AN INVESTIGATION INTO THE CORPORATE ENVIRONMENTAL RESPONSIBILITY STRATEGIES OF THE SOUTH AFRICAN AVIATION SECTOR THROUGH THEIR APPROACH TO EMISSIONS REDUCTIONS

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ABSTRACT

This study examines the corporate environmental strategies of airlines operating in the South African domestic market, namely SAA, Mango, Kulula and 1Time. The investigation focuses on the alignment between the environmental strategies and the initiatives being implemented to achieve the respective emission reduction targets. The use of content analysis of publically available information, a survey of passengers travelling domestically in South Africa, and interviews of representatives of the airlines and organisations that compromise the aviation value chain were used to triangulate the research.

The research reveals that of the South African aviation companies investigated the firms have adopted a wide-ranging set of environmental strategies with diverse priorities. Specifically, the airlines have varying degrees of uptake of IATA’s proposed four pillar strategy towards carbon neutral growth; while none of the South African domestic airlines currently offer a carbon offsetting service to their passengers. Passengers, when surveyed, indicated a large potential uptake of such a carbon offsetting service with 72% of passengers indicating that they would offset their flights if given the choice.

The investigation also found that a gap exists between domestic and foreign airlines with regards to the content and volume dedicated to communicating environmental strategy. ‘Leaders’, airlines that scored higher on environmental reporting, were found to be headquartered outside of South Africa and tended to communicate more detail of the targets and drivers of their respective environmental strategies. ‘Laggards’, those that scored lower on environmental reporting, consisted of the domestic airlines in South Africa. In comparison to their international counterparts South African aviation companies tend to make less detail available with fewer descriptions of the strategic drivers of environmental policy.

KEYWORDS: Aviation, Carbon Offsetting, Climate Change, Corporate Social Investment, Emissions Reduction, Environmental Responsibility, Ethical Consumption, Strategy, Strategic Drivers, Sustainability.
INTRODUCTION

1.1 Research Area and Problem

1.2 Research Questions and Scope

1.3 Research Assumptions

1.4 Research Ethics

LITERATURE REVIEW

2.1 Corporate Strategic Drivers

2.1.1 Strategy

2.1.2 Corporate strategic responses to climate change

2.2 Environmental Forces

2.2.1 Emissions Trading and Carbon Offsetting

2.2.2 Criticism of the Carbon Emissions Market

2.2.3 The Voluntary Carbon Offset Supply Chain

2.2.4 Ethical Consumption

2.3 The Aviation Industry and Emissions Reduction

2.4 Conclusion

RESEARCH METHODOLOGY

3.1 Research Approach and Methodology

3.2 Research Design, Data Collection Methods and Research Instruments

3.1.1 Content Analysis of publically available data

3.1.2 Survey of airline passengers

3.1.3 Interviews

3.2 Data Analysis Methods

RESEARCH FINDINGS, ANALYSIS AND DISCUSSION
**LIST OF TABLES**

Table 1 Research assumptions and impact mitigation ................................................................. 12
Table 2 Categories of research and instruments .......................................................................... 32
Table 3 Analysis methods per research instrument ..................................................................... 34
Table 4 Details of companies for content analysis .................................................................... 36
Table 5: Categories and Indicators of environmental responsibility strategies .............................. 38
Table 6: Scoring table per indicator ............................................................................................ 39
Table 7: Two Step cluster analysis output .................................................................................. 40
Table 8: K-means cluster analysis output .................................................................................... 41
Table 9 Survey responses concerning willingness to offset flights ............................................ 48
Table 10 Interview responses - Corporate strategic drivers ........................................................ 51
Table 11 Interview responses - Corporate strategic drivers, stakeholders .................................... 52
Table 12 Interview responses - Current initiatives ...................................................................... 53
Table 13 Interview responses - Proposed initiatives ................................................................... 54

**LIST OF FIGURES**

Figure 1 Origin of offsets by region and type ............................................................................... 22
Figure 2: Icelandic eruption emissions example ......................................................................... 25
Figure 3 IATA 4 Pillar Strategy to emissions reduction ................................................................. 27
Figure 4 Research triangulation design ....................................................................................... 30
Figure 5 Findings, Analysis and Discussions layout .................................................................... 35
Figure 6 Example of Mango's Green Fee ................................................................................... 47
Figure 7 Public billboards for Food and Trees for Africa in O.R. Tambo International, Johannesburg .................................................................................................................... 56
Figure 8 Summary of findings ....................................................................................................... 61
LIST OF GRAPHS

Graph 1 Percentage of passengers thought to have been given a choice of offsetting .......... 45
Graph 2 Percentage of passengers thought to have been given a choice of offsetting per airline ............................................................................................................. 45
Graph 3 Percentage of passengers thought to have paid to offset their flight ...................... 46
Graph 4 Percentage of passengers thought to have paid to offset their flight per airline .......... 46
Graph 5 Percentage of passengers willing to offset their flight .............................................. 47
Graph 6 Percentage of passengers willing to offset their flight per airline ............................... 47

GLOSSARY OF TERMS

ASATA Association of South African Travel Agents
BA British Airways
CDM Clean Development Mechanism
EU European Union
ETS Emissions Trading Scheme
FTFA Food and Trees for Africa
IATA International Air Transport Association
SAA South African Airways
UN United Nations
UNFCCC United Nations Framework on Climate Change
VCO Voluntary Carbon Offset
VER Voluntary Emission Reductions
STATEMENT OF ORIGINAL OWNERSHIP

1. I know that plagiarism is wrong. Plagiarism is to use another’s work and pretend that’s it is one’s own.

2. I have used the recognised convention for citation and referencing. Each significant contribution and quotation from the works of other people has been attributed, cited and referenced.

3. I certify that this submission is all my own work.

4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.

Signed: Trevor Watson

Date: 10 December 2010
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RESEARCH TITLE

“An investigation into the Corporate Environmental Responsibility strategies of the South African aviation sector through their approach to emissions reductions.”

1 INTRODUCTION

The aviation industry as a subset of the global transportation industry is one of the largest contributors to green house gas emissions (GHGs), conservatively estimated to be accountable for 2% of all GHG emissions (Reagan, 2007). The aviation industry worldwide, and certainly not in developing countries such as South Africa, is not bound to the Kyoto Protocol, whereby those signatories that have ratified the agreement are legally bound to reducing their emissions in lines with the protocol’s targets (UNFCCC, 1998). Airlines and air freight haulers are however not immune to changes in the competitive landscape and are constantly competing for limited resources in the form of market share, customers, brand recognition, awareness and profitability. Like any competitive firm, airlines are expected to make a number of strategic decisions in order to improve performance while maintaining their competitive advantage. Similarly, firms are under increasing pressure to reduce their carbon emissions from competitive, legal, ethical and customer-driven forces, all of which shape their responses through their corporate environmental responsibility programmes. Of interest are the South African airline’s strategic responses to these forces, be it through an internal emissions reduction policy or through an external mechanism such as carbon offsetting.

The aviation industry is of particular interest to this research as it has experienced a number of changes in the recent past that have been shaped by legislative changes, economic opportunities, evolving leadership thinking and stakeholder pressures. Where the aviation industry is different is in its inability to quickly adapt to these forces due to the nature of the technology employed, the slow timelines required to implement change and the large capital nature of running an airline. The result is that there has
been little scope for reduction in emissions by the airlines themselves. Instead, the industry has embraced the use of voluntary carbon offsets offered to passengers and consumers in certain markets, thereby transferring the mechanism for emissions reduction from corporate environmental responsibility to consumer driven consumption.

1.1 Research Area and Problem

The main area of research this project sets out to explore is: How are South African airline operators addressing climate change mitigation? What are the corporate strategic drivers of emissions reduction policies in the South African airline industry? And, why are certain emission reduction strategies chosen?

The research seeks to understand firstly what the strategic responses to emissions reduction have been by each of the operators in the South African aviation industry and whether these responses have been based on compliance to legislation, stakeholder pressures, inclusion into environmental responsibility programmes or an economic opportunity that could be exploited. Secondly, if South African aviation firms have responded to climate change, how has the carbon offset mechanism been used and how well understood is the mechanism by those firms? Lastly, how well is this mechanism understood by customers of the aviation firms, namely corporate organisations, travel agents, tour operators and most importantly, airline travellers.

This type of study would be of interest for the stakeholders within the airline industry such as: environmental officers, senior management, marketing departments, intermediates (for e.g. travel agents and tour operators) and airline travellers. The carbon trading industry, including traders and producers of carbon offsets, would also be interested in the outcome of this research.
1.2 Research Questions and Scope

What are the corporate strategic drivers behind a firm’s approach to reducing their carbon emissions?

