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Selecting the Sustainable Tourist Market for Bali Based on Carbon Footprint

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Abstract: This article investigates the carbon footprints of tourists from various countries to inform Bali's sustainable tourism strategy, especially its environmental sustainability. Analysing data from the top 20 tourist-generating countries, the research employs a carbon footprint calculator to assess emissions associated with their flights. The findings categorise these countries into three groups based on their carbon emissions: low, medium, and high-carbon footprint markets. Countries with lower carbon footprints, particularly Southeast Asian ones, should be prioritised as target markets to promote sustainable tourism in Bali. Conversely, tourists from medium and high-carbon-footprint countries should be considered the less-preferred tourist market, and their number should be reduced through demarketing strategies. The article concludes with managerial implications and highlights research limitations, emphasising the need for ongoing efforts in sustainable tourism management.

Keywords: Bali; tourism carbon footprint; sustainable tourist market; sustainable tourism; demarketing

1. Introduction

Sustainable tourism maintains that tourism should benefit the local economy, conserving the environment and the social and cultural of the local community (Butler, 2018), while keeping the visitors satisfied (UNEP & UNWTO, 2005) with the experience they have enjoyed. The definition of sustainable tourism implies a limit that has to be carefully taken care of in order for tourism to be sustainable. One such limit is the carrying capacity which considers the ability of a destination area and its local community, along with their social and cultural life, to cope with the negative impacts of tourism as

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essential when planning, monitoring, and evaluating tourism development. Implementing carrying capacity in tourism development will require a tourism authority to determine the appropriate number of tourists that can be accepted to visit a tourism destination (Butler, 2019), because too many tourists will lead to unsustainable tourism development.

However, many countries and global tourism organisations still believe that the measure of tourism success is solely based on the growth in tourist arrivals (Gössling et al., 2021; Gössling & Higham, 2021). This assumption is exacerbated by the fact that many tourist destination countries still focus their efforts on long-haul markets (Gössling et al., 2015), which require extensive support from the aviation industry to allow the passenger to arrive at a destination in a short amount of time (Eiseman, 2018). Both factors are counterproductive to achieving net-zero carbon emissions by 2050, given that a significant portion of international tourist travel is accomplished by air travel (UNWTO, 2020). Although carbon emissions from tourism have not been well-documented (Lenzen et al., 2018), it is known that the aviation industry contributes 3% of the total global carbon emissions (Klöwer et al., 2020). Meanwhile, most (54%) of global tourism travel is air travel (UNWTO, 2023). Consequently, if the recent COVID-19 pandemic does not bring about significant changes in how tourism is conducted, it is feared that there may be a sharp increase in demand for aviation services, possibly reaching 300% by 2050, if not tightly regulated (Higham & Font, 2020). If this were to occur, there is concern that the goal of achieving net-zero carbon emissions by 2050 may not be attainable, and tourism will become one of the sectors significantly responsible for the environmental impacts, such as climate change, due to the high concentration of carbon in the Earth's atmosphere.

To avoid this scenario, experts have proposed methods through their writings in various journals. Since tourism is the result of the combination of motivational push and destination pull factors (Dann, 1981), the methods can specifically target the motivational push of the visitor and the destination pull. The flight shame campaign is one of the famous examples of a motivational targeted method to decrease greenhouse gas emissions from flying (Happonen et al., 2023). Flight shame or *flygskam* (Becken et al., 2021) suggests that flying may worsen climate change. Thus, one should feel guilty or ashamed to fly and encourage others to do the same (Gössling et al., 2019; Mkono, 2020). The other method that targets the motivational push to travel is in the form of policy, for example, the policy that requires traveller to declare their climate declaration for a long-distance trip (Happonen et al., 2023).

Focusing on short-haul markets and implementing demarketing strategies for long-haul markets (Gössling et al., 2015; Gössling & Higham, 2021) are

examples of methods targeted at the destination pull (Happonen et al., 2023). Focusing on short-haul markets means that tourist destinations are expected to target nearby countries as their primary tourism markets while making efforts to "de-market" long-haul markets. By choosing short-haul markets, a destination can reduce the carbon emissions generated by its visitors. Conversely, destinations that target long-haul markets will bear significant responsibility for the carbon emissions from each flight their visitors take (Picture 1).

Picture 1. One of Indonesia's national airlines' aircraft transported tourists to various tourism destinations in and outside Bali (Source: Darma Putra, 2013)

Demarketing is an effort to control a specific market segment that a tourism destination wishes to attract (Clements, 1989). Demarketing can be done to limit the demand for a tourism destination, restrict or even change the target market for a tourism destination, or convey scarcity in the supply of a tourism destination's offerings, ultimately altering the demand for that tourism destination (Eiseman, 2018). Kotler and Levy define demarketing as a marketing activity that reduces demand for a product, either temporarily or permanently (Eiseman, 2018). Demarketing is an aspect of marketing (Kotler & Levy, 1971) and is not the opposite of marketing (Beeton & Benfield, 2002). In the field of tourism, demarketing is defined as a technique (Pomering et al., 2011) or policy

tool (Beeton & Benfield, 2002) to control the demand for tourism products in a tourism destination by reversing the effects of marketing activities, and reducing the attraction for a specific market segment (Happonen et al., 2023).

