



**Escola Superior  
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Politécnico de Coimbra



**Escola Superior  
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Politécnico de Coimbra

# **Airlines' Environmental Sustainability Actions and CSR Impact on Customer Behavior**

Departamento de Comunicação [ESEC]

Departamento de Ciências Empresariais [ESTGOH]

Mestrado em Marketing e Comunicação



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e Gestão**

Politécnico de Coimbra

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Título da Tese de Mestrado: Airlines' Environmental Sustainability Actions and CSR Impact on  
Customer Behavior

Dissertação em Marketing e Comunicação, na especialização em Comunicação de Marketing  
apresentada ao Departamento de Comunicação da Escola Superior de Educação de Coimbra e  
ao Departamento de Ciências Empresariais da Escola Superior de Tecnologia e Gestão de  
Oliveira do Hospital para obtenção do grau de Mestre.

Trabalho realizado sobre a orientação do Professor Doutor Ricardo Filipe Ramos.

Trabalho realizado sobre a coorientação do Professor Doutor Rui Biscaia.

Fevereiro, 2023.

## **Agradecimentos**

Gostaria de expressar a minha profunda gratidão à minha família, amigos e orientadores por todo o apoio e incentivo durante a minha jornada académica.

À minha família, em especial meus pais, avó e irmã, que sempre me apoiaram em todas as minhas decisões e me deram o suporte necessário para concluir mais uma etapa do meu percurso académico.

Aos meus amigos e namorado, que sempre estiveram ao meu lado, apoiaram e acreditaram em mim quando eu própria não acreditava.

Aos meus orientadores, que me guiaram nesta jornada académica, ensinando e orientando cada passo desta jornada. Os seus conselhos e orientações foram fundamentais para o sucesso deste trabalho.

Por fim, quero agradecer a todos os que contribuíram de alguma forma para a realização deste trabalho. Espero que este seja apenas o início de uma longa jornada académica e profissional.



**Título da Tese de Mestrado: O Impacto das Ações de Sustentabilidade Ambiental e de Responsabilidade Social Corporativa de Companhias Aéreas no Comportamento do Consumidor**

Resumo: A aviação comercial procura cada vez mais compensar o seu impacto ambiental. Este estudo tem como objetivo analisar o impacto das comunicações relacionadas com Responsabilidade Social Corporativa (RSC) e Ações de Sustentabilidade Ambiental (ASA) das companhias aéreas na fidelização dos clientes, numa perspetiva de Marketing Relacional (MR). Seguindo uma abordagem de mineração de texto, 6.181 comentários foram extraídos de páginas de Facebook de dez companhias aéreas. Os dados recolhidos foram usados para criar uma matriz de frequência de palavras para cada comentário e construir um modelo de equação estrutural. Os resultados indicam que a comunicação baseada em ASA e RSC afeta positivamente a lealdade comportamental e o comprometimento. O MR exerce um efeito moderador no impacto das comunicações da ASA na lealdade do cliente, mas não na relação entre as comunicações sobre RSC e lealdade. Estas descobertas sugerem que a comunicação sobre esforços ambientais afeta positivamente a lealdade do cliente, fornecendo aos gerentes de companhias aéreas informações valiosas que devem ser consideradas nas estratégias de comunicação, aumentando o retorno na forma de retenção de clientes.

**Palavras-chave:** companhias aéreas; sustentabilidade ambiental; comportamento do consumidor; lealdade do consumidor; responsabilidade social corporativa.

## **Airlines' Environmental Sustainability Actions and CSR Impact on Customer Behavior**

**Abstract:** Commercial aviation increasingly seeks to compensate for its environmental impact. This study aims to analyze airlines' Corporate Social Responsibility (CSR) and Environmental Sustainability Actions (ESA) related to communications' impact on customer loyalty through a Relationship Marketing (RM) perspective. Following a text mining approach, 6,181 comments were extracted from ten airlines' Facebook pages. Collected data was used to create a word frequency matrix for each comment and construct a structural equation model. Results indicate that communication based on ESA and CSR positively affects behavioral loyalty and commitment. RM exerted a moderating effect on ESA's communications' impact on customer loyalty but not on the relationship between CSR communication and loyalty. These findings suggest that communicating environmental efforts positively affects customer loyalty, providing airline managers with valuable insights that should be considered within communication strategies, enhancing return and customer retention.

**Keywords:** airline companies; environmental sustainability; customer behavior; customer loyalty; corporate social responsibility.

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## **INTRODUCTION**

## 1. Introduction

*Sustainability* is defined as preserving present needs while assuring future ones, established in 1987 by the United Nations Brundtland Commission (United Nations, 2021). This term can be applied to several dimensions, being the environmental one the most referred to as climate change and global warming. The global temperature has increased by 1.18 °C since 1880 – caused mainly by Carbon Dioxide (CO<sub>2</sub>) Emissions -, which leads to issues such as a 3.4-millimeter sea level rise per year and an ice sheet mass loss of 428 billion metric tons per year (NASA, 2021). Droughts, floods, and wildfires are other consequences of the climate crisis, directly impacting animal species, places, and peoples' quality of life (Worldwildlife, 2021). The aviation sector is responsible for climate change and global warming by approximately 5% through Carbon Dioxide (CO<sub>2</sub>), water vapor (H<sub>2</sub>O), Nitrogen Oxides (NO<sub>x</sub>), and Sulfur Oxides (SO<sub>x</sub>) emissions (Grewe et al., 2017). Besides gas emissions, the aviation industry significantly impacts worldwide fuel consumption. The transport sector was responsible for approximately 39% of the world's fossil fuel consumption in 2020 (Haegel et al., 2019). In 2022, the commercial aviation sector alone consumed 60 billion gallons of fuel, compared to 57 in 2021 (Statista, 2022). Fuel consumption and Green House Emissions (GHG) are associated with the fossil fuel industry. The aviation sector is responsible for significant water, energy, and electric power consumption and hazardous and non-hazardous material production (Migdadi, 2020). For this reason, the aviation sector is one of the most significant contributors and one of the most impacted by the climate crisis.

