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**Passenger perceptions of the green image associated with airlines**

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## Abstract

Environmental issues in air transport have grown in importance in recent years, and in response some airlines have been proactive to demonstrate their 'green' credentials. The aim of this paper is to identify air traveller perceptions of different airlines with regard to green image, and how passengers perceive different measures that airlines can introduce to reduce their environmental impact. The research is based on a large quantitative survey, of over 600 air travellers, conducted at Liverpool John Lennon Airport between April and July 2010. The data in this papers stems from a range of attitudinal statements on airlines, and measures that airlines could adopt to improve their environmental performance.

When presented with a list of airlines, about half of respondents were able to differentiate between airlines based on environmental friendliness. The results show that low-cost airlines in general are not seen as more or less environmentally friendly than full service network airlines. Yet air travellers do indicate differences in the environmental image based on individual airlines. Furthermore, results vary depending on whether passengers had flown previously with a particular airline. Passengers also differentiate between measures that airlines can adopt to reduce the environmental impact of aviation. Using newer aircraft is seen as the most effective way to address the issue.

## Keywords

Green image; Airline; Environment; Passenger attitude

## 1. Introduction

Research on environmental issues in air transport has increased over the last few years. A major focus has been on the use of policy instruments and technical advances to address the negative impacts aviation has on the environment. However there is some doubt that technological advances will be able to mitigate the increasing output of greenhouse gases produced by the industry. As a short-term solution, policies to increase taxation are a suggested option (Chapman, 2007). So far there has been only some focus on the role of consumers in this system (e.g. Dickinson et al., 2010). However, while some of the policy measures suggested in previous publications (e.g. Chapman, 2007) directly affect air travellers by making air travel more expensive, passenger responses to these measures have not been evaluated in depth. Depending on passengers' price elasticity of demand, such measures should reduce the demand for air travel and therefore the negative

externalities created. The effectiveness of these fiscal measures is ambiguous, as research shows that only large price increases (e.g. £50 and more for flights to European destinations) create a major change in demand (Ryley and Davison, 2005). However, travellers are willing to accept fees, if the revenues from them are used for environmental initiatives, although it does not necessarily mean a change in consumer behaviour in response to environmental issues (Kelly et al., 2007).

For airlines, this means that while consumers are aware of environmental impacts and are willing to address these to some extent, they still want to travel and are not willing to give up on this part of their lifestyle. This opens up an opportunity for airlines to focus their marketing communication on environmental credentials and therefore create a green image that could be attractive to customers. Image is used by customers to differentiate between companies (Liou and Chuang, 2009). Following on, it is necessary to identify whether air travellers actually differentiate between airlines depending on their environmental friendliness, and what measures they perceive to be effective in addressing environmental issues.

So far, there has been limited research on air travel behaviour and the environment (e.g. Hares et al., 2010) and on environmental marketing in the airline sector (e.g. Lynes and Dredge, 2006). This paper aims to bring together the two subjects of air traveller perceptions and environmental marketing in the airline industry, which so far has received little attention. The first objective of this paper is to investigate air travellers' perception of different airlines with regard to environmental friendliness. This is a key stage for airlines, before they engage in the development of green marketing messages. If passengers do not differentiate between airlines based on their environmental performance, there is little need for the development of such a marketing strategy. The second objective is to analyse if passengers differentiate between business models (e.g. full-service network airlines and low cost airlines) based on their environmental friendliness. The third objective is to identify the measures that airlines can adopt that are perceived by passengers as particularly effective in addressing the environmental impacts of air transport. The fourth objective of the paper is to identify the differences in air travellers' green attitudes and perceptions of certain airlines based on their travel experiences with those carriers (i.e. whether they have flown with that carrier or not).

## 2. Attitudes towards the environment

Over the last ten years or so, research on consumers' attitudes towards the environment and ecological consumer behaviour has been substantial. Consumers in different markets have changed their purchasing behaviour in favour of environmentally friendly products and companies react to this trend by addressing these "environmental needs" (Finisterra do Paço et al., 2009). Evidence from different sectors (mainly for physical products like supermarket shopping and furniture) shows that people's purchasing behaviour is influenced by environmental concerns (e.g. Bovea and Vidal, 2004, Pickett-Baker and Ozaki, 2008). In addition service sector studies show that similar trends can be identified, for example in the hospitality sector where green images of hotels can attract and help to retain more guests (e.g. Lee et al., 2010).