Demarketing as a strategy for achieving sustainable tourism has advantages and disadvantages (Eiseman, 2018). Its advantages include supporting environmental conservation efforts and offering flexibility to adapt to the specific situation faced by a tourism destination. On the other hand, demarketing is seen as a discriminatory strategy, especially when it involves price increases, which can reduce the ability of low-income visitors/tourists to enjoy a particular product. Another drawback is that this strategy can lead a tourism destination to bankruptcy if the number of visitors/tourists fails to meet expectations (Eiseman, 2018). Therefore, for demarketing to be successfully implemented, a tourist destination must first determine its target market (Clements, 1989). Targeting a specific market is vital since the sustainability of a tourist destination is often determined by its target market (Ritchie & Crouch, 2003). Thus, selecting a suitable market segment is the fundamental step that needs to be done by a Destination Management Organization (DMO) (Ritchie & Crouch, 2003), and selecting the sustainable tourist market is a market-driven strategy that can be implemented by a tourism authority (Dolnicar, 2004) so that the economically, environmentally and culturally benefitting sustainable tourism can be achieved (Hertwig & Lusby, 2021).

This article discusses the approach that can be used to select the sustainable tourist market based on their carbon footprint calculation for the destination to participate in the net-zero carbon campaign. Using Bali as the case study, this article will discuss the tourist-generating countries that are best targeted and those that should be avoided by an island destination that is primarily attractive but prone to climate change (Lee et al., 2018). In doing so, this article will also contribute as the first attempt to segment the tourist market based on its carbon footprint, thus contributing to the literature on sustainable tourism in Indonesia that lacks specific and detailed content (Kawuryan et al., 2022), such as carbon footprint.

2. Literature Review

Discussion on the sustainability of tourism in Bali gained significant traction (Demolingo et al., 2024) especially from 2010 to 2019, with topics such as agriculture, host-guest relationships, tourist villages, and marine tourism dominating publications (Wiweka & Pickel-Chevalier, 2022). Marketing for sustainable accommodation operations is also an interesting topic, with contributions from authors such as those who developed a "marketing mix 7P +" that combines the 7P of marketing mix with the elements of the Triple

Bottom Line of sustainability (Yoga et al., 2020). The carbon footprint in relation to sustainable tourism in Bali has also attracted significant interest from researchers in this field. Analysis of 200 published research articles on sustainable tourism and carbon footprints in Bali using VOSviewer indicates that discussions primarily focus on ground transportation, carbon intensity, and electricity. While some studies explore carbon emissions related to sustainable tourism destinations and the hospitality industry, none specifically address carbon footprints from the perspective of tourist segmentation, highlighting an important gap in the literature.

Picture 2. Visualisation of literature review on Sustainable Tourism and Carbon Footprint of Bali (Source: Authors' analysis using VOSViewer, 2024)

To date, some researchers have attempted to segment the sustainable tourist market. Their segmentations were developed under various terminology such as community-based tourists (Lee & Jan, 2019), geopark visitors (Fung & Jim, 2015), geo-travellers (Boley & Nickerson, 2013), ecotourists (Carvache-Franco et al., 2019; Carvache-Franco et al., 2019b, 2019a; Palacio & McCool, 1997), sustainable transport passengers (Dallen, 2007), sustainable tourist (Jani, 2018), unsustainable tourists (Juvan et al., 2016), rural tourists (Kastenholz, 2004; Kastenholz et al., 2015), sustainable market segment (Dolnicar, 2004), national park visitors (Veisten et al., 2015), and mountain protected area visitors (Taczanowska et al., 2019).

The indicators used to segment the sustainable tourist market are the perceived concept of sustainability (Sánchez-Fernández et al., 2019), environmentally responsible behaviours (Lee & Jan, 2019), motivations (Carvache-Franco et al., 2019; Carvache-Franco et al., 2019b, 2019a; Fung & Jim, 2015; Jani, 2018), geo-travellers tendency scale (Boley & Nickerson, 2013), attitude toward sustainability (Dallen, 2007), sustainable values, motivation and demographics (Jani, 2018), tourists' pro-environmental disbeliefs and

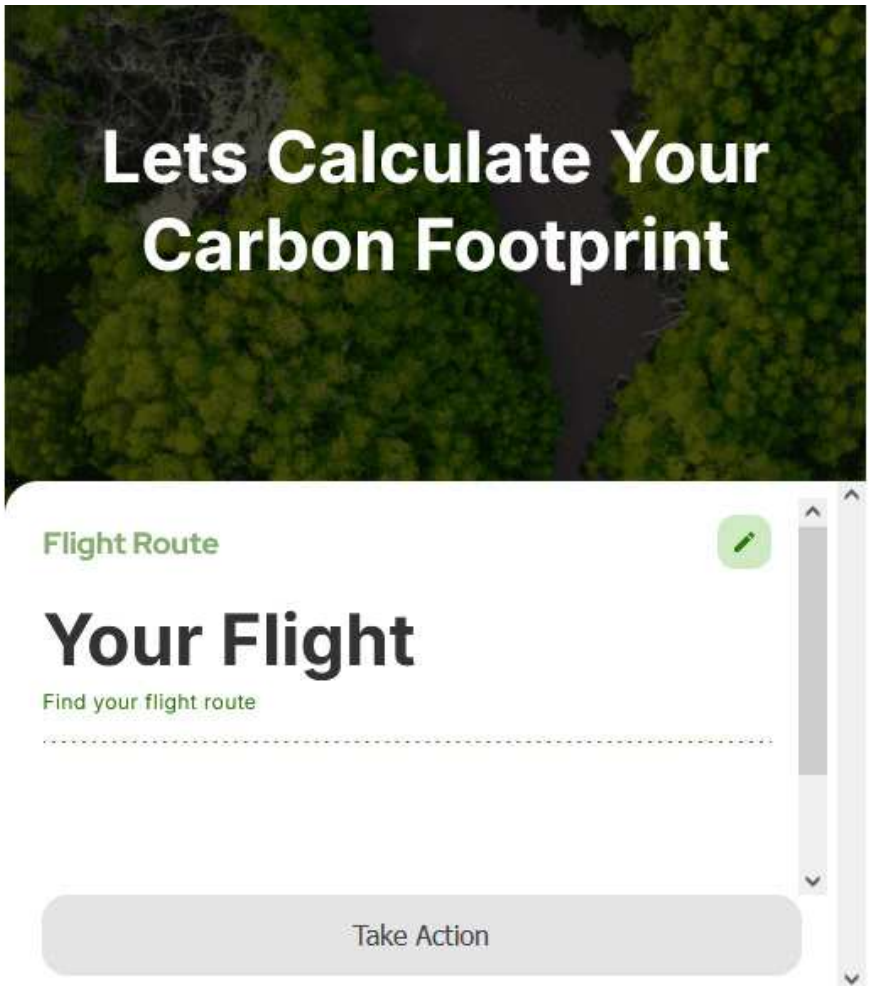
unsustainable behaviour (Juvan et al., 2016), destination attractiveness and fit (Kastenholz, 2004), a priori segmentation (Dolnicar, 2004), tourist's interaction pattern in a rural tourism destination (Kastenholz et al., 2015), perception towards park's facilities (Veisten et al., 2015), social demographics, trip characteristics and activities (Palacio & McCool, 1997), and self-organizing maps (Taczanowska et al., 2019). Interestingly, none of the above segmentations have been made based on tourist carbon footprint calculations.