This topic is addressed through a series of research sub questions, namely:

a. What activities have airlines and airline fleet operators undertaken in order to reduce their emissions?

b. Are these activities decided on within a strategic framework in order to maintain or increase competitive advantage?

c. Of the airlines and fleets operating in the South African airspace, which of these offer some form of carbon offsetting?

d. How well is the carbon offset market understood by the airlines and consumers (i.e. airline passengers) of the offsets in terms of the origin, mechanism, final destination and reliability of an emission offset?

e. Do airline passengers desire carbon offsets when travelling on airlines in South Africa?

The scope of this research will be to review the corporate strategic drivers of South African aviation firms. Included in this scope are the main stakeholders throughout the value chain of the industry. These individuals and organisations consist of passengers travelling on the airline carriers, travel agents and tour operators facilitating the transaction process, the service providers of the carbon offsets and people who are currently working for or have worked for an airline. Although the study is limited to South African carriers, British Airways (as the part of the joint venture with Comair) has been included in the content analysis of the publically available information as a carrier that competes with SAA both internationally and domestically. Singapore Airlines, the other non-South African carrier in the content analysis has been used as an example of a carrier that operates in multiple regions (including South Africa) and has worked closely with IATA with regards to reducing the airline’s emissions.

Environmental strategies that have been developed for internal use by aviation companies but have not been shared with the general public are out of scope in the
content analysis section of this piece of research. This will facilitate the comparison between equally available content amongst the airlines without having been subject to availability constraints.

1.3 Research Assumptions

The main assumptions that might impact on the success of this research were:

<table>
<thead>
<tr>
<th>Research Assumption</th>
<th>Impact on Research</th>
</tr>
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<tbody>
<tr>
<td>Availability of public data pertaining to an airline’s environmental policy, if not available then this will be used as a data point in itself, i.e. the public do not have recourse to a firm’s corporate environmental policy</td>
<td>Negligible – scoring system for content analysis included ‘zero information available’</td>
</tr>
<tr>
<td>Key informants within the airline industry will make themselves available to be interviewed within the prescribed timeline of the research project.</td>
<td>Four of the domestic airlines made themselves available during the interview process: SAA, Mango, 1Time and Kulula. Comair, consisting of BA local and Kulula, was separated into the respective divisions. BA was not available for comment and was excluded from the interview process - an overlap in strategy does exist between Kulula and BA however, as indicated by the representative of Kulula.</td>
</tr>
<tr>
<td>Passengers travelling with airlines will make themselves available for 2-3 minutes to be surveyed. A potential exists that travellers will be reluctant to be surveyed, this will be overcome by increasing the duration of survey and number of potential individuals surveyed.</td>
<td>Approximately one in three passengers approached agreed to being interviewed. The number of potential interviewees was increased to approximately 250 individuals.</td>
</tr>
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Table 1 Research assumptions and impact mitigation

1.4 Research Ethics

The design and collection of the data was conducted so as to ensure that there were no risks or dangers presented to individuals being interviewed and that confidentiality of participant’s details and responses were kept confidential if requested – this offer was not undertaken by any of the participants. Written and verbal consent was asked for prior to the interview process. Passenger surveys were done with full oral consent asked
for prior to commencing. A clearance certificate was also submitted as part of this report to the UCT ethics committee.

2 LITERATURE REVIEW

The literature review has been divided into three broad categories that require an understanding prior to commencing the research project. These follow a top down approach: starting with the drivers of corporate environmental responsibility, followed by an understanding of the environmental forces at play, such as the corporate responses to climate change, ethical consumption and carbon offsetting, and lastly, context specific to the aviation industry. This research aims to contribute to the literature and discussions on environmental strategic drivers specifically within the context of aviation. Although the South African aviation market may be unique, parallels and areas of learning may be developed in this research and applied to other aviation markets. Similarly, the topic of strategic responses when viewed through the lens of changing environmental and market pressures might well be further broadened by this specific case.

2.1 Corporate Strategic Drivers

2.1.1 Strategy

The role of management is to develop a strategy that focuses on the external forces acting on a firm, such as Porter’s Five Forces model, while deploying its internal resources in order to make the best strategic decision as a means to maintaining or improving its competitive advantage; if management succeeds in doing this effectively the firm’s performance will improve (Barney, 1991; Porter, 1980). In terms of responding to competitive forces and using the resources at its disposal, competitive advantage has traditionally come from the deployment of financial, human and manufactured capital. However newer frameworks have been developed to include natural and social capital as part of a firm’s strategic resources (Hanks, 2010a). Similarly, a move has been made to identify social responsibility as a source of opportunity and competitive advantage that can be deployed to enhance economic value throughout the business (Porter & Kramer, 2006). Organisations that are capable of ‘surfing’ and ‘creating a wave’ of transformation through innovation and the engagement of society as a whole,
ultimately improve their strategic positioning, and hence their competitive advantage
over an extended period of time (Hanks, 2010b). Rugman and Verbeke (2000) argue that
a sixth force should be included in Porter’s five forces model, that of government
regulation. Since government regulation has as much of an impact on the firm’s
governance and strategic thinking as does, say, buyer or supplier power then regulation
(or at least an understanding of it) can also be seen as a resource that can be used by
firms to create a competitive advantage (Rugman & Verbeke, 2000). Rugman & Verbeke
(2000, pg. 384) state that “the main implication of a ‘six forces’ approach is that firms
may attempt to develop a dynamic green capability, allowing not only an effective first
mover response to environmental regulation indirectly vis-à-vis the five forces, but also
directly vis-à-vis government itself”. Thus, the link between external forces acting on a
company, internal capability and a firm’s strategic positioning is important, especially
when the firm’s response is relation to social and environmental responsibilities.

Constraints and, in particular institutional constraints, shape the strategic responses of
organisations (Barney, 1991; J Pinkse & A Kolk, 2007). While true, it is of interest as to
whether firms are able to act on their own interests when presented with an
institutional constraint, for example the newly introduced government regulation
mentioned above. Firms overcome this by becoming institutional entrepreneurs and
thereby use the opportunity to change the rules of the game depending on the type and
strength of the institutional constraint (Seo & Creed, 2002). The strategic response can
take the form of one of four types depending on the organisation’s recognition of the
opportunity against the expected strength of the constraint. They are: institutional
conformist, institutional evader, institutional entrepreneur or lastly, institutional
arbitrageur (J Pinkse & A Kolk, 2007). Of interest to this research is the type of response
members of the aviation industry have chosen when faced with changes in legislation
(see section 3.3 for a description of the EU ETS) and changing consumer habits. Those
that choose to conform to constraints can be said to be the equivalent of ‘riding the
wave’ of sustainable development, while becoming an institutional entrepreneur is a
form of embracing change and, essentially, ‘surfing the wave’ (Hanks, 2010b; J Pinkse &
A Kolk, 2007).
Managerial attention to stakeholder interests is critical to success (Freeman, 1984); in conjunction to this it has also been found that the strategic stakeholder management model is an element of improved firm financial performance (Berman, T. M. Jones, Wicks, & Kotha, 1999). It is therefore important to understand the relationships between a firm’s management and its stakeholders when attempting to measure the value being created or destroyed by that firm’s strategic intent. The normative approach to stakeholder theory states that managers need to pay attention to key stakeholder relationships and that the firm is guided by a set of moral principles which in turn guide the decision making process (Berman, T. M. Jones, Wicks, & Kotha, 1999).

Alternatively, the instrumental approach to stakeholder theory views stakeholders as part of an environment that must be managed by the firm in order to maximise shareholder value. It can therefore be said that good stakeholder management has an intrinsic value for the firm (Berman, T. M. Jones, Wicks, & Kotha, 1999). In terms of stakeholders within the aviation industry, Bows, Anderson, & Mander (2009) identified five key classes of agents (or stakeholders), as: manufacturers, air traffic control, airlines, airports and consumers. Research during this project will focus on the airlines, their passengers and intermediates that act as go-betweens for both.

2.1.2 Corporate strategic responses to climate change

Behaviour traits noticed in firms is that they “choose the options that they believed secured the highest returns, independent of their ecological consequences.”(Bansal & Roth, 2000, pg. 724). In contrast to this mindset is the concept of Corporate Environmental Responsibility (sometimes referred to as CER), a subset of corporate strategy. According to Desjardins (1998), corporate environmental responsibility should achieve two purposes: 1) it should affect business decisions by aiming to reverse environmental and ecological degradation, and, 2) it should be capable of influencing business policy. This thinking recognises that capital extends beyond financial, manufactured and human to include social and natural (environmental) capital. The purpose of corporations should be to think beyond short term profit maximisation and to ensure that sustainable value is created, ultimately linking economics and ecology (Desjardins, 1998; Hanks, 2010a; Heinberg, 2007). Porter and van der Linde (1995)
argued that firms complying with environmental regulation could leverage off the innovation required to reduce emissions and pollution and actually improve efficiencies and lower the cost of production, thus creating economic value. Therefore environmental responsibility enhances the business case within the decision making criteria and need not be concerned with natural capital alone.