As people become more aware of the impacts that their purchases have on the environment, they start to include these aspects in their information gathering before they make purchasing choices. As a result they often have to trade off certain characteristics of the

product or service and its price against its environmental impact (Antonides and van Raaij, 1998). Customers perceive environmentally friendly products to be of higher quality and are prepared to pay for these environmental attributes (Landor Associates, 2007).

Ottman (2011, p. 41) identifies three basic cases when consumers are prepared to "pay a premium for green": if the product will save them money; if the product is better for their health; or if consumers "believe that brands are genuinely attempting to be more sustainable". This last point is particularly of significance for airlines that aim to generate a green image. A review of papers on the topic by Cotte and Trudel (2009) suggests that the willingness to pay for socially conscious products varies, with an average premium of about 10%. The review also identifies that in general, consumers are more likely to change their behaviour than to pay a premium for a more socially conscious choice. However, a study published by the Commission for Integrated Transport (2007) shows that people are in many cases not prepared to give up their current travel behaviour for environmental reasons.

From 2001 to 2006, the number of consumers in the UK who would be prepared to pay more for environmentally friendly products has increased slightly from 36% to 39%. However, when looking at the travel industry, only 14% of respondents would pay more to environmentally friendly hotels or holiday companies (Mintel, 2007). The difference in consumers' attitudes towards environmental issues between physical products and travel services, in particular, highlights the need for separate, more in-depth research in this field. Dickinson et al. (2010) suggest that some air travellers claim environmental behaviour in other areas of life to justify the use of air travel when going on holidays.

A UK-based study conducted by YouGov illustrates that the airline industry generally has a poor image when it comes to environmental friendliness (Benady, 2007). Among the top six companies perceived to be environmentally unfriendly are five airlines: British Airways, American Airlines, Ryanair, easyJet and Virgin Atlantic. This might make it more difficult for airlines to achieve a green image in comparison to other companies, particularly in the fast moving consumer goods sector (retailers scored very well in this survey). The negative perception of airlines with regard to their environmental impact is also mirrored in a survey in the US (Bonini and Oppenheim, 2008), where 12% of customers suggest that flying less is one of the best three ways to reduce global warming, although it is only ranked eighth by actual effectiveness.

### 3. Image and perception

A company's image can be defined as "a function of how constituencies perceive the organisation based upon all the messages it sends out through names and logos and through self-presentation, including expressions of its corporate vision." (Argenti, 2009, p. 81). Following this definition it is clear that companies can have different images depending on the different stakeholder perceptions of the organisation. This paper solely focuses on air travellers' (i.e. the airlines' customers) perceptions of airlines and therefore of the images that they hold of different airlines.

Different types of images can be identified: corporate image, product image, brand image and marketing image (Barich and Kotler, 1991). This paper will predominantly address the marketing image of airlines in terms of meeting the needs of customers and brand image in respect to how consumers view a particular airline brand in comparison to its competitors.

The corporate image that focuses on the wider market environment (e.g. potential employees, investors, regulators) will not be further investigated.

Creating positive images is at the forefront of companies' market communication strategies. Such positive images have a positive impact on consumers' behaviour and on their probability of purchasing a good or service (Flavián et al., 2005). In the consumers' decision process for purchases (i.e. the stages that a consumer goes through from "need recognition" to "consumption" and "post-consumption evaluation"), images influence purchasing behaviour in an early stage of the process, in the "Search for Information" phase (which is part of the pre-purchase phase). Among other activities in this phase, consumers draw on previous knowledge that they have of the company and product. Images form a part of this previous knowledge (Blackwell et al., 2001), and are then used as a "short-cut" in the search for information (Kotler and Gertner, 2002). Because marketing images have an impact on the purchasing decision making process, it is of particular interest to companies and therefore necessary for further investigation in this area. Whilst an image has an influence on purchasing decisions, transactions between the company and the consumer can alter the image that consumers have of a company. Companies' aim in this respect is that their image improves after the transaction has taken place (Argenti, 2009).

The image is created by the perceptions that people have of a particularly company. Perceptions of a company are influenced by a range of different factors. This paper focuses only on  the perception of environmental factors. In this paper, environmental factors relate to the ecological environment (i.e. not the market environment). This means that only the perceptions of the 'green' elements of the marketing mix (e.g. newer aircraft) are considered.

Chen (2010, p. 309) defines "green brand image" as "a set of perceptions of a brand in a consumer's mind that is linked to environmental commitments and environmental concerns." Perceptions of environmental commitments of airlines play an important part in generating a green airline image. Therefore it is necessary to identify measures that could be included in airlines' self-presentation and corporate vision, perceived by passengers as effective to reduce the environmental impacts of air travel.