Carbon footprint is the measure of the CO_2 and the methane emitted from a specific population or activity, which reflects the behaviour of the country, organization, enterprise, and individual in terms of their compliance with the principles of environmental justice (Huang & Tang, 2021). In the tourism industry, the carbon footprint is estimated from the CO_2 emitted directly during a tourism activity, such as fuel of the land, sea, or air transport, as well as those emitted indirectly during a tourism activity that is embodied in the food, accommodation or souvenir bought by the tourist (Lenzen et al., 2018). There are two types of carbon footprints (Huang & Tang, 2021; Whittlesea & Owen, 2012). The first are those resulting from the direct use of fossil fuels, and the second are those hiddenly emitted during the preparation and production of various commodities (Huang & Tang, 2021; Whittlesea & Owen, 2012). As the industry that is considered the major contributor to climate change due to its carbon footprint (Kitamura et al., 2020), the emission of greenhouse gases from the tourism industry should be managed and minimized to reduce its negative impact on the environment (Sunarta & Saifulloh, 2022; Whittlesea & Owen, 2012). Using the carbon footprint to select the desired sustainable tourism market and demotivate the less-desired unsustainable tourist market for environmental sustainability represents one approach to minimising the negative impact of tourism's carbon footprint.

3. Method and Theory

3.1 Method

The tourist-generating countries discussed in this article are the top 20 countries whose residents visited Bali in 2022, according to the data of the Bali Government Tourism Office, available online at https://www.disparda.baliprov.go.id. The carbon footprint for each tourist-generating country is calculated using the Carbon Footprint Calculator of The Ministry of Tourism and Creative Economy of the Republic of Indonesia, available online at https://jejak.travel, as seen in Picture 3. The carbon footprint calculator is the system intended to calculate the carbon emission of travellers' flights so they can compensate for the negative effect of their actions on the environment through carbon offset, thus contributing to sustainable tourism in Indonesia.



Picture 3. Screenshot of Carbon Footprint Calculator of The Ministry of Tourism and Creative Economy of the Republic of Indonesia (Source: https://jejak.travel)

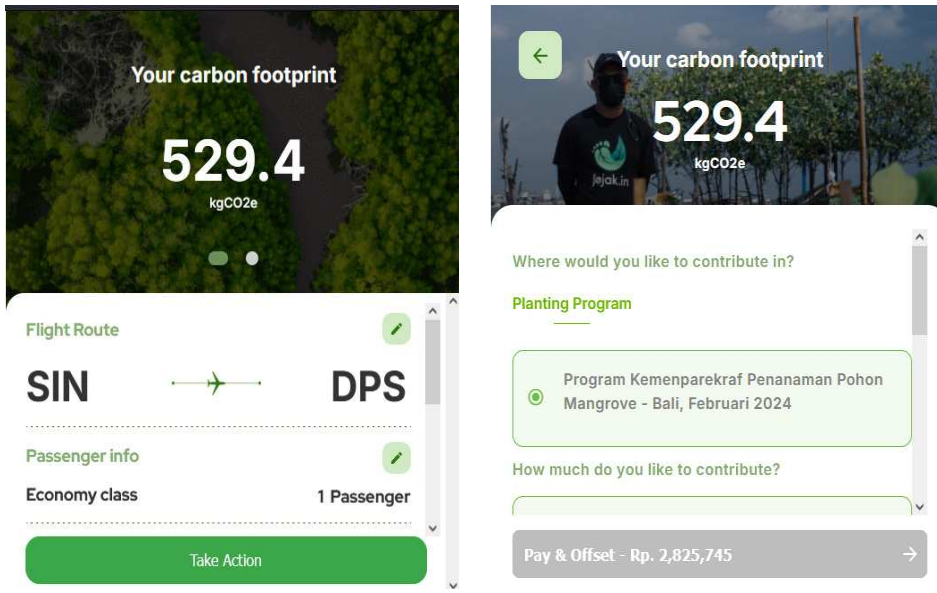
The Carbon Footprint Calculator of The Ministry of Tourism and Creative Economy of the Republic of Indonesia calculates the carbon footprint of each visitor using four parameters: 1). distance, 2). fuel consumption, 3). omission factor, and 4). length of stay in a hotel. To use the calculator, a visitor must input information, such as departure airport, arrival airport, cabin class, number of passengers, and travel purpose. The visitor only needs to select an option concerning their flight information from the available options. Once all the required information has been input, the calculator will show the carbon footprint of their flight. Visitors can proceed by clicking the "take action" button to learn the available carbon offset options. There are five choices of carbon offset that visitors can choose from such as 1). Mangrove ecotourism rehabilitation at Berau, 2). Mangrove tree planting, 3). Tiga Warna CMC Mangrove ecotourism

project, 4). Mangrove tree planting at Klawalu, and 5). The endemic tree planting program. Clicking a choice button will show the amount of carbon offset the visitor must pay in Indonesian Rupiah or USD and the number of trees planted.