As mentioned, the deployment of rare and valuable resources is a means to a sustainable competitive advantage (Barney, 1991). Of interest is how climate change creates a situation whereby firms use those specialised resources in order to compete within institutional constraints. Bansal and Roth (2000) developed a preliminary model for the drivers that induce a response from ecological changes. They are:

1. Legislation
2. Stakeholder pressures
3. Corporate ecological responsiveness
4. Economic opportunities

Examples of corporate ecological responsiveness are the leadership values displayed and the underlying ethical motives for deciding on a course of action. Economic opportunities can be said to be drivers such as lowered costs, new revenue streams or increased products or services that arise as a direct result of a firm’s response to ecological changes. The authors later motivate condensing the four drivers into three primary drivers, namely: competiveness, legitimation and ecological responsibility. For the purpose of this research the four preliminary drivers shall be used.

A parallel mechanism for understanding the underlying context behind corporate strategic responses was also developed by Levy & Kolk (2001), these categorised the explanatory reasons for corporate positions on climate change as: locational factors (society, perceptions, etc), economic and market position (finances, positioning, long term planning), and, internal organisation factors (degree of centralization, CEO leadership style, decision making process, corporate culture). Again, corporate strategic responses to climate change have been similarly divided into political, technological, organisational, financial and public relations components (C. A. Jones & D. L. Levy, 2007) and can be measured through indicators such as ratings by external organisations, commitments regarding emissions and joint political actions. Of these dimensions it can
be said that firms have focused to a greater extent on the political and public relations components of their responses while technological investments, which have the greatest impact on emissions reduction, have lagged behind (C. A. Jones & D. L. Levy, 2007). A defensive-opportunistic-offensive continuum of corporate responses to climate change was developed by Kolk and Pinkse (2004). In this continuum a company’s aim or strategic intent when responding to climate change is either through innovation or compensation. This research aims to understand aviation firms’ responses to climate change, potentially contributing to the understanding of where in that spectrum airline carriers have currently positioned themselves.

The general responses are further classified according to the objective chosen to achieve the desired strategic intent; these are of three types (A. Kolk & J. Pinkse, 2004):

1. Internal: Strategic intent is achieved through process improvement, control and target setting.
2. Vertical: Strategic intent is achieved through product development and improvements through the supply chain.
3. Horizontal: Strategic intent is achieved through cooperation with other companies and new market combinations.

Since airlines operate in a competitive cost environment while simultaneously attempting to win market share from one another it is particularly pertinent to understand the initiatives developed by the local South African carriers in order to fulfil their respective strategic intent.

In summary, changes in the environment in which a firm operates, such as new legislation, stakeholder behaviour and/or economic opportunities drives a firm’s response in a certain direction as it attempts to maintain or develop a competitive advantage in light of these changes (C. A. Jones & D. L. Levy, 2007; A. Kolk & J. Pinkse, 2004; Ans Kolk & Hoffmann, 2008; Ans Kolk, D. Levy, & Jonatan Pinkse, 2008). It is the business opportunity (or business case) that firms attempt to seize by “reducing risks and costs, anticipating regulation, developing green capabilities through new products or markets, and strategic behaviour” (Levy & Kolk, 2001, pg. 501).
2.2 Environmental Forces

It is important to understand the political, environmental and social landscape within which firms are currently operating in order to understand the strategic responses these firms make as they experience major changes and depart from a ‘business as usual’ approach. Formal recognition of a need to address climate change resulted in the Earth Summit in Rio de Janeiro in 1992, followed by the Kyoto Protocol of 1997, which in turn created market based mechanisms for emission reduction (Lovell, Bulkeley, & D. Liverman, 2009; UNFCCC, 1998). This need arose as the linkages between atmospheric CO₂ emissions and a global temperature rise became apparent (EU, 2010; 1998). Legislative changes took place via a number of multinational agreements as well as through local and state initiatives (J Pinkse & A Kolk, 2007), resulting in changes in specific industries, such as the transport industry, while changes in consumer behaviour gave rise to the concept of ethical consumption, all of which are explored below. This is especially so in the aviation industry where changes in legislation and consumption have lead to wide-scale changes in the strategic decisions under consideration.

2.2.1 Emissions Trading and CarbonOffsetting

Countries, industries and organisations are faced with a number of choices with regards to emissions reductions, ranging from heavily regulated CDM credits to self regulated voluntary carbon credits. The Kyoto Protocol initiated three main institutional mechanisms, namely: Emissions trading – known as “the carbon market”, the Clean Development Mechanism (CDM) and Joint implementation (JI) (UNFCCC, 1998). Of importance for this research is that airlines have a choice as to what mechanism they employ for reducing their carbon footprints, as they are not bound to the Kyoto Protocol. It is also important to note that each choice is presented as an opportunity or a threat to their current competitive positioning. For example, airlines in South Africa can decide to purchase CDM credits or they can choose to purchase local or international voluntary credits. Their reason for choosing one over the other would depend on their corporate environmental responsibility policies, the positioning of their brand and the economics of the offset pricing and the volume of credits that would need to purchased. An understanding of the various carbon reduction options is therefore required for this research.
Emissions trading offsets, as defined by Bumpus & Liverman (2008), is the mechanism that allows an individual or company to invest in projects that reduce greenhouse gas emissions. Importantly, these reductions would not have occurred if the project had not been undertaken. The cap and trade system created to facilitate this process has effectively commoditized carbon within an institutional and regulatory framework. The result is that a tonne of carbon can be priced, traded and consumed (Bumpus & D. M. Liverman, 2008; Egenhofer, 2007; Hodder, 2009). The advantage of such a market based system is that it is a cost effective means of reducing a firm’s carbon overhead, it therefore gives businesses the opportunity to make strategic decisions with regards to meeting their emission reduction targets. As the emission needs to be priced prior to being traded an element of standardisation (to a degree) has been introduced into the market, thereby improving long term predictability - another requirement for developing effective business strategies (Egenhofer, 2007). As Reagan, (2007, pg. 362) explains relating specifically to the history of the EU Emissions Trading Scheme: “Confidence in emissions trading systems increased in the debate following Kyoto, as member states discussed low-cost means to attain the emissions reductions mandated by the Protocol.”

In countries that did not ratify the Kyoto Protocol, in particular the United States, either corporate or state lead initiatives arose to fill the legislative void, notably voluntary emissions trading schemes (Ans Kolk & Hoffmann, 2008). Thus, in parallel to the rise of the regulated CDM market has been the advent of a Voluntary Carbon Offset (VCO) market in which Voluntary Emission Reductions credits (VERs) are traded (Bumpus & D. M. Liverman, 2008; Hamilton, Sjardin, Peters-Stanley, & Marcello, 2010). The voluntary market allows companies and individuals to offset their emissions by purchasing carbon credits outside of the CDM. The main difference between the two mechanisms is that of their respective governance structures: compliance markets belong to a legally binding framework whereas VCO markets are completely voluntary, relying on the influence of supranational and non-state actors to package offsets according to their needs at the time (Bumpus & D. M. Liverman, 2008). While the CDM has established strict standards for the design, monitoring and certification process of its projects the voluntary market is regarded as more informal with fewer requirements in place. This lack of uniformity
and standardisation has led to criticism of the VCO market, which is discussed in later detail.

The voluntary market has been effective in that it can be tailored to consumer’s needs; it is increasingly sophisticated and has been able to meet secondary objectives above and beyond emissions reductions. These needs are the promotion of sustainable development in least developed countries, conservation of bio-diversity and community development (Bumpus & Liverman, 2008; Hamilton et al, 2010). As Hamilton et al (2010, pg. 1) comments, “In the context of the regulated markets, the voluntary carbon markets proved they could be ‘the size of a mouse but have the roar of a lion.’”

2.2.2 Criticism of the Carbon Emissions Market

The rise of emissions trading has not been without its critics. At a macro level, critics argue that emissions trading cannot achieve the structural changes required and that it lacks the moral persuasion required to bring about lasting change that pure regulation should (Hodder, 2009; Kotchen, 2009; Monbiot, 2006). Cap and trade systems have been designed to help companies focus on the economic efficiency drivers of the business thus achieving “an optimal level of pollution rather than the elimination of emissions” (Hodder, 2009, pg. 52). Similarly, reliance on market-based systems to correct environmental damage created by poor regulation and overuse of complex financial instruments can lead to speculation (Bond, 2010).