Airlines have engaged in using marketing messages to show environmental commitment. While some airlines (e.g. Flybe, easyJet) put more focus on the topic on their websites, others (e.g. Wizz Air, bmiBaby) hardly address this subject in their internet presence. Table 1 illustrates some green marketing messages and environmental initiatives that airlines promote on their websites. It shows that there are some common measures addressing ecological issues (e.g. use of newer aircraft), while others seem to be more unique to a particular airline (e.g. purchase of electric cars for ground dispatch team).

*Table 1: Examples of Airline Environmental Marketing Messages and Initiatives*

| Airline | Examples of Environmental Marketing Messages and Initiatives |
| --- | --- |
| Bmi (mainline) | "Single engine taxi", "reduced take-off thrust" |
| bmibaby | Purchase of "electric car" for ground dispatch team |
| British Airways | "More efficient operation", use of "latest technology" |
| Eastern Airways | "Fuel-efficient and environmentally friendly" aircraft |
| easyJet | Use of "newer planes", "higher load factors", accessibility of airports by public transport |
| Flybe | "Green aircraft", "eco-labelling" for aircraft |
| KLM | "Fleet renewal", supporting research to "develop new aircraft", "wing improvements" |
| Ryanair | "Europe's greenest airline", "youngest and most fuel efficient fleet" |
| Thomas Cook Airlines | "Eco-Labels", "onboard recycling" |
| Thomson Airways | "One of Europe's most fuel-efficient airlines", "remove excess weight off aircraft" |
| Virgin Atlantic | "New aircraft", "higher load factors", "sustainable biofuels" |
| Wizz Air | "New aircrafts [sic] represent the latest technology, which helps to keep our operational cost down" |

Source: Airline websites (accessed October 2011)

It has been identified that a positive image has an impact on purchasing decisions (Flavián et al., 2005). This is also true for the green image which can improve consumer satisfaction and fulfil people's "green needs" (Chen, 2010). In practice, it can be shown that airlines do take active steps to improve their image through addressing environmental concerns. For example, enhancing the airline's image is one of the key drivers of SAS's environmental policy, and improvements in the airline's green image have had a positive impact on its overall image (Lynes and Dredge, 2006).

Whilst generating a green image positively affects consumer purchasing behaviour, the majority of UK consumers (63%) believe that companies use environmental issues to make themselves look good (Mintel, 2007). However, Lynes and Dredge (2006) in their case study on SAS suggest that while the airline is also guided by commercial motives, their aim of environmental management is not purely to leverage market benefits. The case study suggests that cultural aspects ("Scandinavian spirit" and internal culture) are responsible for a "good corporate citizen" and altruistic attitude of the airline. Commercial drivers include financial benefits (e.g. lower production costs) and as mentioned in the previous paragraph improvements in the airline image.

To counter claims of 'green washing', companies are required to provide evidence in their marketing mix (e.g. newer aircraft) to support their market communication in creating a positive environmental image and attract more customers.

## 4. Methodology

The limited amount of research that has been carried out in discussing traveller's attitudes towards the environment has mainly focussed on qualitative research techniques (e.g. Dickinson et al., 2010; Hares et al., 2010), although a few studies have utilised quantitative techniques (Department for Transport, 2010). This research is based on a large quantitative survey of over 600 air travellers, conducted at Liverpool John Lennon Airport between April and July 2010. Liverpool John Lennon Airport handled around 5 million passengers in 2010.

The airport has grown over the last ten years from around 2 million passengers in 2000. This growth was mainly attributed to the development of low-cost travel at the airport, which was fostered by Ryanair and easyJet as they established bases at the airport. Besides low-cost airlines, the airport also handles regional flights (e.g. by Eastern Airways) and scheduled full-service flights by KLM. The global economic downturn of 2008/2009 also had an impact on passenger numbers at Liverpool John Lennon Airport, with passenger numbers dropping by 2.4% in 2008 and by 8.5% in 2009 in comparison to the previous year. However, terminal passengers in 2010 increased again to just over 5 million passengers (CAA, 2011).

The main survey was preceded by a pilot survey in March 2010, which led to some minor changes to the questionnaire. The main survey was conducted on different days of the week and at different times of the day to cover the full range and type of airport passengers. Passengers were randomly approached in the departure lounge to complete a questionnaire.