For this article, the calculation was done for one (1) passenger of an economy-class flight who stayed in a 4-star Hotel for 3 days. The 3 days of stay is based on the 2022 data available online on 2023 at https://disparda.baliprov.go.id/buku-statistik-pariwisata-bali-tahun-2022/2023/03/, which shows that tourists are staying in Bali for 2.54 days per visit, which is 3 days. The length of stay in Bali is chosen as the parameter of calculation instead of the length of stay in a hotel because there is a possibility that a visitor/tourist stays in more than one hotel in Bali. On the Carbon Footprint Calculator, there are three lengths of stay choices: two days at a 5-star hotel, three days at a 4-star hotel, and seven days at a 3-star hotel. Since not all tourists stay in a 5-star hotel in Bali, the author chose three days as a parameter for the calculation, as it is based on the length of stay data of tourists in Bali.

Suppose we want to calculate the carbon footprint of a resident of Singapore who travelled to Bali. We can choose Changi as the departure airport on the carbon footprint calculator and Bandara Udara International Ngurah Rai Bali as the arrival airport. As soon as the name of the arrival airport is chosen, the calculator will ask to provide the "passenger info", where we can select the cabin class of the passenger from the three choices available and the number of passengers from the four choices available. Suppose we select economy as the cabin class and one person as the number of passengers, then click the "save" button. After saving the information, the calculator still requires us to fill in other information concerning travel purposes. There are three choices of purpose available in the calculator: 7 days at 3 stars hotel, 3 days at 4 stars hotel, and 2 days at 5 stars hotel. After completing the travel purpose, we click the "take action" button to take us to the calculation result. The calculator will show a number indicating the amount of carbon dioxide emitted by the flight of a Singapore resident to Bali (in Kg), as shown in Picture 4.

After the calculation process had been obtained, the author determined the rank of carbon footprint for each country of origin based on the amount of CO_2 emitted to the atmosphere. The rank is arranged in reverse order, where the country with the most significant carbon emission is ranked number one, while the country with the smallest carbon footprint is ranked number 20.

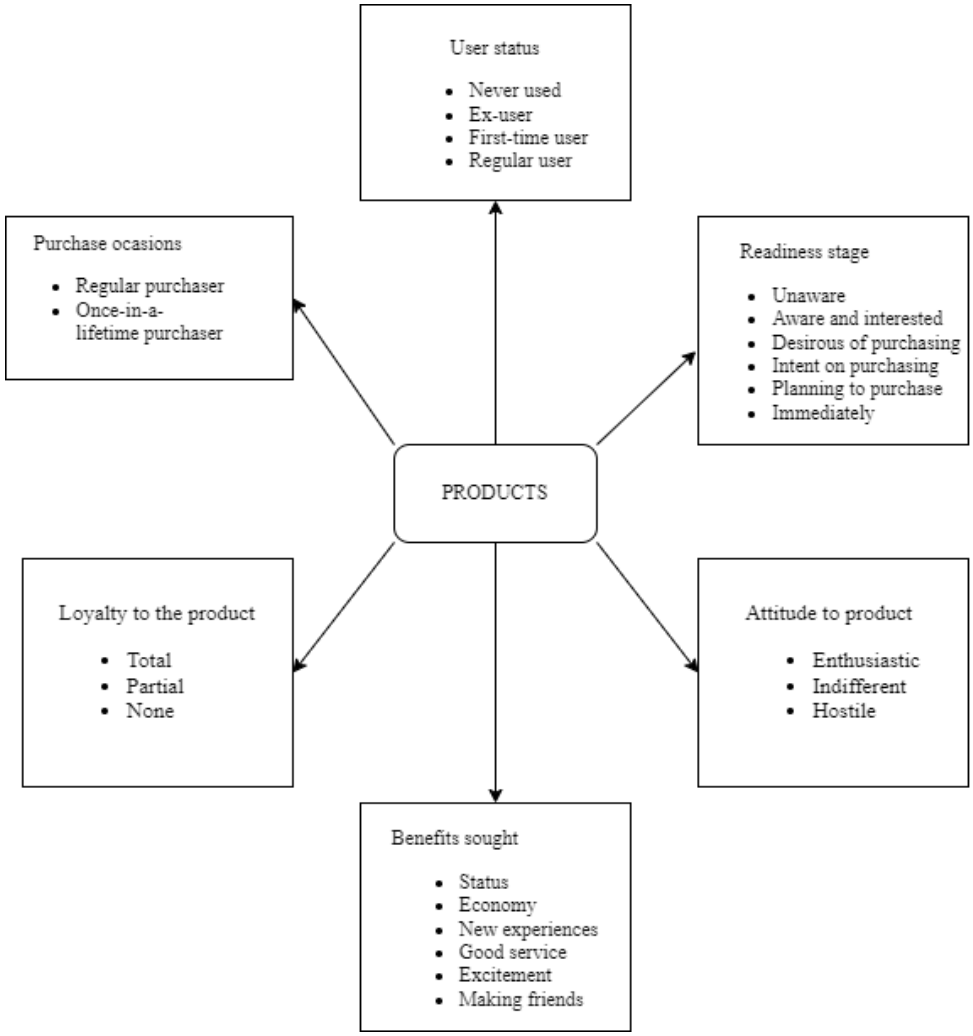


Picture 4. Result of carbon footprint calculation using The Carbon Footprint Calculator of The Ministry of Tourism and Creative Economy of the Republic of Indonesia (Source: https://jejak.travel)