Accordingly, airlines are looking for ways to fly more sustainably to become CO<sub>2</sub> neutral by 2050 (IATA, 2022). To do so, airline companies are taking measures to mitigate their environmental impact through Corporate Social Responsibility actions (Serhan et al., 2018). Corporate Social Responsibility (CSR), defined as a company's commitment to enhancing their community's life quality (Y. Kim et al., 2020), can contribute to a more sustainable future through Environmental Sustainability Actions (ESA). CSR communication allied with a Relationship Marketing (RM) strategy – defined by its ability to build a stable and healthy relationship with its customers, attracting and retaining them (Affran et al., 2019) – can strengthen bonds and enhance positive outcomes.

Facing environmental challenges, CSR actions are imperative for the survival of airline companies (Y. Kim et al., 2020), becoming fundamental to influencing customers' attitude and perspectives regarding a company. Subsequently, the communication of CSR actions on social media is an opportunity for companies to manage their image, as it constructs the abstract corporate image and reveals tangible actions, positively influencing customers' perceptions (Ramesh et al., 2019). Moreover, since this type of customer perceptions can result in loyalty (Lee et al., 2019, 2012; Okumus et al., 2020; Vicente et al., 2020), these will directly impact airlines' revenue and competitiveness.

Many research studies about the airline industry have been carried out throughout the last years. For example, studies regarding CSR applied to the airline industry in specific airlines conclude that some of them apply social and economic CSR, focusing less on the environmental dimension (Ayu et al., 2020). One other study focused on how desired and required CSR actions affect customer loyalty in the airline industry suggests that customer loyalty increases when companies practice desired CSR – unlike when they practice required CSR (Y. Kim et al., 2020). In environmental sustainability, a study about passengers' psychological benefits from green actions (Hwang & Choi, 2018) found that specific dimensions of psychology contribute to increasing the overall image of an airline, positively impacting the intention to use, willingness to pay more, and word of mouth. A study regarding the factors contributing to customers' support of environmentally sustainable initiatives (Winter et al., 2019) considers that customers positively reinforce overall sustainability, supporting biofuel usage, sustainable aircraft manufacturing, and sustainable construction materials. However, from an RM perspective and the communicational point of view, no study was conducted regarding airlines' ESA and CSR online communications' impact on customer behavior.

Considering this, we aim to understand airlines' ESA and CSR-related communications' impact on customer loyalty through a RM perspective. Online reviews were collected from airline companies' Facebook posts to achieve this goal. Social Media platforms gather tremendous amounts of user-generated information leading to valuable insights for companies and industries. For instance, Facebook's mass adoption and its

real-time features make it a valuable platform for research, either to recruit participants or to collect user-generated data (Rife et al., 2016).

Collected data were further analyzed using text mining techniques to develop a word frequency matrix. This matrix served as the input for data analysis on partial least squares structural equation modeling (PLS-SEM). This investigation's outcomes will allow an understanding of how these dimensions can be considered within airline's marketing strategies from a long-term perspective. Moreover, this study can help provide important information to airlines' regarding their ESA and CSR from a communication point of view to enhance customer behavior towards this industry.

## **LITERATURE REVIEW**

## **2. Literature Review**

### **2.1. The Need for a Literature Review**

Considering the sectors' dimensions, it is essential to understand what advances have been made in researching them. Especially considering the post-pandemic context, it is even more pertinent to study and provide the airline industry with relevant knowledge that can be incorporated into internal and external procedures. Since this investigation focuses on airlines' communication regarding environmental and CSR efforts and their consequences, it is imperative to recall previous studies on this issue.

The integrative review is an excellent method to retrieve the studies we need to do so since it recurs to specific keywords and parameters previously selected. Therefore, two Integrative Literature Reviews were performed:

**Integrative Review 1 (IR1)** – It aims to assess what investigations were carried out regarding airlines' ESA.

**Integrative Review 2 (IR2)** – It aims to assess what investigations were carried out regarding airlines' CSR.

### **2.2. IR1 and IR2 Review Protocol**

In order to perform both integrative reviews, the Scopus database was used. On each one, it was used a group of selected keywords:

**Integrative Review 1 (IR1)** – “Environmental Sustainability Actions AND Airlines AND Communication”;

**Integrative Review 2 (IR2)** – “Airlines AND Environmental Sustainability Actions AND CSR”;

In both Integrative Reviews, inclusion and exclusion criteria were defined. We narrowed the search for indexed articles from academic journals or conference proceedings written in English and available online. Only articles published from 2018 to 2022 were considered to obtain the most recent findings related to the themes in the study. These Integrative Reviews were conducted on the 22<sup>nd</sup> of January 2022 and were highly relevant to developing a complete and efficient literature review on this research's main concepts.

### 2.3. Airlines' Environmental Sustainability Actions on Customer Loyalty

Environmental Sustainability is in the order of the day, especially in the corporate sector. Pressure from stakeholders requires companies to decrease and compensate for their environmental impacts (Naidoo & Gasparatos, 2018). For this reason, companies are adopting ESA, and it is pivotal to examine how these impact customer behavior and affect the decision-making process, not only to increase customer loyalty but to implement strategies towards it more efficiently (Han et al., 2019).

*Environmental Sustainability* can be defined as the society's state of balance that allows answering needs without exceeding ecosystems' capacity or affecting diversity (Morelli, 2011). To attain this condition, individuals, governments and industries need to carry out ESA. When these actions are planned as part of a company's overall strategy and considered in every aspect, it shows real commitment and consistency (Ramli et al., 2015), often resulting in customer loyalty and brand love (Han et al., 2019). The Cognitive Consistency Theory (Kruglanski et al., 2018) states that individuals set their behavioral intentions based on their perceptions. In the airlines industry, this means passengers who perceive the airline's environmental sustainability efforts positively, will have a better behavioral response towards it – that can be manifested through behavioral loyalty, reinforcing the importance of this dimension.