During the eight days of the main survey, 998 passengers were approached and asked if they were willing to fill in the questionnaire. Of those approached, 612 passengers returned a usable questionnaire, yielding a response rate of 61.3%. This compares favourably to response rates of other surveys conducted at airports, which range from about 30% to 75% (Aksoy et al., 2003; Gilbert and Wong, 2003). The self-completion questionnaire focused on traveller attitudes towards air transport and airlines with regard to environmental issues. The questionnaire also collected socio-demographic data and passenger travel history. The data in this paper stems from a range of five-point Likert scale questions covering attitudinal statements on airlines, and measures that airlines could adopt to improve their environmental performance.

Respondents were presented with twelve airlines, representing different business models (full-service network airlines, regional airlines, charter airlines, low-cost airlines). Initially all airlines that regularly operated flights from Liverpool John Lennon Airport were identified (KLM, Eastern Airways, Flybe, easyJet, Ryanair and Wizz Air). As no UK based full-service network airline (FSNA) operated from the airport, the three largest UK FSNAs by Revenue Passengers Kilometres (RPKs) were chosen to supplement the sample. The UK's two largest charter airlines (by RPKs) were also included in the survey. Additionally, the low-cost airline bmibaby has been included to identify differences between an airline's low-cost subsidiary and the mainline operations (in this case Bmi). Table 2 shows the twelve airlines incorporated by business model.

*Table 2: Airlines examined in the survey (by business model)*

| *FSNA:* | *Regional airlines:* | *Charter airlines:* | *Low-cost airlines:* |
|---|---|---|---|
| Bmi (mainline) | Flybe | Thomas Cook Airlines | bmibaby |
| British Airways | Eastern Airways | Thomson Airways | easyJet |
| KLM | | | Ryanair |
| Virgin Atlantic | | | Wizz Air |

In the questionnaire, five-point Likert scales were used. While Likert scales are very popular, a key question that arises is whether responses from such scales can be treated as an interval scale or only as ordinal data. Many scholars make the case to treat Likert scales as ordinal data (e.g. Cohen et al., 2007; Keller, 2008; Kuzon et al., 1996), yet in practice results

from Likert scales tend to be used as interval data. The underlying reason for the discussion of whether ratings should be treated as interval or ordinal data, lies in the analysis as ordinal data requires the use of non-parametric techniques (Keller,2008; Kuzon et al, 1996).

Bryman and Cramer (2005) suggest that with regard to sociological variables, like attitudes, ordinal data is routinely treated as interval data. In air transport research (similarly to other areas) Likert scale information is often treated as interval data. Research in air transport (e.g. Gilbert and Wong, 2003; Lubbe and Louw, 2010; Mason, 2001) uses Likert data in combination with parametric techniques (e.g. means, standard deviation and ANOVA). As such, Likert scale information in this survey will be treated as interval data.

Furthermore, in order to use parametric techniques to analyse the data (Kuzon et al., 1996), the data needs to fulfil certain criteria (e.g. random sample, normally distributed, large sample size). While some of these criteria were met without further tests required (random sample, large sample size), the data was examined for normality using histograms with normal curves, reviewing the values of skew and kurtosis and conducting the Kologorov-Smirnov test. This test showed that all results were significantly non-normal (p < 0.001); however it has to be borne in mind that the samples were very large which limits the usefulness as a measure alone. The values of skew and kurtosis also indicate non-normality as they were different from zero, which they should be in a normal distribution (Field, 2008). Therefore, non-parametric tests will be applied in this paper.

## 5. Summary of the sample

Table 3 provides an overview of the sample. Of the 612 respondents, 593 (96.9%) provided information on their gender and age, although only 385 (62.9%) were willing to state their banded personal annual income. The sample covers a range of different ages. The age distribution is similar to a previous study conducted by the UK Civil Aviation Authority (CAA) at Liverpool John Lennon Airport in 2007/2008 (CAA, 2007/2008). With regard to the respondents' occupation 576 respondents (94.1%) provided this information.