3.2 Theory

Given the difficulties in achieving a net-zero carbon, it is argued that progress toward the agenda can be achieved through a transition (Gössling & Higham, 2021). A framework that will allow a DMO to progress toward the net carbon footprint agenda has been proposed for the transition. The framework consisted of three strategies: 1). Reducing carbon, 2). Reducing leakages, and 3). Adding values. Reducing carbon, in particular, can be achieved through marketing the short-haul market and equally demarketing the long-haul market. These strategies are considered the immediate strategy that can be used to lower a tourist destination's carbon footprint (Gössling & Higham, 2021). Segmenting the market, therefore, is an essential step that needs to be carried out in preparation for implementing the reduction of carbon strategy.

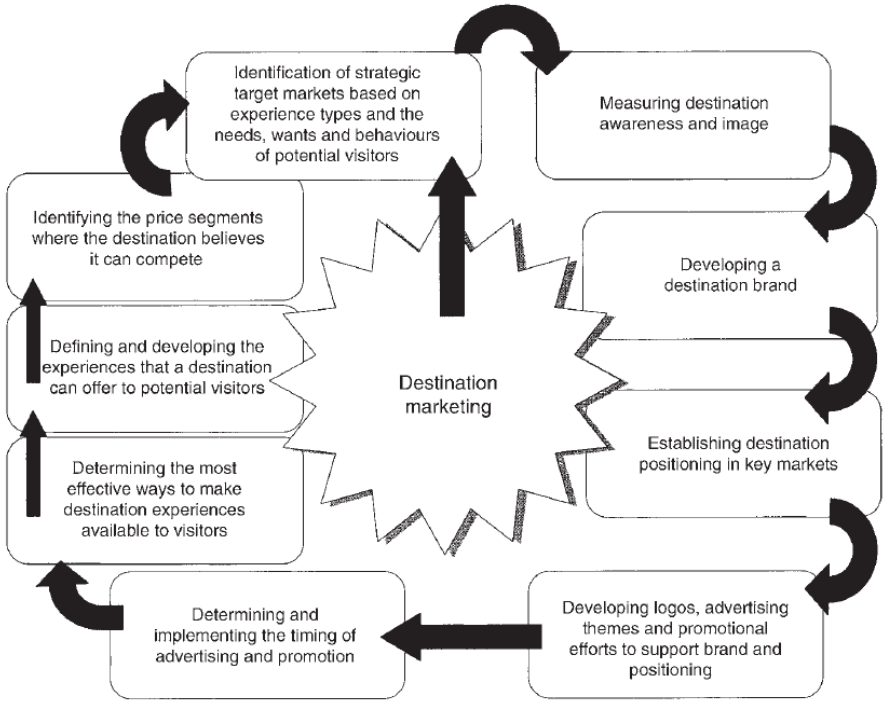
Market segmentation is an endeavour to classify the tourist market with distinctive needs (Suardana et al., 2020) or similar characteristics for marketing purposes (Horner & Swarbrooke, 2007). Segmentation can be determined based on some criteria. There are classic segmentation criteria and tourism-specific methods of segmentation. Segmentation based on geographical elements, socioeconomic variables, demographic factors, psychographic and behaviour characteristics, as shown in Picture 5 are classic segmentation examples.



Picture 5. Behaviouristic Segmentation (Source: Horner & Swarbrooke, 2007)

Tourism-specific segmentation is based on criteria such as the purpose of travel, the visitors' needs, the motivation and benefits sought, the visitors' characteristics, demographic, economic, and geographic characteristics, and the visitors' psychographic characteristics and price. Tourism-specific segmentation can also be made based on the method of travel to reach a destination and the length of the journey (Middleton & Clarke, 2001; Swarbrooke, 1999; Shaw, 1999, as cited in Horner & Swarbrooke, 2007).

Once the market segment has been determined, the next step is to select the target market. Identifying the target market is essential for a Destination Management Organization (DMO) to make its destination competitive and sustainable (Ritchie & Crouch, 2003), as shown in Picture 6. Once the target market has been selected, the DMO may proceed with the next element of destination marketing.



Picture 6. Elements of sustainable tourism destination marketing (Source: Ritchie & Crouch, 2003)

4. Results and Discussion

4.1 Results

Using the Ministry of Tourism and Creative Economy of the Republic of Indonesia's carbon footprint calculator, the carbon footprint of Bali's top twenty tourist-generating countries was calculated. The results are presented in Table 1.