Lovell, Bulkeley, & Liverman (2009) identified two main types of critiques that have arisen in response to carbon offsetting, namely ethical and technical issues. Ethical critiques raised against offsets are that they are an indulgence and a green guilt tax (Kotchen, 2009; Monbiot, 2006) and that they have created unfair trade infrastructures between the developed North and the emerging South (Bumpus & D. M. Liverman, 2008; Lovell, Bulkeley, & D. Liverman, 2009).

On the technical side the concept of additionality, timing of offsets and accountability of the offsets have been questioned. Additionality clauses in the CDM require that offsets must show that a baseline of emissions is reduced in comparison to alternative projects
(EU, 2010). Project developers if poorly regulated could exaggerate baselines or claim reductions that will never occur. Timing of carbon reductions have also been questioned in the past in that offsets are sometimes sold before reductions are achieved, and in some cases have been re-sold or double counted in the market (Ans Kolk, D. Levy, & Jonatan Pinkse, 2008). Lastly, the pricing of equivalent units of carbon have varied in the past as a result of scientific differences in opinion on accounting of emissions, for example within the aviation industry similar length of flights in similar aeroplanes have produced varying prices in the offsets calculated (Kotchen, 2009). The result of the number of concerns raised in the CER and VER markets is that consumers of the offsets have begun demanding evidence and clearer accountabilities when it comes to purchasing carbon offsets (Bumpus & D. M. Liverman, 2008).

As noted earlier carbon offsetting is a strategy currently being pursued by international airlines whereby there are two options available to the industry: CDM and VER credits. Since the airline industry is not legally bound by the Kyoto Protocol to reduce emissions (at least not as of now) voluntary offsets are more often utilised than CDM credits due to their lowered cost, flexibility and the ability to tailor the offset to an airline’s particular needs and corporate responsibility requirements. To this end an understanding of the voluntary carbon offset market has been undertaken.
2.2.3 The Voluntary Carbon Offset Supply Chain

Approximately 93.7 MtCO2e was transacted in the global voluntary carbon during 2009 (Hamilton, Sjardin, Peters-Stanley, & Marcello, 2010). Briefly, the origin and types of offsets are as follows:

Figure 1 Origin of offsets by region and type (Hamilton, Sjardin, Peters-Stanley, & Marcello, 2010)

Sellers of carbon offsets (both voluntary and CDM) can be categorized into four major types: project developers, wholesalers of bulk credits, retailers of smaller amounts of credits to organisations and, lastly, brokers who facilitate the transactions (Hamilton, Sjardin, Peters-Stanley, & Marcello, 2010). The various standards, their descriptions and the scope of the projects have been summarised by Hamilton et al (2010) and presented in appendix 9.1.

The breakdown in the buyers of VERs is approximately 80% corporations, 12% government, 5% individuals, 2% NGO's (Lovell, Bulkeley, & D. Liverman, 2009). The reasons for them having been bought are of interest for this research and range from investments being bought for resale, pre-compliance, corporate responsibility initiatives, and, VERs being bought as an alternative to internal emissions reductions or efficiency improvements (Hamilton, Sjardin, Peters-Stanley, & Marcello, 2010).
2.2.4 Ethical Consumption

As a result of the general rise in levels of awareness and education of consumer groups since the Kyoto Protocol and Earth Summit behaviour in the consumption patterns of individuals have begun to change. Lovell, Bulkeley, & Liverman (2009) have identified three mindsets (or narratives) that have emerged amongst individuals driven by ethical consumption motives, they are:

1) Quick Fix for the planet,
2) Global-local connections
3) Avoiding the unavoidable

The reason these narratives are of interest to this research is that the drivers of corporate responses to climate change, identified by Bansal and Roth (2000), requires an understanding of the mindsets of the consumers shaping the opportunities and threats to the firm’s competitive positioning. Examining these narratives in greater detail one can begin to develop timelines and expectations of these various groups, which in turn can be used to understand the mindsets of some of the airlines prospective customers.

Quick Fix for the planet: Members of this group recognize the urgency of climate change and propose that action is required straight away. Voluntary offsetting fulfils the needs of this group as the offset is an immediate solution and is readily available.

Global-local connections: The narrative in this group recognizes that pollution and emissions reductions are global in their scope. More importantly, this group seeks to highlight the co-benefits of carbon reduction projects such as sustainable development and poverty reduction, ultimately transferring wealth from the Global North where emissions originate to the Global South where projects originate.

Avoiding the Unavoidable: The main drivers for this group are self-control and the government of consumption patterns. Ideally, emission reductions are the primary focus of any initiatives followed by offsetting of an activity if a reduction is unavoidable. This narrative has developed a hierarchy of energy offsets. These are: Reduce (avoid energy use where possible, Replace (use renewable energy where possible) and Neutralise (offset unavoidable emissions). Therefore it is important for companies operating within markets that are driven by ethical consumption behaviour to understand the various narratives currently being developed. Strategic decisions made based on an assumption
of one type of behaviour when the market is predominantly driven by another type may impact on a firm’s performance.

2.3 The Aviation Industry and Emissions Reduction

“On December 20, 2006, the European Commission (EC), the executive body of the EU, announced a proposal for a directive...that would bring civil aviation within the ETS. The Proposed Directive would extend the ETS to cover flights within the EU in 2011 and all flights arriving in or departing from the EU in 2012” (Reagan, 2007, pg. 350)

The aviation industry, originally exempt from the Kyoto Protocol, has increasingly come under pressure to reduce its emissions. This can be seen in the recent changes in the EU ETS (EU, 2010) whereby airlines arriving and departing in the EU will be subject to capping of emissions. The main reason for the revised legislation is that the aviation industry is a large source of global carbon emissions and is thought to be responsible for 2% of all global carbon emissions, this is expected to rise in line with the expansion of the industry as a whole (Gossling et al., 2007; Reagan, 2007). An example that illustrates the volume of CO₂ that the airline industry emits occurred during April 2010 when the Icelandic volcano Eyjafjallajökull erupted, which in turn grounded flights within the European Union. The result was that an estimated net saving occurred during the grounded period.
The expected impact of bringing the aviation industry in line with the EU ETS is that it will provide the incentive for the industry to improve efficiencies as well increase the need for emissions trading within the industry (Reagan, 2007). Airlines operating into and out of the EU have responded through formal lobbying against the intended changes on the one hand, while also implementing a host of initiatives to reduce emissions in order to comply with the legislation on the other. Most of this effort has been concentrated via the International Air Transport Association (IATA), a body that represents 93% of all scheduled air traffic.

Airlines operating in South Africa are not bound by the Kyoto Protocol or the future EU ETS regulation. They may however be affected by the changes set to take place in 2013 in the EU if they are a) departing from South Africa and landing in the EU, b) controlled
by a European company, such as BA, seeking to roll out emissions across all fleets, or c) expected to change their service offering for customers expecting similar emission reductions. A summary of the timing and implementation rules for the EU ETS aviation legislation can be found in appendix 9.2.

Unfortunately the aviation industry has been slow to respond to historical changes and is expected to struggle to adapt to the pending changes required. The main reasons for this are the low carbon technologies available to the industry and the long lead times required for new technologies to penetrate into airline fleets (Bows, Anderson, & Mander, 2009). Also of interest is the ‘global-local’ nature of the airline industry, that is, national carriers departing from non-EU countries will be subject to the EU ETS regulations. Hence a ‘local’ initiative in Europe will resonate globally in its implementation (Reagan, 2007). Currently, specialised voluntary offset products serve the needs of airline customers who have become increasingly aware of the impact of aviation emissions on the global climate (Lovell, Bulkeley, & D. Liverman, 2009) with a particular growing niche sector of the offsetting products catering towards tourists (Becken, 2004).

Research indicates that airlines have a number of strategic options available to them with regards to increasing efficiencies. These include: compliance to pending legislation (fuel taxes, emission reductions or emission trading), technological implementation (more efficient engines and the use of bio-fuels) and, lastly, structural changes to operations (changes to flight corridors, flight altitudes and the number of flights) (Gossling et al., 2007). IATA has adapted these options to create a “Four Pillar Strategy” recommended for implementation by their member organisations (IATA, 2010). In addition to the technological, operational and infrastructural strategies suggested by Gossling et al. (2007) is the area labelled ‘Economic Measures’ which describes the means to “plugging the gap” (IATA, 2010, pg. 5) through the use of carbon offsetting, as can be seen in figure 3:
This final element of IATA’s four pillar strategy specifically details the means to achieving carbon neutral growth from 2020 onwards by offsetting an estimated 90 million tonnes of CO₂ that could not be reduced through the use of the original 3 pillars (IATA, 2010). Airlines and industry stakeholders have differed in terms of strategy development and the uptake of these economic measures to help achieve emission reduction targets. This research seeks to develop a better understanding of the South African aviation industry’s approach to the four pillar strategy, with emphasis on the varying approaches to carbon offsetting.