*Table 3: Summary of the sample*

| | | |
|---|---|---|
| Gender (n = 593) | Male | 48.2% |
| | Female | 51.8% |
| | | |
| Age (n = 593) | 18-24 | 19.1% |
| | 25-34 | 22.0% |
| | 35-44 | 15.2% |
| | 45-54 | 15.4% |
| | 55-64 | 18.1% |
| | 65 and over | 10.3% |
| | | |
| Occupation (n = 576) | Full-time employment | 44.8% |
| | Permanently retired from work | 17.9% |
| | In Education | 11.6% |
| | Self-employed | 11.1% |
| | Part-time employment | 9.4% |
| | Other | 5.2% |
| | | |
| Personal Annual Income (n = 385) | Less than £10,000 | 15.3% |
| | £10,001-£20,000 | 25.7% |
| | £20,001-£30,000 | 19.5% |
| | £30,001-£40,000 | 15.6% |
| | £40,001-£50,000 | 10.1% |
| | £50,001-£60,000 | 4.2% |
| | More than £60,000 | 9.6% |

The number of passengers in each income group declines with increasing income up to the group earning more than £ 60,000 a year. In the income group of passenger earning more than £60,000, the majority travel for business reasons. As to be expected, share of business travellers in the lowest income groups is the smallest.

## 6. Results

### 6.1 Green image of airlines

In the survey, over half of the respondents thought that some airlines do more for the environment than others, with only a small percentage (6.8%) disagreeing or strongly disagreeing with this statement.

No significant difference has been identified between male and female respondents in regard to whether they perceive some airlines more environmentally-friendly than others ($p > 0.05$). There was also no significant difference in respondents' view on this issue depending on their occupation, age and income bracket ($p > 0.05$). Demographic composition does not have a significant influence on air travellers' environmental perception of airlines in general.

When asked if low-cost airlines are more environmentally-friendly than other airlines, only one third of respondents distinguished between the two business models when it comes to their green credentials, with the remainder suggesting no differences. Only a small proportion (13.4%) of respondents agreed that low-cost airlines are more environmentally friendly than other airlines, while 22.5% disagreed with this statement.

To identify whether respondents were able to differentiate between airlines depending on their environmental friendliness, they were presented with twelve airlines and asked to rate them from "very environmentally friendly" to "very environmentally unfriendly". Respondents also had the opportunity to tick "Do not know that airline". The rating of the different airlines gives the opportunity to identify those airlines viewed as more environmentally friendly by passengers than others, as well as to assess how the airlines in general are perceived. It also shows if passengers differentiate between these airlines with regard to their green image. To analyse if passengers differentiate between airlines, all airlines that respondents knew or had an opinion about were examined. When presented with the list of different airlines, nearly half of the respondents (46.5%) differentiated between the environmental images of the airlines. The remainder of the sample rated all airlines in the same way (e.g. all "somewhat environmentally friendly").

Table 4 shows the mean scores, the standard deviation and the sample size for each airline. Taking into account positive and negative perceptions, Virgin Atlantic has the best mean with regard to its environmental friendliness, followed by easyJet. The two large low-cost airlines (Ryanair and easyJet) are characterised by the highest standard deviation, showing that their environmental image is more varied than for the other carriers.

*Table 4: Environmental Friendliness by Airline*

| Airline | N | Mean[a] | Std. Dev. |
|---|---|---|---|
| Virgin Atlantic | 380 | 2.75 | 0.859 |
| easyJet | 472 | 2.83 | 0.892 |
| British Airways | 427 | 2.86 | 0.834 |
| KLM | 380 | 2.89 | 0.785 |
| BMI | 336 | 2.91 | 0.663 |
| bmibaby | 351 | 2.96 | 0.694 |
| Flybe | 363 | 2.96 | 0.788 |
| Thomson Airways | 360 | 2.97 | 0.757 |
| Eastern Airways | 299 | 3.01 | 0.751 |
| Thomas Cook Airlines | 367 | 3.03 | 0.735 |
| Wizz Air | 301 | 3.10 | 0.716 |
| Ryanair | 463 | 3.10 | 0.952 |

[a] 1 = very environmentally friendly; 2 = somewhat environmentally friendly; 3 = neither environmentally friendly nor unfriendly; 4 = somewhat environmentally unfriendly; 5 = very environmentally unfriendly

The difference in the mean values for environmental friendliness between Virgin Atlantic and the other airlines is statistically significant ($p < 0.01$). Yet the differences between easyJet, British Airways, KLM and Bmi are not significant, as well as the differences between bmibaby, Flybe, Thomson Airways, Eastern Airways and Thomas Cook Airlines ($p > 0.05$). There is also no significant difference between Wizz Air and Ryanair ($p > 0.05$).This analysis supports the argument, that low-cost airlines in general are not seen as less environmentally friendly than other airlines.