Table 1. Result of Carbon Footprint Calculation of the Top-20 Tourist Generating Countries of Bali

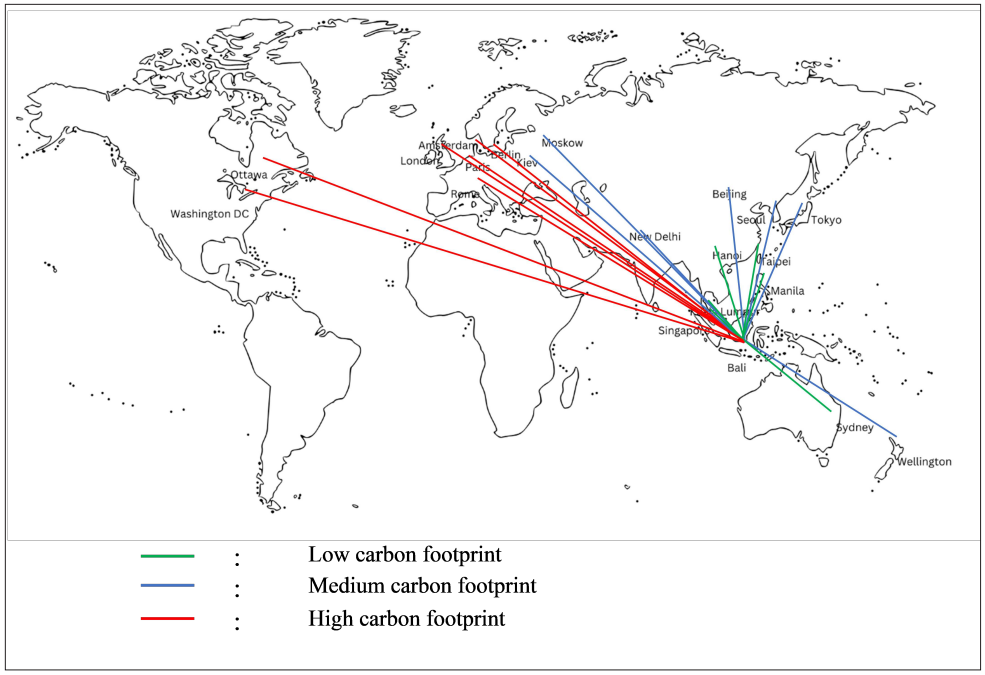
No	Nationality	Number of tourists in year 2022	Carbon footprint (Kg)	Carbon footprint rank
1	Australia	605,955	666.8	18
2	India	181,888	1,100	13
3	Singapore	129,088	529.4	20
4	UK	126,893	2,200	4
5	USA	108,132	3,100	1
6	France	95,510	2,200	3
7	Germany	94,516	2,000	7
8	Malaysia	91,058	573.1	19
9	South Korea	63,037	1,000	14
10	Russia	58,031	1,800	9
11	Netherlands	55,730	2,100	6
12	Vietnam	39,289	789.7	16
13	New Zealand	38,674	1,300	10
14	China	33,087	1,100	11
15	Philippines	30,559	678	17
16	Italy	27,729	2,100	5
17	Canada	24,329	2,800	2
18	Japan	20,021	1,100	12
19	Taiwan	8,400	835.5	15
20	Ukraina	7,466	1,800	8

Source: Result of the Author's analysis (2023)

As visualised in Picture 7, Bali draws visitors from diverse countries spanning several continents. The spectrum of nations contributing to Bali's tourist influx encompasses those in the immediate proximity of the ASEAN region, including Singapore, Malaysia, Vietnam, and the Philippines.

Bali also garners substantial visits from countries located in the far-eastern expanses of Asia, notably South Korea, China, Japan, and Taiwan. Further southward, the island attracts South Asian tourists, with India, considered the fastest-growing tourism market in the world (Putra et al., 2020), being a noteworthy contributor. It also casts its allure upon nations within the

southern hemisphere, specifically Australia and New Zealand, which fall under the Oceania region. Simultaneously, Bali maintains an international appeal, as European nations such as Italy, France, Germany, the Netherlands, Russia, Ukraine, and the United Kingdom significantly contribute to its tourism industry. Stretching across the Atlantic, the United States and Canada constitute integral tourist-generating countries for Bali, representing the American continent.



Picture 7. Visualisation of Bali's tourism market countries' location and carbon footprint when visiting Bali (Source: the Author, 2025)

The calculations revealed that flights from two of the top three tourist-generating countries of Bali, Australia and Singapore will produce the lowest CO_2 emissions. Australians, the number one tourist market for Bali, generate 666.8 kilograms of CO_2 emissions per flight to Bali. Meanwhile, Singapore, the closest of the three, produces 529.4 kilograms of carbon emissions per flight to Bali. India ranked number 2 in Bali's most important tourist market, emitted 1.1 tons of CO_2, and ranked number 13 in the carbon footprint ranking. Other ASEAN countries in Bali's top 20 tourist-generating countries are Malaysia, the Philippines, and Vietnam, ranked 19th, 17th, and 16th, respectively.

Regrettably, two of the top five countries generating tourists for Bali, the UK and the USA, also rank among the top five countries with the highest carbon emissions. The UK emits 2.2 tons of carbon per flight, while the USA emits 3.1 tons. Surprisingly, Canada, situated further north of the USA, emits 2.8 tons of carbon for each of its residents' flights to Bali, which is lower than the USA's carbon footprint.

Asian markets such as China and Japan, located in the western and northern part of the Korean Peninsula, respectively, emitted the exact amount of 1,1 tons of carbon per flight of their residence to Bali. Moreover, South Korea, located closer to Bali, emitted 1 ton of CO_2 into the atmosphere for each flight of their resident to Bali.

Among the four European countries that are closely situated, Italy and the Netherlands residents generate 2.1 tons of carbon emissions per flight to Bali. In contrast, flights from Germany and France produce 2 and 2.2 tons of CO_2, respectively. Countries at war, Russia and Ukraine, whose citizens travelled to Bali extensively in 2022, produced identical amounts of carbon emissions for each flight taken by their residents to Bali. On the other hand, New Zealanders, the residents of a tourist destination known for their sustainable tourism, generate 1.3 tons of carbon emissions for each flight to Bali. The carbon footprint of the New Zealand market is twice as much as the carbon emissions of their neighbouring country, Australia, which is currently the most important market for Bali.

