated to determine how much room rates should be increased.

The cost of Tree planting was researched among environmental non-governmental organizations that provide this service, such as the WWF Greensteps, Iniciativa Verde, SOS Mata Atlântica, Plante Árvores, and others. The cost of Tree planting to a legal entity is very high to the Company, the lowest value was R$12.00 for legal entity with SOS Mata Atlântica. This high cost makes the planting of trees impracticable, as to compensate for single guest, the cost is R$ 45.36 (3.78 trees * R$ 12.00), which represents 50.4% of the daily rate.

Alternatively, the cost of Tree planting for an individual with SOS Mata Atlântica is R$ 2.00. To offset a single guest, the total cost would be of R$7.56 (3.78 trees * $ 2.00), which

corresponds to 8.4% of the daily rate, whereas the owner of the enterprise has already registered with the website of SOS Mata Atlântica, to facilitate the purchase of seedlings.

Another way to calculate this cost is by dividing the average annual hag by the average daily guests. The formula previously presented was perfected for better presentation (as shown in Table 07) to obtain more specific data for the hotel.

Considering the costs of Tree Planting with SOS Mata Atlântica seedlings, compared to the annual invoicing of the enterprise, the amount spent in trees could compromise the net profit of the Company. Since it turned out to be impracticable, an alternative presented to the Company to compensate its environmental liabilities was suggested: present to the guest the choice to neutralize the impacts of their stay at check-in, based on costs previously established by the Eduardo Hotel. The best option was to spend 10% of monthly net income of the Company to purchase seedlings through the website SOS Mata Atlântica.

A questionnaire was applied to understand the characteristics of the guests over a 15-day period, however, as it was the low season, the research did not achieve a sufficient number of respondents. For this reason, the research turned to potential hotel guests to identify the socioeconomic and behavioral profile of the potential clients, which will be presented in the next section.

HEFM Check of Potential Clients

The formula to calculate HEFM was achieved after bibliographical research, using the formula indicated by Parente (2007), which proved to be the one that encompasses the required indicators and obtained a concrete result. In this quest to gather more information about the formula, it was noticed that most studies replicated the same theoretical information, since this is a new subject.

Requesting help from Parente to find an electronic calculator that would be able to identify HEFM, many calculators were discovered online, such as Trip Zero, a travel agency that strives to promote environmental awareness, and seeks to compensate the carbon footprint of tourists that use its services.

The calculator covers the issue of accommodation and individual transportation, resulting in the amount of carbon emitted on the tourist trip, however, being an international website, the units of measurement were not compatible with the Brazilian reality, therefore it was not possible to obtain a concrete or reliable result of HEFM.

Another website was consulted - Carbônica - an international institution engaged in global warming issues, which provides a calculator that uses a very specific calculation, according to the type of trip that the individual will take, and the activities carried out during the trip. Since it is too specific, it could be used in this tudy.

It was observed that most calculators had replicated information from other websites, and that the data for the calculation were not compatible with the local reality, as the indicators did not meet the criteria of the survey. Bibliographic research showed that the main indicator of tourist impact during vacation is transportation, that is, the average transportation used to travel. According to Borges et al. (2007, p. 4) "carbon monoxide (CO) emitted by automobiles is the main factor responsible for air pollution, and causes a number of adverse effects to the human body and the environment". This concept justifies the importance of calculating the individual transportation.

Given that tourist transportation is one of main indicators of HEFM, this study used the online calculator, which presented this component most accurately. The calculator is available from Green Nation, a Brazilian website supported by many partners claiming to be a collaborative online ambience, interacting with different people to gather information on culture and environmental protection and issues involving the future of the planet.

The electronic calculator evaluates transportation by means of transportation and route used. The estimates used in the calculation were based on or adapted from The Greenhouse Gas Protocol and tools established by the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI). The result is given in the amount of CO2 emitted, and the website itself provides information on how many trees would be needed to compensate for the carbon emissions.

To identify the HEFM tourists, all the 348 questionnaires were submitted to the virtual calculator. It was found that 47% of respondents used aircraft as a means of transportation. Kerosene is the main fuel used for aircraft, and burning kerosine gives rise to several dangerous pollutants that contribute to global warming, such as carbon monoxide and carbon dioxide, gaseous hydrocarbons, and nitrogen oxides. It is therefore worth nothing that Brazil registered an increase of 8.1% in demand for domestic flights in April 2014. This means that people are traveling more and more, and are doing nothing to minimize their carbon footprint.

Following the calculation, the sum of CO2 from respondents was 62.704 Kg, thus, the number of trees corresponding to the compensation of these tourists' transportation would be 316.48 trees.