In comparison to the previously referred to YouGov survey (Benady, 2007), where British Airways was perceived to be more environmentally unfriendly than any other airline in the sample, in this survey British Airways was one of the more environmentally friendly airlines. In the YouGov survey, a range of different companies from different industries were evaluated and all airlines in that sample scored similarly (and no information on whether the differences between the airlines were statistically significant was provided). Also, the current

survey was undertaken three years after the YouGov survey and in this time perceptions of airlines could have changed.

With regard to gender differences, no significant differences in the evaluation of the environmental friendliness of the airlines could be detected, with the exception of the two charter airlines. Female respondents rated Thomas Cook Airlines and Thomson Airways as significantly more environmentally friendly than male respondents ($p < 0.05$).

Data has also been collected on airlines that have been used by respondents in the twelve months leading up to the survey. Table 5 illustrates the differences in people's perception of airlines, depending on whether they had travelled with an airline or not. It shows that the order of airlines with regard to their mean value for environmental friendliness has changed to the previous table. Thomson Airways achieved the "best" mean value by its own passengers (i.e. passengers that have flown with the airline in the previous 12 months), followed by Virgin Atlantic and Wizz Air. A noticeable improvement in the ranking has been by Wizz Air that improved from the penultimate rank in the overall ranking to third place when looking at an airline's own passengers. It has to be mentioned thought, that only a small number of respondents, in one case as little as 15, had flown with some of the airlines.

*Table 5: Environmental friendliness by airline*

| Airline | Flown | | | Not flown | | | |
| | with that airline in the last 12 months | | | | | | |
| | N | Mean[a] | Std. Dev. | N | Mean[a] | Std. Dev. | p |
|---|---|---|---|---|---|---|---|
| Thomson Airways | 22 | 2.55 | 0.739 | 308 | 3.00 | 0.755 | 0.006 |
| Virgin Atlantic | 16 | 2.56 | 0.814 | 329 | 2.76 | 0.863 | 0.324 |
| Wizz Air | 16 | 2.62 | 0.806 | 257 | 3.15 | 0.697 | 0.009 |
| easyJet | 274 | 2.72 | 0.920 | 152 | 3.03 | 0.821 | 0.001 |
| Flybe | 48 | 2.79 | 1.031 | 284 | 2.98 | 0.742 | 0.185 |
| BMI | 20 | 2.80 | 0.616 | 289 | 2.91 | 0.661 | 0.727 |
| Eastern Airways | 15 | 2.80 | 1.082 | 256 | 3.02 | 0.730 | 0.187 |
| bmibaby | 27 | 2.81 | 0.786 | 295 | 2.97 | 0.682 | 0.241 |
| KLM | 36 | 2.83 | 1.028 | 312 | 2.90 | 0.758 | 0.315 |
| British Airways | 51 | 2.88 | 0.864 | 337 | 2.86 | 0.825 | 0.946 |
| Ryanair | 247 | 3.00 | 0.946 | 176 | 3.26 | 0.967 | 0.013 |
| Thomas Cook Airlines | 23 | 3.26 | 0.864 | 312 | 3.03 | 0.716 | 0.253 |

[a] 1 = very environmentally friendly; 2 = somewhat environmentally friendly; 3 = neither environmentally friendly nor unfriendly; 4 = somewhat environmentally unfriendly; 5 = very environmentally unfriendly

For most airlines (except British Airways and Thomas Cook Airlines) the mean values for passengers who had flown with that particular airline are perceived to be more environmentally friendly, than among those passengers who had not flown with that airline in the previous twelve months. These differences in mean values however are only statistically significant for Thomson Airways, easyJet, Wizz Air and Ryanair. This means that three out of the four low-cost airlines included in the survey achieved statistically significantly better results for their environmental image if passengers had flown with that airline, while none of the full-service airlines achieved this. Therefore, it can be suggested that particularly for low-cost airlines, the environmental image is related to whether passengers had flown with the airline or not.

For passengers that had not flown with that specific airline in the previous twelve months, the top four airlines for environmental image are all full-service network airlines (Virgin Atlantic, British Airways, KLM and Bmi). This suggests that these airlines have a particularly good environmental image among passengers who have not flown with them.

The only low-cost airline that did not significantly improve its result was bmibaby. In the case of bmibaby it might be suggested that this could be because travellers find it difficult to distinguish between Bmi and bmibaby (one being a full-service network airline, the other one being a low-cost airline). The results of Bmi and bmibaby for their environmental friendliness show that they are not significantly different ($p > 0.05$).