In the airline industry, being environmentally responsible means the company must make a real effort to implement actions such as recycling and fuel, water, and energy saving within its business model and policies, considering the environment (Hwang & Choi, 2018). Customers are increasingly more environmentally aware and expect airlines to adopt a positive attitude towards the environment through their CSR strategies (Ahn et al., 2021). A previous study proved that airlines' stakeholders and customers tend to support and have a better image of airlines that perform ESA, like biofuels usage and sustainable aircraft construction (Winter et al., 2019). Especially regarding airlines' ESA within CSR, Sheran et al. (2018) concluded that these activities positively influence airlines' image. With the ongoing pressure on airlines to become more environmentally friendly, people familiar with CSR are compelled to fly with this type of airlines, reflecting on customer behavior and the purchasing decision-making process. Thus, it is essential to understand that ESA can appear in many ways.

One way is the use of environmentally friendly fuel. Biofuels can come from sugar, used cooking oil, municipal and agriculture waste, pellets and energy waste (Winter et al., 2019). Through specific processes, these feedstocks become Sustainable Aviation Fuel (SAF), adopted by many airlines worldwide. Lee et al. (2019) suggest a new perspective where CSR and corporate image are formed through CSR activities, especially environmental sustainability-related ones. A great example of this type of effort is Etihad's "most sustainable flight ever," performed in October 2021, using a mix of 62% regular aviation fuel with 38% SAF, reducing flight CO2 emissions. (Pallini, 2021). Furthermore, this flight represents the industry's desire to perform safely and efficiently more sustainably way while bringing awareness to this issue.

Dewald (2014) proved that people are more supportive and have a better image of companies that contemplate environmental protection within their strategies. Waste generation, greenhouse emissions, and noise pollution are an issue within airports worldwide (Sardjono et al., 2021), and implementing the right ESA can cover reductions of the carbon footprint, recurring to the right technology and resources to make the airport more efficient while reducing costs (Winter et al., 2019). SITA, an IT company that provides for the aviation industry, developed a technological solution to monitor and quantify specific emissions for the Palermo Airport, enabling the airport to easily report and address them (Aviation Pros, 2021).

In aircraft manufacturing, materials should be lasting, repairable, and available for the whole aircraft's life cycle to guarantee maintenance and replacements when needed (Gialos et al., 2018). A previous study has concluded that passengers view new aircrafts as more sustainable and one of the most efficient ESA, reflecting the airlines' image (Mayer et al., 2012). As an example, Airbus 350 and Boeing 787 Dreamliner are the first commercial aircraft to be built broadly with carbon fiber-reinforced polymers (CFRP), a material that makes them more resistant and fuel-efficient while being lighter-weight, assuring lower maintenance costs and providing a better flight experience, due to their silent cabins (Herbert, 2021). Even with aircraft design, this can have a decisive role in how sustainable it will be. Airbus designed A350 with this in mind, creating a wing based on nature, valuing and maximizing aerodynamics, contributing to a lower need for fuel and lower emissions (Airbus, 2021).

Since ESA are part of a company's CSR strategy (Y. Kim et al., 2020), these have a direct impact on the outcomes for the company. Transparency in airlines' environmental actions is crucial since it directly impacts customers' behavior and decision-making process (Santos & Delina, 2021). Furthermore, when there is environmental sustainability commitment from the transport sector, this is not overlooked by passengers, who recognize it, positively affecting their loyalty towards it (Vicente et al., 2020). Following this premise, it is proposed that:

**Hypothesis 1.** Airlines' ESA have a positive effect on Customer Loyalty.

#### **2.4 Airlines' CSR on Customer Loyalty**

Despite the evolution of the definition of CSR throughout the years, it can currently be defined as a company's compromise with social issues, where corporate activities' interests and responsibilities go beyond their own benefit, instead extending to external stakeholders and the community (Carroll & Shabana, 2010). CSR continues to gain importance with the rising concerns about social issues and companies' role towards them. In the hospitality sector, which relies entirely upon consumer spending and highly substitutional products and services, CSR actions that result in brand recall and customer loyalty are pivotal (Rhou & Singal, 2020).

Going back to Carroll's model (Carroll, 1991), four dimensions of CSR were established – Economic, Legal, Ethical, and Philanthropic – and broadly applied in studies within several sectors, including the aviation sector (Han et al., 2019; Ilkhanizadeha & Karatepeb, 2017; Y. Kim et al., 2020; Kuo et al., 2016; Serhan et al., 2018). CSR dimensions evolved throughout the years, and more recently, Dahlsrud (2008) subdivided CSR into five dimensions – Environmental, Social, Economic, Stakeholders, and Voluntariness. Regarding the hospitality sector, Inoue and Lee (2011) consider CSR from the stakeholders' point of view, considering dimensions like environmental issues, community relations, and diversity. Additionally, CSR strategies can generate excellent outcomes for companies when practiced willingly. Subdividing Carroll's model into required (economic and legal) and desired (philanthropic and ethical) CSR, the last one can have a positive effect on customer loyalty when these efforts are perceived and comprehended (Y. Kim et al., 2020).

Many theories were developed around the concept of loyalty. According to Cheng (2011), it is possible to define and subdivide the concept of loyalty into two types: behavioral and attitudinal. These two differ in terms of outcomes. Behavioral Loyalty ensures that the customer will be converted and buy from the brand. Attitudinal Loyalty is not centered on the customers' purchase intentions but will guarantee advocacy and positive word of mouth, creating a positive image for the brand. Both types of loyalty are pivotal since they bring direct and indirect revenue to a company.

Oliver (1999), on the other hand, states that loyalty comprises four stages. It starts with cognitive loyalty, gained from experience or word of mouth. Next, when satisfaction with the brand or product is developed, the affective loyalty stage begins, marked by a positive attitude and feelings towards the brand or product. Follows the conative loyalty, defined by real commitment towards a brand, translated into intentions to purchase and/or use. Lastly, action loyalty sets in when the actual purchase is made. From a communication point of view, CSR activities can strengthen customers' affective and cognitive relations with a company, resulting in loyalty towards it (Ahn et al., 2021).