Parallel to the new environmental forces at play within the aviation industry has been the emergence of budget airlines catering to the high volume, low cost market, represented by the likes of Mango, 1Time and Kulula in South Africa. Again, varying strategies have been adopted at times to win market share in this hyper-competitive space. One such strategy, recognised by IATA, is to reduce an airline’s cost base through reduced emissions resulting in increased competitiveness. This investigation details which local airlines have adopted this strategy. Another strategy, and not mutually exclusive to the former, is to develop and market carbon offsetting services to the general public as a means of capturing market share from competitors – this too will be investigated and discussed.
2.4 Conclusion

New and pending legislation in the EU combined with the groundswell recognition that climate change has an impact on business and society alike has resulted in airlines and their service providers having to weigh up different strategies in response to the changing environment. Passengers have also changed their consumption patterns, and, in certain cases have created a new demand for services and products within the aviation sector that cater towards their own need to fly in an ethical fashion. The competitive landscape itself has changed of late with budget and premium airlines seeking to drive down costs while differentiating themselves from their competitors. This differentiation can be seen in the diverse strategies adopted by airlines with regards to emissions reduction and carbon offsetting.

To this end, the emissions and carbon offsetting markets have responded by developing a wide array of increasingly sophisticated products that cater towards the specific needs of the airlines and their passengers – these range from projects that are local and social in nature through to ‘off the shelf’ standardised packages. The airlines themselves, while struggling to maintain competitive advantage, appear to have to tailor their strategies between those that are environmentally focused, cost driven, legislative or marketing driven. Failure to act could potentially result in one less airline competing in an already competitive environment.
3 RESEARCH METHODOLOGY

3.1 Research Approach and Methodology

The research design is in the form of a case study with data collected through interviews, content analysis of publically available data and surveys of airline passengers. Case studies have been suggested as a basis for a research design when 1) "How" or "Why" questions are being asked, 2) the investigator has little control over events occurring in the research, and, 3) the focus of the research is on contemporary phenomena (Yin, 2009). The purpose of this research is to understand the underlying strategic drivers behind why and how firms operating in the South African aviation industry choose to control or reduce their emissions. To this end a case study approach has been used to identify the key themes that would emerge when embarking on this type of investigation and mixed methods have been used to describe and analyse the questions posed in section 1.2.

The case study approach has been subject to criticism in the past, this is due to a number of reasons predominantly formed on the basis that traditional social scientists believed in a hierarchy of investigation - with case studies only used for the preliminary section of an investigation (Yin, 2009). Other issues raised have focused on case studies perceived lack of rigor, confusion between teaching case studies and case study research, difficulties in using single case studies for scientific generalization, and at times that case studies can become too long and unwieldy (Eisenhardt, 1989; Yin, 2009). This researcher intends to mitigate these risks by analyzing within-case data, selecting multiple cases and searching for cross case patterns, and lastly, as ethnographic data collection (which would require detailed observational evidence) will not be undertaken it is hoped that length of reporting will not affect the clarity of the intended research.

The mixed method approach to data gathering is a means of achieving triangulation of the intended study’s outcome, as Yin, (2009, pg. 19) describes, “some case study research goes beyond a type of qualitative research, by using a mix of quantitative and qualitative evidence”. The reason for doing so is in order to achieve convergence and to
develop more confidence in the theory, constructs and hypotheses being developed (Eisenhardt, 1989; Jick, 1979). Triangulation was achieved through three sources of research:

1. A content analysis of published and publically available data describing airlines corporate environmental policies and emission reduction strategies.
3. Interviews with management of airlines, stakeholders, tour operators, travel agents and employees.

An inductive approach based on grounded theory was used in order to deliberately avoid “specifying any theoretical propositions at the outset of an inquiry” (Yin, 2009, pg. 35). This is in line with grounded theory which proposes that the data generated by a piece of research should ultimately generate the theoretical framework required to analyse it, as opposed to a predisposed theory (Glaser & Strauss, 1967). Grounded theory is useful in that it begins with the inductive approach but can be flexible with regards to guidelines, mostly; it is a means for conducting emergent inquiry (Charmaz, 2003; Glaser & Strauss, 1967). The ‘constructivist approach to grounded theory’ is a contemporary revision of grounded theory, one that takes into account multiple perspectives. It is useful in that it builds in the “what” and “how” questions (Charmaz, 2003), it therefore lends itself to case study investigations such as this one.
For case studies, Yin (2009) suggests that theory development is an important part of the design phase and that “the complete research design embodies a ‘theory’ of what is being studied” (Yin, 2009, pg. 36). Therefore the research topic, as described by the research questions posed, the literature reviewed and the purpose of the investigation emerges to form a theoretical framework based on why firms attempt to maintain competitive advantage through strategic decision making (Barney, 1991; Porter & Kramer, 2006). As Eisenhardt, (1989, pg. 548) recommends, "a strong theory-building study yields good theory (that is, parsimonious, testable, and logically coherent theory) which emerges at the end, not the beginning, of a study."

### 3.2 Research Design, Data Collection Methods and Research Instruments

The firms, organisations and individuals that were investigated originate from the population described as stakeholders within the South African aviation industry. These are: service providers, intermediates, customers, booking agents and employees. The following table details the organisations investigated, the individuals interviewed or surveyed and the instruments used to conduct the research:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Organisation / Individual</th>
<th>Research Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Providers</td>
<td>Domestic Airlines</td>
<td>SAA, Mango, BA, 1Time, Kulula</td>
<td>Interviews and Content Analysis</td>
</tr>
<tr>
<td></td>
<td>International Airlines</td>
<td>British Airways, Singapore Airlines</td>
<td>Content Analysis</td>
</tr>
<tr>
<td></td>
<td>IATA</td>
<td>International Air Transport Association</td>
<td>Interviews and Content Analysis</td>
</tr>
<tr>
<td>Employee</td>
<td>Former head of Qantas domestic strategy¹</td>
<td></td>
<td>Interview</td>
</tr>
<tr>
<td>Employee</td>
<td>SAA Pilot (current)</td>
<td></td>
<td>Interview</td>
</tr>
<tr>
<td>Intermediates</td>
<td>ASATA</td>
<td>Association of South African Travel Agents</td>
<td>Interview</td>
</tr>
<tr>
<td>Travel agent</td>
<td>Flight Centre</td>
<td></td>
<td>Interview</td>
</tr>
</tbody>
</table>

¹ Although Qantas is not part of this investigation the interview was undertaken as a means to understanding how other airlines in the past have developed their respective strategies in light of a changing competitive landscape.
<table>
<thead>
<tr>
<th>Corporate booking agent</th>
<th>GSB Booking agents</th>
<th>Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon offsetting project developer</td>
<td>Food and Trees for Africa</td>
<td>Interview</td>
</tr>
<tr>
<td>Consumers</td>
<td>Airline passengers (n=81)</td>
<td>Survey of customers using airlines operating in South Africa</td>
</tr>
</tbody>
</table>

Table 2 Categories of research and instruments

3.1.1 Content Analysis of publically available data
Airline’s published and publically available data was used to gain an understanding of their policies towards emissions reduction and corporate environmental strategy. The sources of the data were company annual reports, sustainability reports, website details and, if available, information given to airline customers when purchasing airline tickets. The outcome of the review was to tabulate each airline’s strategy against a series of questions, develop categories and indicators against which each airline was scored using a predetermined coding system. SPSS software was used to analyse the content using two-step and k-means cluster analysis.

Details of the input data, clusters and findings of the analysis can be found in section 4.1

3.1.2 Survey of airline passengers
The purpose of surveying a number of airline customers was to investigate passengers’ understanding of carbon offsetting and to evaluate the effectiveness of how airlines communicate their environmental programmes to their passengers. Specifically, the nature of the questions sought to identify whether:

- Passengers knew if their airline had offered them an offsetting option
- Offsetting was inclusive in the ticket price. For example in the case of Mango Airlines passengers are charged a mandatory R2.50 Green Fee that contributes towards the airline’s environmental programme.
- Passengers had a demand for voluntarily offsetting their flights if their airline had to offer such a service.