## 6.2 Perceived effective measures by airlines

Having shown that there are differences in the green image of different airlines, the next step is to identify measures that airlines can introduce to show "environmental commitment". Given Chen's (2010) definition of green brand image, it is important for companies to show environmental commitment and concerns in order to generate a green image. In this respect, it is less important for these measures to be actually effective, but rather that they are perceived by the consumer to be effective. Therefore, in the survey respondents were presented with a list of nine measures that have been or could be introduced by airlines to improve their environmental performance. The proposed measures were:

1. Increasing the number of seats per aircraft
2. Using newer aircraft
3. Reducing the waste on board by not offering free food
4. Offering "carbon off-setting"
5. Promoting public transport to reach the airport
6. Testing bio fuels
7. Serving "fair-trade" and organic products
8. Having a positive attitude towards the environment
9. Using propeller aircraft instead of jet aircraft

The nine measures have been selected based on the literature review and a review of airlines' current market communications with regards to green initiatives. For example, Miyoshi and Mason (2009) suggest the operation of a fuel-efficient fleet of aircraft and higher density cabin configurations as key areas for airlines to reduce their carbon emissions. These two areas are also referred to in easyJet's (2009) communication on environmental issues. With regards to airlines' initiatives, some airlines have started bio fuel tests (Jones and Milmo, 2008, p. 11) while others have introduced carbon off-setting schemes (easyJet, 2009).

Passengers were asked to rate these measures on a Likert scale from "Very effective" to "Very ineffective"; respondents could also select "Do not know". This choice was then treated as a missing value in the analysis, as for example some passengers were not aware of "carbon off-setting" schemes (20.8%) or the difference between propeller and jet aircraft (32.5%). These figures were higher than for any of the other seven measures suggested. Table 6 shows the mean scores for each measure's perceived effectiveness.

*Table 6: Passengers' perception of the effectiveness of environmental measures*

|  | N | Mean[a] | Std. Dev. |
|---|---|---|---|
| Airlines using newer aircraft | 514 | 1.73 | 0.739 |
| Airlines having a positive attitude towards the environment | 523 | 1.90 | 0.848 |
| Airlines testing bio fuels | 489 | 1.92 | 0.915 |
| Airlines promoting public transport to reach the airport | 532 | 2.08 | 0.986 |
| Airlines offering "Carbon Off-Setting" | 434 | 2.34 | 0.929 |
| Airlines increasing the number of seats per aircraft | 503 | 2.46 | 1.053 |
| Airlines serving "fair-trade" and organic products | 511 | 2.63 | 1.095 |
| Airlines using propeller aircraft instead of jet aircraft | 366 | 2.68 | 1.046 |
| Airlines reducing the waste on board by not offering free food | 519 | 2.69 | 1.074 |

[a] 1 = very effective; 2 = somewhat effective; 3 = neither effective nor ineffective; 4 = somewhat ineffective; 5 = very ineffective

Travellers perceive the using of newer aircraft as significantly more effective than an airline's positive attitude towards the environment ($p < 0.001$). This illustrates that "tangible" elements of the marketing mix are an important part of creating a green image. This also relates to the actual environmental impact of airlines. For example, while only 5% of SAS Group's environmental impact stems from ground operations and on board activities, 95% relate to flight operations in form of fuel consumption and noise (SAS Group, n.d.). The operation of fuel-efficient aircraft was also identified by Miyoshi and Mason (2009) as one of the key areas to reduce carbon emissions. Nevertheless, in addition, "soft" aspects in the form of "having a positive attitude" are regarded as effective in reducing the environmental impacts of aviation, and so are able to contribute to a green image.

The data suggests that air travellers' attitudes towards different airlines also vary depending on their perception of the above mentioned measures.

Passengers who see the reduction of waste on board (by not offering free food) as an effective measure, perceive the low-cost airlines in the sample (Ryanair, easyjet and Wizzair but not bmibaby) as more environmentally friendly than those who believe this measure to be ineffective ($p < 0.05$).

As shown in Table 6, one of the most effective ways for airlines to reduce their environmental impact, as perceived by passengers, is for airlines to have a positive attitude towards the environment. Generally passengers who perceive this attitude as an effective way for airlines to address environmental issues, rate airlines as more environmentally friendly than those who suggest it is an ineffective approach. The large international airlines (British Airways, KLM and Virgin Atlantic), the charter airlines (Thomson Airways, Thomas Cook Airlines) and Flybe and easyJet are significantly more highly rated for their environmental performance by passengers who support the measure of having a positive environmental attitude ($p < 0.05$). Airlines that scored better with regards to their environmental performance, have shown a more proactive approach to environmental issues. For example, Virgin Atlantic conducted bio fuel tests in 2008. While the effectiveness of these tests are disputed, from a market communication perspective, Richard Branson of Virgin Atlantic was able to portray the airline in a positive way by claiming that "This pioneering flight will enable those of us who are serious about reducing our carbon emissions to go on developing the fuels of the future" (Jones and Milmo, 2008, p. 11).