The airline industry has always explored customer loyalty in a particular way through Loyalty Programs. Kim et al. (2021) affirm that this type of program effectively rewards regular customers, guarantees their return, and creates an exclusive and emotional bond between the company and its customers. A previous study concluded that a company working in a way that a positive image is formed from CSR activities is working towards customer loyalty, especially if it requires customer engagement in CSR actions (Lee et al., 2019). Following this premise, airlines are, more and more, promoting loyalty through environmental actions within their CSR strategy. For example, Qantas has launched the world's first green loyalty program, within Qantas Frequent Flyers - Green Membership – starting in 2022. This program will reward 13 million frequent flyers for daily sustainable actions, from staying in eco-hotels to walking to work (Qantas, 2021).

Pérez and Bosque (2013) affirm that customers' image of CSR strategies depends on the type of stakeholder and CSR actions' amount of visibility, directly influencing the level of loyalty. Thus, identifying how to improve and communicate is pivotal to companies' CSR strategy success. Turkish Airlines, for instance, provides detailed CSR reporting on its website, describing CSR activities and policies focusing on ESA. Detailed

and transparent CSR reporting can create a positive image and reputation for the airline and its CSR strategy, often resulting in customer loyalty and intentions to use the airline in the future (Okumus et al., 2020).

Since a successful CSR strategy directly impacts customer loyalty (Lee et al., 2012), marketers should consider that when developing CSR strategies and activities (Lee & Yoon, 2018). Therefore, the following hypothesis is formed:

**Hypothesis 2.** CSR within airlines will have a positive effect on Customer Loyalty.

#### **2.4.2 Relationship Marketing: a Moderator for Airlines' CSR and Environmental Sustainability Actions on Customer Loyalty**

Building long-lasting and positive relationships with customers and stakeholders is pivotal to enhancing loyalty. Being the airline industry often defined as a competitive field, loyalty is imperative, as it guarantees companies' customer retention and, consequently, revenue (Mostert & De Meyer, 2010).

Through RM, companies can get closer to their stakeholders, having a competitive advantage and directly influencing customers' behaviors (Affran et al., 2019), based on creating and maintaining relations with stakeholders, with customer loyalty as the primary goal (Ahn et al., 2021). The growing importance of CSR and environmental issues has changed markets, companies, and customers' preferences and daily choices. Therefore, airlines need to acknowledge and shift perspectives, engaging with and involving customers in these processes (Morsing & Schultz, 2006; Payne et al., 2017).

ESA often results in a positive perception of sustainability, increasing customer engagement with a company and commitment (Chen et al., 2020), which is why RM should be considered. Saudia's participation in Skyteam's Sustainable Flight Challenge 2022 – a challenge that aims to find the most sustainable way to operate a flight – was distinguished with an award for Best Customer Engagement by creating a flight lab for collaborating and co-creating with actual customers that submitted ideas of ESA with the potential to be implemented (AlMutlaq, 2022; Singer, 2022).

A previous study confirms that customers will maintain more robust and longer relationships with companies they have a positive image of (Barry et al., 2008), and that can happen through customers' involvement in CSR actions (Lee & Yoon, 2018). CSR

actions that promote engagement with customers (Agyei et al., 2021) or recur to approaches like co-creation to develop actions within CSR strategies (Ahmad et al., 2021) are one way to strengthen relationships between both parties and enhance loyalty. In 2019, KLM launched the controversial campaign “Fly Responsibly,” encouraging passengers to fly more responsibly and creating awareness for projects outside the aviation scope, such as rainforest protection programs. The campaign asked passengers to consider air travel’s impact and evaluate their journeys beyond the act of flying, considering every action and how sustainable they were. The public eye quickly accused KLM of shifting the responsibility to passengers. However, one study has confirmed that programs promoting citizen participation and engagement in CSR activities contribute to a more positive perception and image of a company’s CSR activities, which often leads to loyalty behaviors, such as intentions to purchase or use and positive word of mouth (Lee & Yoon, 2018).

Globally, a positive image attained through successful CSR strategies and ESA helps companies establish a stronger relationship with the communities and stakeholders, with RM playing a pivotal role and especially when customers are part of the process (Chen et al., 2020; Lee & Yoon, 2018), having a positive effect on customer loyalty (Khoa, 2020). Considering this, the following hypotheses are formed:

**Hypothesis 3a.** RM moderates the influence of ESAs on Customer Loyalty.

**Hypothesis 3b.** RM moderates the influence of CSR on Customer Loyalty.

## **2.5 Conceptual Model**

Figure 1 shows the conceptual model that mirrors the hypothesis previously mentioned:

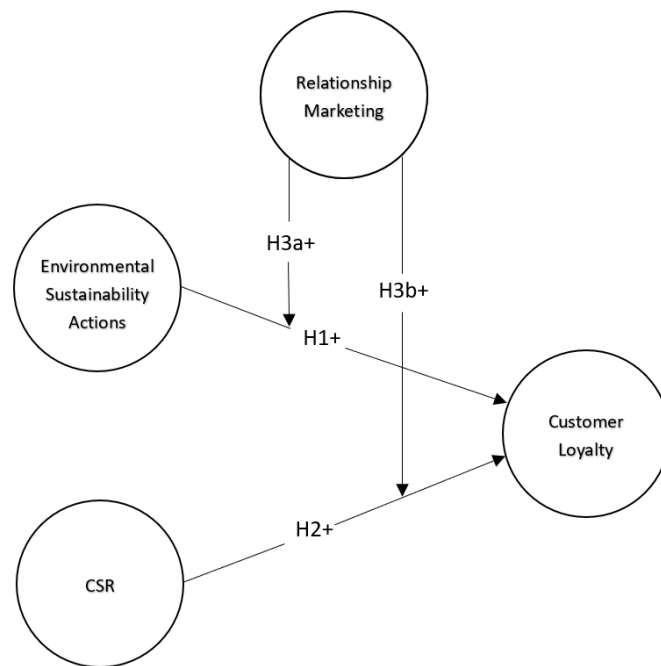


Figure 1 - Conceptual Model

## **METHOD**

### 3. Method

Excluding traditional data collection methods, this research opted for an innovative approach. First, data was collected from Facebook through airlines' pages and users' interactions. Through users' comments on posts based on environmental sustainability and CSR strategies from airline companies, it is possible to collect valuable information for this research. After collecting all the data needed and recurring to selected terms and keywords from comments on airlines' posts, a dictionary was established and analyzed through each keyword's frequency. Lastly, these results served as input to PLS-SEM to understand the relations between constructs.