Based on the carbon footprint calculations presented in Table 1, the carbon emissions generated by Bali's top 20 tourist-generating countries can be grouped into three, categorized by the amount of their carbon footprint. The three groups are the low, medium, and high carbon footprints. Countries that emit less than one thousand kilograms (1 ton) of carbon dioxide into the atmosphere for each of their residents' flights to Bali are classified as low-carbon footprint markets. Those emitting between one thousand and two thousand kilograms of carbon dioxide are grouped as the medium-carbon footprint market. In comparison, those emitting over two thousand kilograms up to 3.1 tons of CO_2 are grouped as the high-carbon footprint markets. The countries falling within the low-carbon footprint category include Singapore, Malaysia, Australia, the Philippines, Vietnam, and Taiwan. Those in the medium-carbon footprint category encompass South Korea, India, Japan, China, New Zealand, Russia, and Ukraine. Germany, Netherlands, Italy, the UK, France, Canada, and the USA represent the high-carbon footprint market.

4.2 Discussion

Sustainable tourism can be approached from two standpoints: the tourist and the tourist destination (Gomes & Lopes, 2023; López-Sánchez & Pulido-Fernández, 2016). Asking tourists to voluntarily calculate their carbon footprint and compensate for it through a carbon offset is an example of how sustainable tourism can be achieved by encouraging tourists to perform pro-sustainable behaviour. On the other hand, destinations can also play an important role in achieving sustainable tourism. Preparing a tool for visitors to calculate their carbon footprint and how much they should pay to compensate through carbon

offset can help achieve sustainable tourism in a destination region. Preparing a carbon offset calculator also serves another purpose for sustainable tourism. The tool can help monitor visitation impact and prepare policy based on collected data. For example, a tourist destination can use the calculator to calculate the carbon footprint of each market segment and use the result to select a target market. Using the carbon footprint calculator to provide data as the basis for an informed decision in selecting a target market is essential since hoping for the tourist to calculate their carbon footprint voluntarily and then asking them to pay for carbon offset is somehow not rewarding. Therefore, a tourist destination manager may provide a policy to reduce the carbon footprint through carbon offset while hoping their visitors will voluntarily perform carbon offset.

To be sustainable, the negative impact of tourism should be minimal (Butler, 1999; Moscardo & Murphy, 2014), and one of the negative impacts that need to be low is carbon emission (Campos et al., 2022). Unfortunately, tourists bring their carbon footprint to a destination (Becken & Shuker, 2019). Therefore, calculating tourism's carbon footprint is an essential step toward sustainable tourism (Huang & Tang, 2021) because it will provide the basis to determine which market is considered sustainable and which is not. The information can then be used to design a policy to achieve sustainability, for example, by selecting the most sustainable tourist market.

As the country of origin with the lowest carbon footprint, Singapore, Malaysia, Australia, Philippines, Vietnam, and Taiwan are the tourist markets that will cause minimum environmental damage when they travel to Bali. With CO_2 emission that is under 1 ton, the amount of CO_2 released to the atmosphere will not be as much as if the Netherlands, Italy, the UK, France, Canada, and the USA do the visit to Bali. It is true even though long-haul travellers are known to stay longer at a destination (Bao & McKercher, 2008; Sun et al., 2020), thus spending more money, which advocates the decision to select the long-haul market as the target market. Therefore, this article recommended that the tourism authority of Bali choose low-carbon footprint countries as the target market for Bali for the upcoming year. While in line with the Carbon Reduction Framework to progress toward the nett-zero carbon agenda (Gössling & Higham, 2021), this recommendation also serves another purpose. Selecting more ASEAN countries as the primary target market for Bali tourism will benefit the ASEAN inter-community connectivity through tourism in creating The ASEAN community (Karim et al., 2022). It will also increase the sense of belonging among its people (Fardhiyanti & Wee, 2022), and contribute to the region's prosperity (Arnakim et al., 2023).

This article also proposed that demarketing strategies should be implemented in the medium- and high-carbon footprint tourist markets to

reduce their number. Bali has been known to have implemented the demarketing strategy. In their seminal work on demarketing, Kotler & Levy (1971) argued that the government of Bali was reported to have chosen to accept the smaller number of higher-spending tourists instead of targeting the large number of low-spending tourists. They are mentioned as follows:

> "For example, the island of Bali in the South Pacific has long been a tourist's dream. In recent years, it has attracted a larger number of tourists than can be handled comfortably with its facilities. The island is in danger of becoming overcrowded and spoiled. If tourism goes unchecked, Bali faces the same fate as Hawaii, which has lost its pristine appeal because of teeming crowds and soaring prices. The authorities in Bali are aware of this danger and are considering measures to reduce demand. Their demarketing strategy is to reduce the island's attractiveness to middle-income tourists while maintaining or increasing its appeal to high-income tourists. They prefer fewer higher-spending tourists to a larger number of lower-spending tourists (in contrast to the savings and loan example cited earlier). To accomplish this, they will build luxury hotels and restaurants, place their advertising in media reaching the rich, and build a distinct image of catering to the affluent class."

However, this article will not revisit the idea of demarketing that prefers only the rich, as Kotler & Levy (1971) reported. Instead, this article recommended that the tourism authority of Bali focus its marketing effort on the low-carbon footprint market and selectively demarket the medium and high-carbon footprint markets. By choosing the low-carbon footprint market, Bali has chosen the quality tourists who perform pro-sustainable behaviour (Li et al., 2023), higher spending power (Nickerson et al., 2016), and more willing to pay for sustainable tourism (Pulido-Fernández & López-Sánchez, 2016), that will benefit the sustainability of Bali.

