



## Valuing air transportation and sustainability from a public perspective: Evidence from the United Kingdom and the United States

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### ABSTRACT

One issue with air transportation and sustainability is that although aviation could be considered economically and socially sustainable, it does generate environmental concerns. The aim of this paper is to examine public attitudes towards air transportation and sustainability, in order to determine how individuals value sustainability in relation to air travel. This empirical paper is based on two large survey data sets, one from the East Midlands region of the United Kingdom and one from the East Coast of the United States. After an initial review of relevant literature and policy, a range of attitudinal statements from the surveys are examined. These statements cover the economic and social benefits of air transportation, the contribution of air travel to climate change, and environmental responses. The analysis demonstrates the high value individuals put on the economic and social sustainability aspects of air transportation. Although many acknowledge aviation's contribution to climate change, few are willing to respond in terms of paying more to offset the negative environmental effects of aviation or to fly less. When analysing the value of sustainability by population sub-group, flight frequency and gender are highlighted as key variables in terms of environmental attitudes.

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### 1. Introduction

The notion of sustainable development has become integral to transportation policy and practice in recent years. Typically defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development, 1987), sustainable development has been translated from a global ideal into national policies such as the Sustainable Development Strategy (Department for Environment, Food and Rural Affairs, 2005) in the United Kingdom (UK) and the more recent Sustainable Communities (HUD–DOT–EPA, 2012) focus in the United States of America (US).

This paper aims to examine public attitudes towards air transportation and sustainability, in order to determine how individuals value sustainability in relation to air travel. It is organised as follows. Initially the literature is reviewed that relates to the valuation and measurement of sustainability and attitudes towards flying and climate change. The research questions and methods are then presented. The analysis is based on two air travel survey datasets conducted in the UK and the US respectively. The Findings and discussion section consists of analysis of air transportation and sustainability attitudinal statements of the overall sample and then by different socio-economic characteristics.

Finally, implications for managerial practice and contribution to scholarly knowledge are provided.

#### 1.1. The valuation and measurement of sustainability

There is a range of environmental impacts of air transport including, amongst others, global climate change concerns; the development of airports and associated infrastructure; noise and vibration from aircraft (and surface access); water pollution (e.g. surface run-off); local air quality pollutants (e.g. CO, NO<sub>x</sub>); and solid waste (scrapped aircraft, waste oil/tyres).

Despite a dip due to the current economic recession, United Kingdom (UK) air travel has increased over the previous ten years. There were 219 million terminal passengers at UK airports in 2011 compared with 167 million in 1999 (Civil Aviation Authority, 2012). It is also likely to experience a long-term growth in demand with a knock-on impact on emissions such as carbon dioxide (CO<sub>2</sub>). Climate change has had an increased role over time within the environmental aspects of sustainable development, as shown by its more prominent role within the 2005 UK Sustainable Development Strategy (Department for Environment, Food and Rural Affairs, 2005), and the subsequent Climate Change Act (United Kingdom Parliament, 2008). With the legally binding Climate Change Act target for 2050 being an 80% reduction based on 1990 levels, emissions from other sectors would have to be cut dramatically to allow aviation to follow the existing trajectory (Bows, Anderson, & Upham, 2006; House of Commons, 2006).

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Indicators are often used as a tool to measure sustainability, as demonstrated by the recent United Kingdom example (Department for Environment, Food and Rural Affairs, 2010). The following eight indicators, out of the full list of 68, directly relate to transport (including in brackets how they are measured):

- Aviation and shipping emissions (greenhouse gas emissions from UK-based international aviation and shipping fuel bunkers at airports and ports)
- Road transport (CO<sub>2</sub>, NO<sub>x</sub>, PM10 emissions from all road transport)
- Private cars (CO<sub>2</sub> emissions)
- Road freight (heavy goods vehicle CO<sub>2</sub> emissions)
- Mobility (number of trips by walking/cycling and public transport/taxi)
- Getting to school (children walking/cycling to school)
- Accessibility (differences in access with and without car)
- Road accidents (number killed or seriously injured)

Only the first indicator relates to air transportation and focuses on environmental sustainability. The use of strategies and indicators as a measurement tool is a top-down approach from national governments to value and measure sustainability. It is therefore of interest how members of the public value sustainability, more of a bottom-up approach. This paper takes this perspective to assess public attitudes using air transportation as the sustainability application. One issue in sustainable development is the tension between economic and environmental goals: aviation may be not environmentally sustainable, but it could be considered economically as well as socially sustainable (Upham, Maughan, Raper, & Thomas, 2003).