Social Media has proven to be one of the most powerful marketing tools and has been extensively explored by airlines that recognize that passengers' use of social media is essential. Its fast-growing proportion must be considered within marketing activities (Seo & Park, 2018), which is why it was the chosen channel to collect data for this research.

#### 3.1. Sample and Data Collection

For this study, the sample is characterized by users who commented on airlines' Facebook social media posts containing the keywords "sustainability" and/or "sustainable". Facebook has several advantages that make it a good tool for social science research, such as its demographic and geographically heterogeneous database and the massive number of user interactions that happen on Facebook daily (Rife et al., 2016). Since the airline industry often recurs to social media as part of their customer engagement strategies, Facebook was chosen as a data source. Only comments on posts from the World's Biggest Airlines on Revenue Passenger Kilometers (RPK) Flown in 2020 (Statista, 2020) were considered (Table 1). This was the criteria chosen because aviation's environmental footprint depends on many factors, passenger-related issues being one of them. Overall passenger weight – including luggage – impacts commercial planes' fuel consumption and, consequently, their carbon footprint (Bofinger et al., 2013).

Additionally, only posts from the last five years were considered, and posts without comments were disregarded. Plus, these posts were filtered to assess their

relatability to environmental sustainability. For example, posts related to financial sustainability were discarded.

*Table 1 - World's Biggest Airlines on Revenue Passenger Kilometers (RPK) Flown in 2020 (Statista, 2020).*

| <b>Airline</b>          | <b>RPKs in Billions</b> |
|-------------------------|-------------------------|
| American Airlines       | 124 B                   |
| China Southern Airlines | 110.65 B                |
| Delta Air Lines         | 106.49 B                |
| United Airlines         | 100.19 B                |
| China Easter Airlines   | 88.73 B                 |
| Southwest Airlines      | 87.26 B                 |
| Emirates                | 78.75 B                 |
| Air China               | 71.42 B                 |
| Ryanair                 | 64.93 B                 |
| Qatar Airways           | 57.17 B                 |

Comments were collected through a web scrapper resorting to the R software's package Rvest. A web scrapper is a tool or piece of code intended to extract data from a specific web page and, afterward, can be exported in the most convenient format for later analysis (Rita et al., 2022). The data was collected on the 14<sup>th</sup> of March 2022, and 6, 181 comments were extracted.

### **3.2. Data Preparation**

Following the approach of Ramos et al. (2022), the online reviews were submitted to a process to build a term frequency matrix that will be used as an input for PLS. Using the R "tm" package, the dataset was cleaned by removing stop words (words with no semantic value such as "and", "or", "the"), adverbs, and articles. Additionally, all the terms were transformed into lower case, and a stemming process (i.e., similar words were transformed into a common term: e.g., "loving" or "loved" = "love") was conducted. Terms related to each of the constructs' items were counted and grouped according to their relatability with these terms, creating a dictionary of the theoretical constructs in the conceptual model (see Figure 1). To allocate each term to the related item, 5% of the

collected comments were randomly selected in order to assess the context in which the term was mentioned. This process, used by previous studies (Piccinelli et al., 2021), facilitates decision-making and ensures accuracy. Using the approach of Ramos et al. (2019), to eliminate the subjectivity associated with constructing such a dictionary, five independent specialists from different universities and backgrounds - three marketing specialists and two CSR specialists - were invited to validate it. Each of the specialists was contextualized about the aim of this study and received relevant information about the data collection and analysis method. By considering the specialists' inputs, the dictionary was reviewed and adjusted. Table 2 showcases the conceptual model's constructs, items, and examples of terms associated with each item.

*Table 2 - Items related to each model construct and respective example terms.*

| <b>Construct</b>                     | <b>Items</b>                               | <b>Example Terms</b>                   |
|--------------------------------------|--|--|
| Corporate Social Responsibility      | Environmental Responsibilities in Aviation | Ecofriend, preserve, environmentalist. |
| Environmental Sustainability Actions | Recycling                                  | Plastic, wrapper, paper.               |
|                                      | Resources Saving                           | Energy, water, power.                  |
|                                      | Greenhouse emissions and biofuels          | Biofuel, biodiesel, carbon.            |
|                                      | Sustainable Aircrafts                      | Aerodynamic, efficient, hybrid.        |
| Customer Loyalty                     | Behavioral Loyalty                         | Repurchase, Return.                    |
|                                      | Commitment: Conative Loyalty               | Commitment, love, compromise.          |
|                                      | Attitudinal Loyalty                        | Favorite, recommend, advocacy.         |
|                                      | Loyalty Programs                           | Reward, membership, tier.              |
| Relationship Marketing               | Engagement                                 | Connect, follow, comment.              |
|                                      | Positive Emotions                          | Care, joy, respect.                    |
|                                      | Customer Support                           | Encourage, accept, support.            |

Following this, the dictionary was confronted with the comments collected from Facebook, resulting in a term frequency matrix. A term frequency matrix is a structure that can identify each time a comment reflects a specific item: each line of the matrix represents a comment, and each column represents one of the items mentioned in Table 2. The more an item is referred to in a comment, the bigger the relation between that comment and the item, originating a continuous scale. Figure 2 sums up this study's methodology.