On the contrary, Ryanair's mean score for their environmental friendliness is not significantly different. This might be because respondents supporting that measure (i.e. the effectiveness

of having a positive attitude towards the environment) do not think that Ryanair has a positive attitude towards the environment. Whilst many airlines try to address the issue of climate change, Ryanair does not consistently follow this line, as outlined by an interview in 2010: "Ryanair's combative boss Michael O'Leary is renowned for backing unusual ideas, but some passengers may feel that even he has overstepped the mark with his latest comments – denying the existence of global warming" (Hickman, 2010). Ambiguous statements like these might contribute to Ryanair's low image when it comes to being environmentally-friendly. However in 2011, Michael O'Leary highlights in another interview that "We are proud to operate the youngest, greenest and most fuel-efficient fleet" (Energy Weekly News, 2011). This also shows that Ryanair addresses environmental issues in their communication strategy.

## 7. Conclusions

This research has shown that nearly half of the respondents differentiate between airlines based on their environmental friendliness, and therefore hold different green images of the airlines. These images are specific to particular airlines rather than to airline business models. From the survey, there is no evidence that low-cost airlines have a different green image from full-service network airlines. This shows it is possible for airlines to differentiate themselves from their competitors based on their environmental image. The business models that an airline follows does not advantage or disadvantage a particular airline. Therefore, it is the airline's marketing strategy that can influence the environmental perception of an airline. As discussed earlier, thus far green attitudes do not necessarily translate into a change in behaviour or even the willingness to pay higher fares. Following Ottman's (2011, p. 41) suggestion, airlines need to convince passengers that their efforts are "genuine" and establish "credibility" in their messages in order for passengers to pay a premium for a green product. This seems to be the next step that airlines need to follow to benefit from their green brand perception.

The green image, in many cases, is also dependent on whether passengers have flown previously with the airline. An airline's own passengers rate them as more environmentally friendly than passengers who have not used the airline (in the year before the survey). This is particularly important for low-cost airlines, whereas full-service network airlines tend to have a good green image also with passengers who have not flown with them. As previously referred to, Argenti (2009) suggests that companies aim to improve their image after a purchasing transaction has taken place. The survey shows that for full-service airlines this has happened with regards to their green image. For low-cost airlines' public relations activities addressing environmental issues are particularly important, in order to generate a positive environmental image with the public (mainly those who have not flown with the airline).

There are significant differences between the perceived effectiveness of different measures that airlines can adopt to be seen as environmentally-friendly. Passengers consider that the most effective approach to be environmentally-friendly is for airlines to have newer aircraft and to have a positive attitude towards the environment. The first measure has financial impacts on the airline through higher ownership costs as fleet renewal plans are usually capital intensive and can only be implemented in the mid- to long-term. However, newer aircraft can also bring savings with regard to fuel costs and improve the green image for airlines that operate them. Communicating the environmental benefits of newer aircraft can

build the foundation for establishing "credibility" and therefore the chance of charging a premium. Additionally, with the inclusion of airlines in the European Union Emissions Trading Scheme (EU ETS), airlines can generate further financial benefits from fleet renewal. Both the operational cost savings and the possibility of charging a premium should be considered in an airline's financial appraisal when acquiring new aircraft.

Having a positive attitude towards the environment is less capital intensive approach to generate a green image and the process can be started on a short- to mid-term basis. This is illustrated by airlines such as Virgin Atlantic and easyJet, for whom green marketing messages are part of the airlines' market communication strategy. While green marketing messages can be introduced in a shorter time than renewing the airline's fleet, the messages need to be based on real environmental benefits of the brand, to avoid 'greenwashing' and to trigger a change in travel behaviour.

While 'green messages' in airlines' advertising are currently not very common, this research has shown that green images of airlines are identified by passengers. Therefore, more focus on this element in their market communications could be a way for airlines to differentiate themselves from their competitors. In future, the green images developed by some airlines need to be used to attract consumers and convince them of paying a premium for a more environmentally friendly airline product. This will be the next necessary step for those airlines that aim to benefit from addressing environmental issues.

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