Details of the questions and results can be found in section 4.2 and appendix 9.8.
### 3.1.3 Interviews
The interviews followed the format of semi-structured interviews with individual respondents. The people interviewed were chosen or requested for their intimate knowledge of the organisation’s environmental responsibility policy. The interviews required a degree of structuring in order to guide questions based on strategic responses to climate change while allowing for open-ended discussions on perceived customer value and perceptions with regards to carbon offsetting. In general, the interviews focused on the questions: “What environmental strategy has been adopted, which initiatives are most aligned to your current strategy and why is your firm offering (or not offering) carbon offsets to your customers?”

Purposeful sampling (Creswell & Clark, 2010; Teddlie & Tashakkori, 2009) was used to determine which companies should be interviewed. The sample, representing all but one airline of the domestic carrier population, namely BA, was informed from the initial review of the publically available data.

Development of the insights gained from the interviews can be found in section 4.3. The interview questions can be found in appendix 9.3.

### 3.2 Data Analysis Methods
The suggested method for analyzing data is to perform in-case analysis (Eisenhardt, 1989); the reason for this is to avoid creating a gap between the data collected and the report and insights being developed. In-case analysis requires descriptive write ups as the research progresses therefore forcing an understanding of the context and details of each case. For this particular research the method of triangulation requires the researcher to understand, write up and develop insights in order to progress to the next phase of research. The second recommendation for analysis is that of cross-case pattern detection in order to mitigate the risks of developing a myopic view of the problem. Here Eisenhardt (1989, pg. 540) states that “the key to good cross-case comparison is to counteracting these tendencies by looking at the data in many divergent ways.” This was achieved by interviewing multiple stakeholders in the airline industry, throughout the
value chain and using a mixed method approach, one that combines both qualitative and quantitative analysis (Creswell & Clark, 2010; Teddlie & Tashakkori, 2009). Each research instrument required a specific form of analysis, these are summarised as follows:

<table>
<thead>
<tr>
<th>Research Instrument</th>
<th>Analysis Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviews</td>
<td>In case analysis, descriptive write ups</td>
</tr>
<tr>
<td>Content Analysis</td>
<td>Cluster analysis using SPSS software, comparison of mean scores between indicators of each cluster.</td>
</tr>
<tr>
<td>Survey of airline passengers</td>
<td>Descriptive statistical analysis</td>
</tr>
</tbody>
</table>

Table 3 Analysis methods per research instrument

Enough analysis, or ‘reaching closure’ occurs when theoretical saturation is achieved, that is, there is minimal additional learning for each incremental piece of evidence obtained (Eisenhardt, 1989; Yin, 2009). Switching between theory and data (the theory building phase) is said to reach saturation when, again, incremental improvements are made without fundamental changes to theory (Eisenhardt, 1989; Glaser & Strauss, 1967). Finally, validity of the data collected can also be achieved by checking with the respondents that the conclusions reached by this researcher during an interview are factually correct and communicate the intentions and sentiment of the interviewee, an exercise that was performed at the end of each interview. Furthermore, in terms of developing the criteria for trustworthiness for the type of research being conducted, the intention is focused in the following areas, as suggested by Teddlie & Tashakkori, (2009):

**Credibility and Validity** – has been enhanced by triangulation of data capture, engagement with the participants to check validity of insights developed and peer debriefing

**Transferability** – has been enhanced by detailed write ups of each interview

**Dependability and Reliability** – has been enhanced by the use of peer to peer coding comparison during content analysis as well as peer review of results
4 RESEARCH FINDINGS, ANALYSIS AND DISCUSSION

The findings and analysis of results have been discussed in accordance to each area of the mixed method of research undertaken, namely:

4.1 Content Analysis of public information
- Section 4.1 describes the content analysis findings
- Appendices 9.5 to 9.7 contain the details of the content analysis input data, two-step cluster analysis and k-means analysis

4.2 Survey of Passengers
- Section 4.2 describes the passenger survey findings
- Appendix 9.4 contains the passenger survey questionnaire
- Appendix 9.8 contains the summarised data of the passenger survey

4.3 Interviews
- Section 4.3 summarises the interview findings
- Appendix 9.3 contains the interview questionnaire

Figure 5 Findings, Analysis and Discussions layout

4.1 Content Analysis and Findings
The content analysed came from three primary sources, namely:

1. Annual reports, (the most recent report was used at the time of researching)
2. Supplemental reports, in the form of Sustainability, Green or Carbon Disclosure Project (CDP) reports. Only external reports published by the company were included
3. The company’s website

The companies analysed consisted of those carriers operating in the domestic market, two airlines (SAA and BA) that operate both internationally and domestically, an international carrier (Singapore Airlines) that operates internationally, the representative of the airline industry (IATA) and the representative of the travel agents in South Africa (ASATA).
The companies are summarised in the following table:

<table>
<thead>
<tr>
<th>Name</th>
<th>Sector</th>
<th>Year of annual report</th>
<th>Operations (local, national, regional, global)</th>
<th>Revenue (R m’s - unless stated)</th>
<th>Member of IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAA Airline</td>
<td>08/09</td>
<td>Global</td>
<td>20,123</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Mango Airline</td>
<td>No AR</td>
<td>Local</td>
<td>No info</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Comair - Kulula</td>
<td>08/09</td>
<td>Regional</td>
<td>3,048</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>BA Airline</td>
<td>09/10</td>
<td>Global</td>
<td>GBP 7,994</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>1Time Airline</td>
<td>08/09</td>
<td>Regional</td>
<td>1,250</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Singapore Airlines Airline</td>
<td>09/10</td>
<td>Global</td>
<td>USD 12,707</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>IATA Airline Association</td>
<td>09</td>
<td>Global</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>ASATA Travel Agents Association</td>
<td>09</td>
<td>Local</td>
<td>n/a</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Details of companies for content analysis

Please Note:

Information analysed for British Airways (BA) is for the parent airline, located in the United Kingdom, annual reports and websites were based on this parent company. Information analysed for Kulula is taken from those reports and websites only pertaining to Kulula and not BA local. And finally, Singapore Airlines was included as an example of an international airline not competing in the domestic market with strong affiliation to IATA.

4.1.1 Content Analysis Methodology

“Content analysis is a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use” (Krippendorff, 2004, pg. 18), in this sense the use of content analysis is a valid tool for helping build a generalised understanding of a firm’s strategies while developing the context for the reader. It is also useful in that it offers an objective means to analysing qualitative subject matter.
The research design for the content analysis section of this report centres on analysing available texts to answer the research question posed in section 2.2. In this sense, a replicable and valid procedure has been used in line with Krippendorff’s (2004) suggested process of unitizing, sampling, coding and summarizing data in order to evaluate the content in a step by step manner.

The process that was used to analyse the content of the publically available was as follows:

- Categories and indicators for each type of content were developed
- Companies’ public information was scored from a scale of 0 to 3 per indicator
- A two step cluster analysis was performed to identify the number of clusters in the population of firm’s being analysed
- A k-step means analysis was run to calculate the mean scores per cluster in each of the indicators
- The clusters were named and described according to their average indicator scores

**Categories and Indicators**

The variables used to analyse the data were divided into five categories. Each of the categories were further reduced to individual indicators, these in turn were scored. The first category, reporting prevalence, relates to the overall coverage dedicated to environmental responsibility programmes, initiatives or strategy development in each of the three reporting media (annual reports, special reports and websites). Secondly, content was analysed as to whether an environmental strategy had been articulated and the depth of implementation that had been indicated. Key indicators being searched for in this category related to the level of disclosure adopted by the organisation in terms of emissions, for example whether full measurement had been reported and if a target setting process had been initiated. Also within this section was the scoring related to the disclosure of any corporate strategic drivers of environmental policy. These drivers were adapted from Bansal and Roth’s (2000) preliminary model.
Next, specific emission reduction initiatives were investigated. These took the form of four types of initiatives that an airline or organisation could embark on, namely technological, operational, infrastructural and economic measures (carbon offsetting). Lastly, business leadership, measured by the content dedicated to describing executive management resources and environmental responsibility intent was analysed. The following table summarises the categories and indicators per category:

<table>
<thead>
<tr>
<th>Category</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting prevalence</td>
<td>• How significant is Corporate Environmental Responsibility overall in the annual report in terms of total space given?</td>
</tr>
<tr>
<td></td>
<td>• Has the organisation produced a separate environmental or sustainability report?</td>
</tr>
<tr>
<td></td>
<td>• How significant is Corporate Environmental Responsibility overall for the company’s website?</td>
</tr>
<tr>
<td>Environmental Responsibility and Corporate strategic drivers</td>
<td>• Is there a plan in place?</td>
</tr>
<tr>
<td></td>
<td>• Are emissions said to be measured?</td>
</tr>
<tr>
<td></td>
<td>• Are emission targets described and reported?</td>
</tr>
<tr>
<td></td>
<td>• Are there specific initiatives described in place to achieve these targets?</td>
</tr>
<tr>
<td></td>
<td>Is there mention of the environmental responsibility strategy driven by:</td>
</tr>
<tr>
<td></td>
<td>• Social responsibility</td>
</tr>
<tr>
<td></td>
<td>• Environmental awareness (climate change)</td>
</tr>
<tr>
<td></td>
<td>• Legislation compliance</td>
</tr>
<tr>
<td></td>
<td>• Cost reduction</td>
</tr>
<tr>
<td></td>
<td>• Marketing (consumer driven)</td>
</tr>
<tr>
<td>Emission reduction initiatives</td>
<td>• Technology initiatives in place?</td>
</tr>
<tr>
<td></td>
<td>• Operations initiatives in place?</td>
</tr>
<tr>
<td></td>
<td>• Infrastructure initiatives in place?</td>
</tr>
<tr>
<td></td>
<td>• Offsetting initiatives in place?</td>
</tr>
<tr>
<td>Business leadership</td>
<td>• Is there an executive board or business unit for environmental responsibility/ emissions / carbon offsetting?</td>
</tr>
<tr>
<td></td>
<td>• How important is environmental responsibility in terms of strategy to the firm in the leadership statement / commitment?</td>
</tr>
</tbody>
</table>

Table 5: Categories and Indicators of environmental responsibility strategies

Research Assumptions for Content Analysis
A key assumption made in this section of research is that the information analysed (annual reports, special reports and websites) reflects the company’s policies and strategies with regards to environmental responsibility. The limitation of this assumption is twofold:

- Some companies simply do not report on their environmental policies and strategies even though they exist and initiatives are under way to address emissions and climate change issues. In this sense, internally communicated strategy may not become available to the external public – interviews of key personnel in section 4.3 were designed to overcome this limitation.

- Secondly, there is a risk that companies do not utilise their communication channels effectively and that data has been made available but is not easily found. This risk was identified when searching for special environmental reports on companies’ websites where the hierarchical layout of information had not been properly developed.

**Coding**

The following coding scores were used to rate the amount of information that each of the indicators has been reported on by the respective companies.

<table>
<thead>
<tr>
<th>Score</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No information about the indicator is provided</td>
</tr>
<tr>
<td>1</td>
<td>Basic information relevant to the indicator is provided, but there is no link to company strategy or operations</td>
</tr>
<tr>
<td>2</td>
<td>Information is provided with regard to the indicator, including basic information about strategic intent and operational aspects</td>
</tr>
<tr>
<td>3</td>
<td>Comprehensive information is provided on the company’s approach to that indicator, including strategic intent, implementation and monitoring</td>
</tr>
</tbody>
</table>

*Table 6: Scoring table per indicator*

Each indicator was scored per company using the above criteria, the final table which formed the input data for the cluster analysis can be found in appendix 9.5. One of the key requirements when conducting reproducible research is to ensure that the method
is reliable, meaning that scores are consistent and stable, and valid, meaning that there is integrity and credibility in the research (Creswell & Clark, 2010; Krippendorff, 2004). This research has been conducted to ensure that conditions are met for reliable content analysis through the use of clearly communicated coding instructions. A comparison between one round of scoring between this researcher and an independent colleague was completed in order to compare and check the reliability of the scoring method.

A two-step cluster analysis was performed to determine the number of clusters in the population, the detailed output of the analysis can be viewed in appendix 9.6. Cluster analysis is a popular tool within content analysis due to the “intuitively meaningful similarities among units of analysis” (Krippendorff, 2004, pg. 210). Simply put, clustering is an effective means of separating groups or relationships from those that are accidental or meaningless (Krippendorff, 2004). Using SPSS software, the two step analysis resulted in the emergence of two clusters from the analysis, with the following characteristics:

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Number of companies</th>
<th>Description</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 (62.5% of population)</td>
<td>Cluster generally scored lower per indicator, lower frequency of same scores.</td>
<td>Laggard</td>
</tr>
<tr>
<td>2</td>
<td>3 (37.5% of population)</td>
<td>Cluster generally scored higher per indicator, higher frequency of same scores.</td>
<td>Leader</td>
</tr>
</tbody>
</table>

Table 7: Two Step cluster analysis output

Hierarchical clustering allowed the iterative process of sub-clusters to be compared; those with the smallest distance between them were merged, whereby the process was repeated until a final number of clusters were identified (SPSS Software index, 2010). Using a k-means cluster analysis for the two clusters identified, see appendix 9.6 for the detailed output, the following mean scores were calculated per category:
### 4.1.2 Interpretation and Discussion of Content Analysis

The emergence of two groups of companies pursuing different strategies with regards to environmental responsibility is of interest to the research question posed. It is important to understand the characteristics of each group and their respective differences in the various indicators measured.

1. **Laggards**

   The group named as Laggards, consists of five companies. Companies in this group have low mean scores (less than 1) in all of the categories, meaning that there is a low prevalence of reporting of environmental issues made public, little or no environmental strategy has been articulated and little description has been undertaken of the initiatives that would help the companies execute their respective strategies. Lastly, little mention is made of what leadership resources and intent is required in order to make environmental responsibility a priority within the organisation.

   South African domestic airlines and associations are represented by this group. There is little internal pressure to affect change, neither is there external pressure, such as legislation, to disclose the state of environmental strategy development and execution to their respective stakeholders.

2. **Leaders**

   Leaders, consisting of three companies, have scored higher on all of the categories investigated – with only leadership (1.83) scoring lower than 2 on the scale of 0 to 3. This group has dedicated documents, word count and internet space to communicating their
respective environmental strategies. Moreover, the initiatives required to achieve those strategies have been described in detail and senior management have made the environmental responsibility a priority in terms of public communication.

The leaders group is typical of those companies that are global in their operations and interactions with other stakeholders. The highly regulated environment of EU airspace (where British Airways is based) combined with the forward looking approach of IATA’s emissions policy has resulted in a cluster of organisations (BA, Singapore Airlines and IATA) with a comparably high disclosure scores. Naturally, Singapore Airlines would be expected to be in the Leaders group as this particular airline was chosen as an example of an organisation with a highly visible environmental strategy and one that works closely with IATA to reduce emissions.

Interestingly, SAA – whose main international market is the EU and is also a member of IATA does not belong to this group and is instead a laggard with regards to developing and communicating its environmental responsibility strategy.

In conclusion, all indications are that greater pressure from governmental and consumer agencies, an example being the EU ETS, will result in more disclosure being required by airlines and not less in the future. In this sense the laggards group within South Africa will need to dedicate more time and resources into catching up to the leaders within the sector.
4.2 Passenger Survey Findings and Analysis

The second area of the research that was conducted focused on speaking to the final consumers of the product, that is, the passengers travelling on the airline carriers. The method of triangulation chosen was to survey the respective passengers and gain an understanding of their understanding of carbon offsetting, the choices delivered to them by their airlines and the extent to which they believe carbon offsetting would be of value to them.

4.2.1 Passenger Survey Methodology

This process required surveying passengers at O.R. Tambo International airport after they had checked into their flight, approximately 2 to 3 minutes of the passenger’s time was requested while the survey was conducted face to face.

The target population being researched was domestic airline passengers using any one of the domestic airlines within South Africa. Stratified sampling was chosen in order to ensure that representation of various subgroups of the population occurred (Teddlie & Tashakkori, 2009). Participants needed to be travelling with one of the five airlines that operate locally in South Africa; this meant interviewing passengers outside each of the check-in areas of the airlines in order to ensure that a sample from each airline was obtained. A probabilistic and entirely random sampling method would not necessarily have netted passengers from the smaller airlines such as 1Time and Kulula.

Approximately 250 people were approached for the survey, of which, 85 passengers made themselves available for the survey. Four of the 85 data points were discarded due to potential language problems by passengers when attempting to understand the questions posed. Using the 81 filtered data the observed result is significant at the 95% confidence level with a 10.89% confidence interval.

It is important to note that the sample size collected is not representative of the entire South African population, nor is it representative of the entire South African domestic aviation market – it is instead a means to forming a generalised understanding of the current state of passengers’ understanding of carbon offsetting and environmental responsibility strategies.