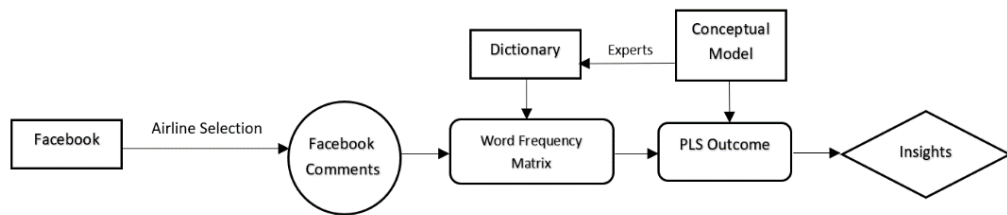


Figure 2 - Methodological Scheme

### 3.3. Data Analysis

The matrix served as the input for data analysis on partial least squares structural equation modeling (PLS-SEM) to assess relations between the data and the model constructs (Ramos et al., 2022). Previous studies have suggested that PLS-SEM is preferred in exploratory analysis with secondary data since it enables the interchange between theory and data (Nitzl, 2016), making it the ideal software to perform this research analysis. Additionally, PLS-SEM is ideal for social science research recurring to secondary data, allowing single-item constructs and formative variables (Hair et al., 2019). In this study, CSR is a single-item measure, and all model relations are formative, meaning constructs result from each item's cumulative effect. This is particularly relevant for this study since loyalty can appear in many forms. For example, someone can be a real advocate of a determined airline by believing in it as a brand and sharing the same values, yet when the time comes to buy an airline ticket, that airline may not be the choice for several reasons (price, routes, availability, etc.), not translating into behavioral loyalty.

The approach chosen for this analysis was the Confirmatory Composite Analysis (CCA). According to Hair et al. (2020), compared to other popular approaches, such as the Confirmatory Factor Analysis (CFA), CCA has several advantages over CFA and other approaches, such as construct validity given by higher item retention and its application to formative models.

Following the CCA approach for formative measures models (Hair et al., 2020), we started by examining Convergent Validity (i.e., minimum path coefficient of 0.7 for a strong relationship between a multi-item formative construct and its reflective measure) and Multicollinear (i.e., [VIF] < 3 to assure multicollinearity absence). Indicators' weight

size and significance were tested using bootstrapping, considering  $\leq 0.05$  the statistical significance necessary to determine the indicators contributing to the construct. The significance level selected to evaluate t values was 5% ( $t = 1.96$ ). Indicators' size and significance are measured to assess their bivariate correlation among each other and the respective variable, considering outer loadings values  $\geq 0.50$  acceptable. Lastly, predictive validity measures ( $R^2$ ) and relevance ( $Q^2$ ) were performed. The attained results were the basis for this study's discussion and conclusions.

## **RESULTS**

## 4. Results

### 4.1. Assessment of Measures

The word frequency (min-max) for ESA indicators ranged between 0-9 (Recycling) and 0-12 (Resource Saving and Sustainable Aircraft). Values between 0-3 (Behavioral Loyalty) and 0-18 (Loyalty Programs) were registered for Customer Loyalty. The moderator variant (RM) shows values between 0-3 (Customer Support) and 0-5 (Positive Emotions). Lastly, the indicator for CSR (Environmental Responsibility in Aviation) showed a 0-4 word frequency variation.

Descriptive statistics are presented in Table 3. Following the CCA approach, the algorithm PLS analysis was performed. Starting with path coefficients ( $\beta$ ), some items' values fall below 0.7 (Hair et al., 2020). The Resources Saving item shows a negative path coefficient value ( $\beta = -0.150$ ), which resulted in its elimination. Due to a combination of theory and item significance, the decision was to keep all remaining items (Hair et al., 2019), concluding that these indicators contribute to explaining each variable. Multicollinearity was tested based on VIF external values. Since all values fall below 3 ( $1.000 < VIF < 1.168$ ), no multicollinearity was observed (Hair et al., 2020). For validity assessment, outer weights analysis reveals all items'  $p$  values are significant, except for the Recycling item ( $p$ -value =  $0.090 > 0.05$ ;  $t = 1.697 < t$ -value recommended  $\geq 1.96$ ). Despite this item's outer loading falling below the suggested criterion of 0.5 (J. Hair et al., 2020) (outer loading = 0.168), it was considered pivotal to maintain it since its removal could affect theoretical validity (Ramos et al., 2022). Additionally, the Customer Support (0.360), Attitudinal Loyalty (0.279), and Loyalty Programs (0.309) results are lower than the recommended criterion. Since they were statistically significant for the formative measures of RM and Customer Loyalty, just presenting lower loadings, the decision was to maintain them in the model, supported by the theoretical evidence by experts in the literature review (Cenfetelli & Geneviève, 2009). The Sustainable Aircraft item has great influence in explaining ESA (0.882), while Engagement (0.759) and Positive Emotions (0.612) highly explain RM.

Table 3 - Items, Descriptive Statistics, Outer Weights, Outer Loadings and correlation matrix.

| Variables                                   | Min-Max | M(SD)       | Outer Weights | t-values (p-values) | Outer Loadings |
|---|---------|-------------|---------------|---------------------|----------------|
| <i>Environmental Sustainability Actions</i> |         |             |               |                     |                |
| Recycling                                   | 0-9     | .089(.053)  | .090          | 1.697*(.090)        | .168           |
| Sustainable Aircrafts                       | 0-12    | .756(.088)  | .763          | 8.637*(.000)        | .882           |
| Greenhouse Emissions and Biofuels           | 0-10    | .464(.118)  | .469          | 3.955*(.000)        | .666           |
| <i>Relationship Marketing</i>               |         |             |               |                     |                |
| Engagement                                  | 0-5     | .715(.065)  | .723          | 11.178*(.000)       | .759           |
| Positive Emotions                           | 0-4     | .555(.076)  | .558          | 7.309*(.000)        | .612           |
| Customer Support                            | 0-3     | .305 (.081) | .305          | 3.769*(.000)        | .360           |
| <i>CSR</i>                                  |         |             |               |                     |                |
| Environmental Responsibilities in Aviation  | 0-4     | 1.000(.000) | 1.000         | N/A                 | N/A            |
| <i>Customer Loyalty</i>                     |         |             |               |                     |                |
| Behavioral Loyalty                          | 0-15    | .470(.053)  | .473          | 8.998*(.000)        | .732           |
| Commitment: Conative Loyalty                | 0-18    | .640(.045)  | .644          | 14.315*(.000)       | .853           |
| Attitudinal Loyalty                         | 0-4     | .198 (.053) | .200          | 3.765*(.000)        | .279           |
| Loyalty Programs                            | 0-3     | .159(.069)  | .157          | 2.270*(.023)        | .309           |

Notes. *Min* = Minimum; *Max* = Maximum; *M* = mean score; *SD* = standard deviation;  $\beta$  = beta weight; *t* = t-value; N/A = Not applicable; \* = significant at the .01 level.