There are many social benefits that air transportation offers, including the well-being aspects of leisure trips for the general public and the employment opportunities provided. These benefits are not equal across society. Most population groups in the UK have increased the amount they fly as a result of the boom in low-cost airlines, but the increase has been greater in the higher socio-economic bands (Civil Aviation Authority, 2006). Furthermore, the climate change impacts from aviation will adversely affect society and some individuals may have to reduce or stop flying as a result of increased taxes and legislation implemented (Budd & Ryley, 2012, chap. 3).

## 1.2. Attitudes towards flying and climate change

There is a growing body of research examining attitudes towards air travel and sustainability, often splitting the population up into sub-groups. For instance, a study by Ipsos MORI (2007) determined the air travel behaviour of segments (ranging from the 'ultra greens' to the 'disengaged') based on the receptiveness to policy approaches such as information provision, government regulation and increases in total flight cost (fares or taxes). An interesting finding is that while the 'ultra greens' are classed as frequent flyers that regularly use low cost airlines to fly for short breaks, the 'disengaged' are not really frequent flyers.

Other research applying market segmentation techniques to examine the influence of context on attitudes and behaviour has found 'cognitive dissonance' within general environmental behaviour (Barr, Shaw, Coles, & Prillwitz, 2010) and for transport mode preferences and choice (Barr & Prillwitz, 2012). More specifically, the segments exerting the highest degree of environmental concern in the household context were often those who were more flight dependent in a tourism context. Howarth, Waterson, and MacDonald (2009) also highlight that an individual's awareness and understanding of climate change is often not reflected in their actions with respect to transport, concluding that there is greater need for measures which support change rather than provide information.

This paper attempts to probe more deeply into individual attitudes relating to air transportation applying a sustainability framework across two survey datasets.

## 2. Research questions and methods

In order to determine how individuals value sustainability in relation to air travel, this paper relies on primary data collected through two questionnaire surveys, conducted in the UK and the US respectively. A questionnaire survey is a data collection technique that enables detailed analysis of individual attitudes and behaviours, although it is noted that there are discrepancies in that individual responses may differ from how they think and behave in practice.

A particular focus of the analysis is on five air transportation and sustainability attitudinal statements within both surveys. A key aspect of the analysis is to examine attitudinal responses by different socio-economic characteristics of the samples. As both surveys contain over 500 respondents, such sub-group analysis was possible. Although it is interesting to compare and contrast the two samples, it is also valuable to build upon previous attitudinal surveys relating to air travel and sustainability (e.g. Ipsos MORI, 2007). It is acknowledged, though, that the attitudes of an individual are not necessarily linked to how they behave. The two surveys, one from the UK and one from the US, are summarised in turn.

### 2.1. East Midlands Air Travel Survey (EMATS)

There have been three air travel surveys conducted in the East Midlands region of the United Kingdom (UK). This paper concerns results from the first East Midlands Air Travel Survey (EMATS). Data collection for this survey was conducted by the Loughborough University team using postal questionnaires, a low cost method that does not involve high personnel travel costs. That said, there can be difficulties with postal questionnaire surveys in obtaining a representative sample due to low response rates. A self-completion questionnaire was posted out to each household sampled, together with a pre-paid return envelope. The request was for one adult within the household to complete the questionnaire and return it in the envelope provided. Survey design was informed by the Charnwood air travel household survey (Charnwood is a distinct sub-region within the East Midlands region), conducted in October 2006 (Ryley & Davison, 2008). In addition, a pilot postal survey of 67 households was conducted in August 2007, sampling the towns of Barrow-upon-Soar and Woodhouse Eaves within the Charnwood Borough Council area. The EMATS questionnaire contained a vast array of variables relating to air travel attitudes and behaviour, together with background socio-economic and transport information.

The EMATS sampling strategy was to select two sub-areas within each of five local authorities in the East Midlands. The size of the East Midlands region is 15,607 km<sup>2</sup>, and it has a mid-2007 population estimate of 4,399,600 (Government Office for the East Midlands, 2009). The five sampled local authorities were: Hinckley & Bosworth, Newark & Sherwood, Northampton, North East Derbyshire, and Nottingham. A quota was set for sampling both the local authority and sub-areas. The criteria for the local authority was to sample at a range of distances from East Midlands airport, the most central airport in the region; to get a mixture of urban and rural districts; and not to select adjacent authorities. The sub-areas were selected to include a range of different socio-economic characteristics, reflecting England and Wales (given the lack of data for the East Midlands); again adjacent areas were rejected. The sampling frame was the Electoral Register, a record of everyone living within the Council area eligible to vote.

Of the 5000 questionnaires posted out in autumn 2007, 517 usable questionnaires were returned. This represents an overall response rate of 10%, lower than expected. Postal survey questionnaires tend

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