It is worth noting that the type of transport used influences the amount of carbon emissions. For instance, a person traveling by car from São Paulo (SP) to Foz do Iguaçu-PR emits 16.8 Kg of CO2, which is equivalent to 0.08 trees, but the same distance by plane throws into the atmosphere 200,02 Kg of CO2, which corresponds to 1 tree. The amounts of emissions vary depending on the type of transport, as shown in Graph 01.

The cost in trees was calculated so that the Eduardo Hotel could take responsibility for the travel of its tourists, or rather, its potential clients.

Strictly on studies theory, as the Canadian study observed and this study discussed in the first objective, holding accommodation establishments responsible for neutralizing the effects of transportation of its clients through planting trees is not a feasible practice either, as 316.48 trees to be planted, at a cost of R$ 12.00 each, totaling R$3,797.76. This is a high amount, since the same cost of planting the same trees, for an individual, would be R$632.96.

Considering that the costs would be applied as compensation for the transportation environmental footprint, airlines should take responsibility for the carbon emissions of its passengers, as the aircraft are the main producers of carbon emissions, along with automotive vehicles.

Another point to note is that tourists travel to meet a destination, and accommodation is only a consequence, which is confirmed by the fact that 84% of the respondents said that leisure was the primary reason for travel, thereby overriding the typology of the attractions as "natural", the tourist destination should contribute to neutralizing the tourists' carbon footprint.

It is worth noting that Turismo CO2 Legal aims to engage and involve every social actor that, directly or indirectly, relates to regional tourism, in order to minimize the environmental impacts. For this purpose, companies and entrepreneurs linked to the tourism production chain (hostels, hotels, restaurants, bars, laundries, reception, entertainment, and others), as well as tourists, should compensate for the CO2 emissions created by their businesses and trips.

The effective engagement of all companies in the sector would make the destination Carbon Free for everyone involved, and would be willing to contribute to neutralize gases emissions, highlighting Foz do Iguaçu as travel destination to the world, as in the city of Itacaré-BA in Brazil. A Carbon Free hotel creates great publicity and provides competitive advantage for the Company.

As it enhances the competition between accommodation establishments of the same class or lower, it is important to seek alternatives that would provide a competitive advantage, as tourists mostly look at the price when choosing a hotel.

FINAL CONSIDERATIONS

This research aimed to expose considerations and discussions on the "Ecological Footprint Method" - EFM, a recent subject among organizations. The study is justified by the range and complexity of the method, given the fact that there is a growing focus on environmental management matters. This study that seeks to identify environmental indicators and compensatory measures applicable as marketing strategies, as a form of competitive advantage for the Eduardo Hotel.

The first achieved goal was to identify the EFM of triggers during the 12 months of 2013 at the Eduardo Hotel. As the goal was achieved, direct relationships were discovered between the triggers (water, energy, waste, soil use and mobility), variations in the behavioral profile of guests, and changes in climatic conditions in Foz do Iguaçu City.
One of the barriers the researchers faced was the complexity of the study, which prompted a search on international websites, for more information on the topic, seeking to find the calculator that could best adapt to the needs of the Company. For a better understanding, it was necessary to perform the calculation of hag per capita, to financially suit the Company.

Second objective of the research was to establish the Holiday Footprint Method - HFM of potential customers and the marketing strategies that could create a competitive edge for the Company. In was noticeable that the respondents have a peculiar profile, related both to prices and environmental concerns. Most respondents would like to minimize their

environmental liabilities, but the research presented data that the compensation value is greater than what potential customers would be willing to pay.

Considering that the main trigger in the Holiday Method is transportation, the hotel should be responsible for minimizing the impact of its activities only, due to its financial conditions, suggesting that transport companies should adopt the same practices to compensate for the impacts caused by their activities. It is important to emphasize the applicability of EFM formula adjusted to the local ecosystem (or adapted to other ecosystems by hag and number of trees planted) as an indicator of environmental compensation for accommodation establishments.

Based on the results, it is important to point out some limitations of the research, such as the novelty and the complexity of the calculus for Hotel Industry. This affirmation is justified for the current demand of hotel clients, the financial situation related to the prices charged by the enterprise, which did not support large investments for the cause, and above all, achieving full neutralization of the main triggers of environmental liabilities, by means of Tree planting through NGO SOS Mata Atlântica.

Every study found on the issue exclusively addressed the environmental footprint calculation for cities or sectors of industry, but none of them addressed the Tourism Industry. A full study on this area, demonstrating the applicability of the Method to the sector, specifically the accommodation sector, would contribute to the development of the science of Business Administration and the Tourism sector (agencies, transportation, events, and others). Both time and availability of researchers and resources would be needed to implement such a study. Finally, future research is needed on the subject, and on the company studied, to extend knowledge in this specific area.

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