#### 4.2. Structural Relationships

All values for internal VIF are below 3, proving no multicollinearity and discarding similarities between items (Hair et al., 2019).

Bootstrapping analysis was performed to test relations between latent variants. Table 4 exhibits the correlations among model variables through path coefficient values ( $\beta$ ) that range from 0.051 and 0.216 and reveal insights about relationships between variables and confirm of this study's hypotheses. CSR has a significant positive direct effect on Customer Loyalty ( $\beta = .077, p < 0.000$ ), as well as ESA on Customer Loyalty ( $\beta = .216, p < 0.000$ ), supporting H1 and H2. The indirect effect of ESA on Customer Loyalty via RM was positive ( $\beta = 0.084, p < .011$ ), supporting H3a. In turn, CSR negatively impacted Customer Loyalty through the moderator RM ( $\beta = 0.051, p < .142$ ), revoking H3b.

Table 4 - Path Coefficients, Indicator Weights, and Explained Variance ( $R^2$ ) and Predictive Capacity ( $Q^2$ ) of Mediated Structural Model.

| Effect            | Path  | Coefficients ( $\beta$ ) | t-value (p-value) |
|-------------------|---|--------------------------|-------------------|
| Direct effect     | CSR → Customer Loyalty  | .077***                  | 4.144 (0.000)     |
| Direct effect     | Environmental Sustainability Action<br>→ Customer Loyalty       | .216***                  | 10.447 (0.000)    |
| Moderating effect | CSR → RM → Customer Loyalty                                     | .051***                  | 1.469 (0.142)     |
| Moderating effect | Environmental Sustainability Actions<br>→ RM → Customer Loyalty | .084***                  | 2.557 (0.011)     |

| Variable         | Explained Variance | Predictive Capacity |
|------------------|--------------------|---------------------|
| Customer Loyalty | $R^2 = .172$       | $Q^2 = .152$        |

Notes.  $\beta$  = beta weight;  $t$  = t-value; \*\*\* = significant at .001 level; n.s. = not significant

Jointly, the structural model explains 17,2% ( $R^2 = 0.172$ ) of Customer Loyalty variance. This value reveals weak explanatory power of the model, which may suggest that other variables not captured through this model may be important to help explain loyalty. It is also worth noting that results should always be interpreted based on the context (Hair et al., 2019), and loyalty is a dynamic concept that often varies throughout time depending on situational factors (Biscaia et al., 2013). This suggests that the variance of loyalty in the model could be higher (or lower) depending on the moment data is collected. Lastly,  $Q^2$  values for the endogenous variable (Customer Loyalty) were over 0. Hence, predictive relevance was established. The value ( $Q^2 = 0.152$ ) reveals moderate predictive relevance for the model (Hair et al., 2013).

All relationships between model variables were proven to be significant, apart from the moderation effect of RM between CSR and Customer Loyalty. This study's structural model supports that airlines' communication about CSR and ESA positively influences Customer Loyalty. Additionally, RM moderates the effect of ESA on Customer Loyalty. Figure 3 represents the schematic structural model of the results discussed above.

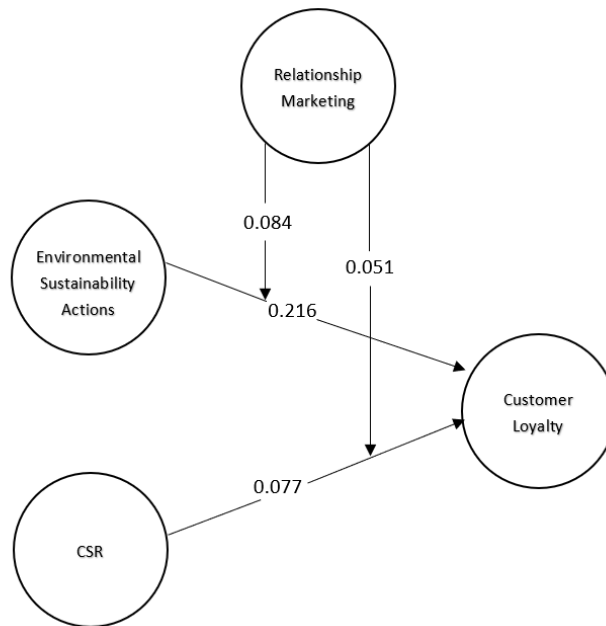


Figure 3 - Schematic results of the structural model (significance level of 5%).

## **DISCUSSION AND IMPLICATIONS**

## 5. Discussion and Implications

This study aims to assess the impact of ESA and CSR-related communications on customer behavior - particularly in Customer Loyalty - considering the moderating effect of RM, through a combination of text mining and a structural equation model approach, distancing itself from traditional methodologies. This research's secondary database was composed of 6,181 social media users' comments, posteriorly structured, and applied to a conceptual model to test the relationship between CSR, ESA, and Customer Loyalty, with RM as a moderator.

The results indicate that airlines' communication on ESA positively affects Customer Loyalty, validating H1 ( $\beta = 0.216$ ,  $p$ -value = 0.000), especially in the dimensions of Commitment and Behavioral Loyalty. Through marketing and communication strategies, companies can reinforce their commitment to environmental issues and disclose efforts to tackle them, ultimately positively influencing customers' purchase intentions and strengthening customer loyalty (Ramli et al., 2015). This finding is consistent with previous studies on customer loyalty and customers' perceptions of airlines' environmental actions (Han et al., 2019; Vicente et al., 2020), corroborating the idea that communicating these efforts is critical and can be determining to business development (Ramli et al., 2015). Sustainable aircraft construction and manufacturing (Winter et al., 2019), newer and more technologically advanced fleets (Mayer et al., 2012), and sustainable aeronautics materials (Gialos et al., 2018) are some of the initiatives that weigh heavier on influencing customer support towards an airline, aligning with this study's results (Sustainable Aircraft – outer loading = 0.882) and indicating airline managers should consider including it within marketing and communication plans when aiming to enhance customer loyalty. Additionally, environmental loyalty programs are another growing trend in the industry and a valuable tool that allows airlines to establish close relationships with frequent flyers through sustainability.