The other reason for suggesting a demarketing strategy for the medium and high-carbon footprint market is that hoping for tourists to do carbon offset voluntarily is too much and will yield less-satisfying results (Higham et al., 2015; Higham et al., 2018). Even though the awareness of carbon offset to compensate for the negative impact of flying is increasing, there is an attitude-behaviour gap (Barr et al., 2010; Higham et al., 2015; Tölkes, 2020), where people tend to perform unsustainably even though they aware of the important of it. There is also a home and away gap, where people tend to behave more sustainably at home than when they are away (Higham et al., 2015). Therefore, decarbonising the tourist destination will require policy initiatives (Gössling & Lyle, 2021) to regulate the tourism industry with authority so that net-zero carbon will be easier to achieve. In that regard, this article argued that targeting the low-carbon

footprint segment while demarketing the medium and high-carbon-footprint market is a policy that is worth the try.

5. Conclusion

The article aims to determine the sustainable tourist market that Bali's tourism authority can target based on its carbon footprint. It argued that the sustainable tourist market suitable for the sustainability of tourism in Bali is the low-carbon footprint market, consisting of four ASEAN countries: Singapore, Malaysia, Philippines, Vietnam, as well as Australia, and Taiwan. The market is characterized by low CO_2 emissions (below 1000 kg per flight). This article recommended that Bali's tourism authority reduce Bali's attractiveness as a tourist destination toward the medium and high-carbon-footprint market through demarketing strategies.

5.1 Managerial Implications

The managerial implications of this article are for the management of tourism in Bali and to be executed by the tourism authority of Bali. First, for calculations of carbon footprint specific to a tourist-generating country to be carried out, the availability of profile data for each country is essential. Therefore, conducting regular research to profile each of Bali's tourist-generating countries is crucial. The tourist's profile information can be used to perform the calculation better since it will allow for the specific parameter calculation to be used for each specific market, thus resulting in an exact calculation result unique to each tourist market.

Second, once the research has been done and the result has been obtained, the carbon footprint for each country can be calculated. The calculation result can be used to select the most suitable target market for Bali, the segment with the lowest carbon footprint. Once the target market has been selected, the tourism authority of Bali can start designing the best product and marketing strategy to attract the target market.

Third, the result of the calculation should also allow the tourism authority of Bali to determine the market segment that needs to be demotivated to visit Bali for their medium and high-carbon footprint and prepare the most effective demarketing strategy to decrease the appeal of Bali to those countries. Some strategies that can be considered as the demarketing strategy are:

1. Rebuff the Visa-on-Arrival policy for the country with a medium and high-carbon footprint to eliminate one of the administrative advantages previously presented by the Indonesian government which is to encourage visitors to visit Bali.

2. Determined the quota of visitors accepted from medium and high-carbon-footprint tourist-generating countries and used the visa application process as a control mechanism to ensure the quota of those markets would not be exceeded.
3. Ask visitors from medium and high-carbon-footprint countries to calculate their carbon footprint using the carbon footprint calculator and compensate for their carbon emissions by selecting any carbon offset plans available on the Carbon Footprint Calculator of The Ministry of Tourism and Creative Economy of the Republic of Indonesia.
4. Decrease the promotional effort and travel incentives for the medium and high-carbon footprint countries to reduce the attractiveness of Bali to those markets.

The four demarketing strategies above may decrease tourist visits to Bali, especially from the medium and high carbon footprint market, because it will require extra effort and resources to visit Bali. While it will negatively impact the economy of Bali, which has been overly reliant on tourism (Bhaskara & Filimonau, 2021), the strategies will ensure that the "overtourism" Bali (Krummeck et al., 2020) will only visited by quality tourists, who will not threaten the social life of the Balinese, respect Balinese culture and conserve the environment. The strategies will contribute to Bali's social, cultural and environmental sustainability in the long term. If, for example, the tourism industry of Bali can prepare products that lengthen the stay of the low-carbon footprint market in Bali, combined with the sense of "scarce" and the "sustainable destination" image resulting from the demarketing strategies, we also hope that in the future, the economic sustainability of tourism in Bali will be achieved.

Fourth, before the research and better calculation can be done, the tourism authorities of Bali can use the calculation presented in this article as the basis to select the most sustainable tourist market for Bali while preparing all that is necessary to carry out the following carbon footprint calculation better.

5.2 Limitation and Future Research

The carbon footprint calculation discussed in this article is based on limited data on the profile of each tourist market, thus resulting in the same calculation parameter being used to determine each country's carbon footprint. Interestingly, the result of the calculation revealed two contradictions. First, being further to Bali than the USA, a flight from Canada will release less carbon into the atmosphere, thus proving that increasing distance is only sometimes associated with a more significant carbon footprint. Second, one of the top five

tourist-generating countries of Bali – the USA – is, in fact, one of the farthest tourist-generating countries of Bali. Although previous research argued that distance possesses the ability to decline tourist arrival (Bao & McKercher, 2008; McKercher, 2008; McKercher et al., 2008) and prompt people to engage in a short-haul trip (Ho & McKercher, 2014), this is not the case with the USA market for Bali.

To produce better calculation, the parameter used to calculate the carbon footprint should be specific for each tourist-generating country, especially the length of stay, the accommodation where they stay during their visit to Bali, the international airport from which they departed to Bali, and the type of their flight (direct of continuous). The availability of the data will allow the calculation of the carbon footprint to be carried out specifically for each country, thus resulting in a better understanding of the carbon footprint of each market. Therefore, this article recommended that the tourism authority of Bali conduct research every year to profile each target market of Bali. The research should be designed and executed in the best possible way to ensure quality results. Besides providing data for calculating carbon footprint, the research will also serve another essential purpose, such as designing a suitable tourism product and experience for each target market.

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