CSR positively influences Customer Loyalty, supporting H2 ( $\beta = 0.077$ ,  $p$ -value = 0.000). As consumers are aware of social and environmental issues and require companies to step in, CSR communication strategies are essential to establish quality relationships with stakeholders (Morsing & Schultz, 2006), leading to customer loyalty. Although this study focuses solely on the environmental dimension of CSR as per subdivided by Dahlsrud

(2008), these findings suggest that involving customers in CSR strategies, publishing CSR reports, disclosing to the community, and having a solid loyalty program are some ways airlines can enhance customer loyalty and overall image (Y. Kim et al., 2020; Lee et al., 2019; Okumus et al., 2020; Rhou & Singal, 2020). According to the results, CSR has a higher effect on Behavioral Loyalty and Commitment. This shows to be particularly important because, during the decision-making process, customers always proceed to an integrated appraisal of the service and/or product. This includes dimensions such as product offering, overall performance, and pricing (Cheng, 2011). When purchasing an airline ticket, the main criteria are availability (routes, schedules, seats) and pricing, the rest being secondary. Customer loyalty can often depend on how much visibility CSR actions get (Pérez & Bosque, 2013), which is why communicating them can have a decisive role in the decision-making process. From a practical perspective, this study suggests that airlines' communication managers should include CSR efforts in their communication plans, opting for the proper channels such as institutional websites or strategic partnerships. CSR reports are another way of exposing airlines' efforts towards sustainability that airlines' communication managers should consider.

RM positively mediates the relationship between ESA and Customer Loyalty, confirming H3a ( $\beta = 0.084$ ,  $p$ -value = 0.011). When customers become aware of airlines' environmental efforts, this likely generates a positive sustainability perception, positively influencing customer behavior related to loyalty and commitment (Chen et al., 2020). This aligns with this study's outcomes, revealing Engagement weights the most on explaining RM (outer loading = 0.759) and reinforcing its importance. Airlines are working towards customer loyalty by creating valuable relationships with stakeholders (Ahn et al., 2021) and building proximity with customers through co-creation and active involvement in the value chain (Payne et al., 2017). In a reality where travelers are becoming increasingly aware and concerned about environmental issues and are willing to pay more to travel in an environmentally friendly airline (Han et al., 2019), RM can play a significant role in maintaining customer loyalty. Following this finding, RM can help airline managers to better monitor and understand the impact of this type of communications on customers and whether these satisfy their needs and expectations. Ultimately, this provides valuable

insights to adjust their environmental actions' strategies to serve their customers better and increase purchase intentions and loyalty (Ahn et al., 2021).

In turn, the moderation effect of RM in the relationship between CSR and Customer Loyalty was not significant, revoking H3b ( $\beta = 0.051$ ,  $p$ -value = 0.142). This result differs from previous studies that prove customer involvement in CSR actions enhances loyalty through a positive image and perception of companies' CSR strategies (Lee & Yoon, 2018) and, reversely, creates stronger and lasting relationships between companies and stakeholders (Barry et al., 2008). However, this result can be explained by considering the different approaches companies can take on CSR communications. The level to which the customer is involved can affect the outcomes since it can shift and influence customers' expectations and perceptions (Morsing & Schultz, 2006). This means that although companies are communicating their CSR efforts, they are not continuously involving customers in specific areas that are part of airlines' CSR strategies but go beyond the aviation scope, such as support of external environmental projects, fair-trade consumption, or projects that promote daily green habits. Therefore, these results suggest that airline companies should pay closer attention to how these actions are communicated, considering customization, customer segmentation, and adapting their strategy to the different communication channels.

From a theoretical perspective, this study establishes to academia by extending and complementing previous literature on CSR (Lee et al., 2019; Okumus et al., 2020), environmental sustainability (Hwang & Choi, 2018; Winter et al., 2019) and customer loyalty (Han et al., 2019; Y. Kim et al., 2020) in the aviation sector. Additionally, this study innovates by being performed from a communication perspective, that was lacking in the literature until now.

## **5.2. Limitations and future research**

Limitations to the current study should be considered when analyzing it. First, this study only considered airlines that are part of the World's Biggest Airlines on Revenue Passenger Kilometers (RPK) Flown in 2020 (Statista, 2020). Thus, future research should be expanded to other airline companies. Since we are referring to a global industry, culture plays an important role within airline strategies, determining environmental and

social approaches (Kuo et al., 2016). For this reason, studying a wider number of airlines might be relevant to more accurately identify patterns and cultural variables that influence airlines' marketing strategies. Additionally, data for this study was solely collected from Facebook. Future studies should explore other social media platforms and their users' behavior, combining it with primary data such as surveys, in order to confirm results. This combination of secondary and primary data in future research may help better understand which domains and characteristics of airlines' environmental and CSR communication have a greater impact on customers and their loyalty.

Secondly, since the data analysis was made recurring to a dictionary validated by an external panel of marketing and CSR experts, there are always limitations associated with human bias and possible subjectivity that should be considered.

Lastly, we were limited to what Facebook users mentioned in their reviews. A questionnaire that included items absent from our conceptual model might reveal other valuable insights that can contribute to the literature.

## **CONCLUSION**

## 6. Conclusion

In conclusion, this study explores the relationships between CSR, ESA and Customer Loyalty, with RM as a moderator, from a communication point of view, which needs to be improved in the existing literature. The results prove that communicating CSR strategies and ESA is essential to increase Customer Loyalty, especially in Behavioral Loyalty and Commitment. On the other hand, RM does not influence CSR's effect on Customer Loyalty but positively moderates the relationship between ESA and Customer Loyalty. These results satisfactorily answer these study's questions and provide essential insights to airlines and the aviation industry in general, to enhance communication strategies and their outcomes. This further reinforces the notion that social issues – in this case, in the environmental field – should be within the scope of all corporate strategies and activities, going beyond the economic dimension and profit.



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