A summary of the data collected can be found in appendix 9.8
Research Assumptions for Survey Analysis

The assumptions that were made prior to conducting the survey were:

- Passengers would make themselves available for the survey and that the Airports Company of South Africa (ACSA) and the airlines themselves would agree to their passengers being surveyed.
- Those passengers being surveyed would be able to understand the nature of the question and be able to converse sufficiently in English.
- Passengers would not introduce any non-research related bias into the survey, for e.g. poor service experienced prior to check-in should not affect the passengers attitude towards a carbon offsetting service offered by that airline.
- Representation of all of the domestic airlines could be obtained in the survey.

During the course of the survey it was noted, particularly amongst four of the respondents that at times a language barrier existed between this researcher and the person being interviewed. These four data points were subsequently discarded. Both the airlines and the airports company gave their consent so that passengers could be approached.

4.2.2 Interpretation and Analysis of Passenger Survey Results

Through the use of basic descriptive statistics of the survey results an analysis can be made regarding the public’s understanding of carbon offsetting. Section 5 uses the interpretations drawn from this phase to develop conclusions and inferences in line with Creswell & Clark's, (2010) strategies for interpreting connected results.

The summarised findings, supported by the findings of the survey results below, are:

i. Passengers are unaware of whether their airline offers carbon offsetting.

ii. A large proportion (72%) of all respondents would offset their flights if given the choice.

iii. This potential uptake of the offsetting service is not uniformly spread and is at odds with the current services offered to airline passengers.
As can be seen in graph 1, passengers are unaware of whether their airline of choice offers carbon offsetting as a service. Mango customers, see graph 2, have the highest awareness, at 25% of the sample as to whether offsetting has been offered to them. However this airline does not offer the service; instead it is a compulsory charge and is not related specifically to carbon offsetting. Passengers from SAA and Kulula mistakenly thought that their airline offered such a service, SAA has never done so and Kulula has offered the service in the past but not during the course of this year.

Of interest is the fact that 94% of all respondents believe that they have not contributed towards any offsetting fee, as can be seen in graph 3 and 4 below.
Question: Have you paid to have the emissions of this flight offset?

![Graph 3 Percentage of passengers thought to have paid to offset their flight](image)

In fact, all of the Mango customers have made a contribution of a R2.50 Green Fee, as can be seen on the following page in figure 6. Although this is not a carbon offsetting fee and rather a monetary contribution to an environmental cause – a higher indication of people being aware of the Green Fee would have been expected. The reasons for this lower than expected response could potentially be that either, a) Passengers are unaware that a contribution has been included in the purchase of their ticket, or, b) Passengers are aware that they have contributed towards a Green Fee but are unaware that this fee will contribute towards the offsetting of their particular flight.

![Graph 4 Percentage of passengers thought to have paid to offset their flight per airline](image)
Overwhelmingly, 72% of all passengers surveyed would offset their flight if given the choice.

**Question:** If your airline did offer the option of offsetting your flight, would you do so?

![Graph 5 Percentage of passengers willing to offset their flight](image)

However, this is not uniformly split between the carriers. The premium priced airline, SAA, indicated the largest potential uptake by passengers at 88%. Interestingly, the only carrier that currently contributes towards a green fee, Mango, would potentially suffer from the lowest uptake of the service at 42% if it was offered and was not mandatory.

**Question:** If your airline did offer the option of offsetting your flight, would you do so?

![Graph 6 Percentage of passengers willing to offset their flight per airline](image)
The answers received for “Maybe”, relate to consumers wanting to know more about the nature of the offset offered, the transparency of the transaction, and the price of the offset as detailed in the table below:

<table>
<thead>
<tr>
<th>Specific responses to “Maybe” answers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>n</strong></td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>SAA</td>
</tr>
<tr>
<td>1Time</td>
</tr>
<tr>
<td>Kulula</td>
</tr>
<tr>
<td>Mango</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>BA</td>
</tr>
</tbody>
</table>

Table 9 Survey responses concerning willingness to offset flights

In conclusion, although the findings from the passenger survey are not representative of the buying public at large, it is an indication of the level of understanding of carbon offsetting within the airline market.
4.3 Interview Findings and Analysis

4.3.1 Interview Methodology
Purposeful sampling (Creswell & Clark, 2010) was undertaken as participants needed to have experience within the aviation sector. The advantage of such a sample was to focus on the depth of the information being generated (Teddlie & Tashakkori, 2009), as such, the sample size was relatively small with a total of 13 interviews conducted. Representativeness was achieved by selecting a participant from each of the domestic airlines in the country as well as selecting participants that either provided services to the airlines or formed part of the value chain between consumers and the airlines themselves.

Interviews took place in person or via telephone depending on the participant’s availability and geographic location. In general the duration of each interview was approximately 45 – 60 minutes, although the shortest recorded interview lasted 30 minutes and the longest took place over 90 minutes. All participants were subjected to the same questions, in the same order, as a means to maintaining reliability of data collection. Similarly, all participants were given the opportunity to expand on areas of interest that they believed would enhance the piece of research.

Research Assumptions for Interviews

The main assumptions developed prior to the interview process were that participants would be available and that they would be able to discuss current and future environmental strategies being developed. Both assumptions held true as participants set aside time to discuss the topic of research.

4.3.2 Interpretation and Analysis of Interviews
A number of themes emerged during the development of the in-case analysis of the interviews, these are:

i. All of the airlines are in the process of formulating new environmental strategies for 2011 and beyond. To that end there is evidence that the environmental policies of each of the airlines are in a state of flux and
that management teams are currently investigating a broad range of strategies with regards to emissions reduction and carbon offsetting.

ii. Airlines currently have different strategic drivers in terms of their environmental responsibility policies, with different priorities.

iii. Varying degrees of uncertainty exist within the local aviation sector with regards to pending environmental legislation; this is reflected in the different strategies adopted and each airline’s degree of adoption of IATA’s four pillar approach to emissions reduction.

iv. Offsetting is not currently offered by any of the airlines, although three of the four domestic carriers are planning to offer the service in the future. A perceived lack of transparency and governance in the carbon credit markets were cited by some of the airlines as a barrier to implementing full carbon offsetting.

v. Airlines indicated a willingness to purchase South African based carbon credits as opposed to international credits. Two airlines, Mango and Kulula indicated that an element of Corporate Social Responsibility (CSI) would increase the attractiveness of such a product.

vi. Organisations that facilitate the ticketing process, such as travel agents and corporate booking managers have had minimal exposure to the environmental policies of their own organisations. Also, travel and booking agents are unfamiliar with the environmental policies of the airlines from whom they purchase their tickets.

vii. A mixed message has been received with regards to the back office functionality of the systems and processes that support the ticketing process. Airlines have indicated that changes to their websites can be made with relatively little difficulty to include carbon offsetting options. Travel agents, however, are unsure of whether the Amadeus and Galileo booking systems currently support offsetting options and whether these booking systems could be changed in the future.
4.3.3 Discussion of Interview Findings

When asked to prioritise the drivers of their organisation’s environmental and emissions policies, participant’s responses varied, here “1” is the main driver of a policy:

<table>
<thead>
<tr>
<th>DRIVERS</th>
<th>SAA</th>
<th>Mango</th>
<th>Kulula</th>
<th>1Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Environment - “it’s the right thing to do”</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Legislative Compliance</td>
<td>2*</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Cost Reduction</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Marketing (Customer driven)</td>
<td>2*</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 10 Interview responses - Corporate strategic drivers

*SAA rated both Legislative Compliance and Marketing as shared second priorities.

Firstly, all of the airlines recognised that the drivers put forward adequately describe the strategy decision points encountered when developing an environmental policy. As noted earlier, it is of interest that varying priorities were given – although Kulula and 1Time have the same sets of priorities when ranking their most important and least important drivers, being The Environment and Marketing drivers respectively.

SAA have adopted a cost reduction priority for lowering emissions, the reasoning behind such a decision centres on the recognition that emissions equate to fuel, therefore any reduction in fuel burn translates into direct cost savings for the airline. Kulula and 1Time (and to a slightly lesser degree, Mango), however, indicated that the main driver of their environmental policy is an altruistic one, and that it is simply the “right thing to do”. Mango believes that their environmental policy is driven primarily by satisfying their customer’s needs and that the marketing approach to providing the correct service and product in all elements of the company’s strategy, including the environmental strategy, is important to maintaining their competitiveness.

It is only SAA that has recognised the importance of developing an environmental strategy that caters for the changing legislative environment. The main reason, as described by the airline, is the fact that Europe is one of the airline’s largest markets and therefore new environmental taxes or incentives would affect the bottom line of the
company. To that end, SAA have a dedicated team monitoring changes to the legislation, in particular the impact of the EU ETS changes in 2011.

When the external stakeholders of the airlines were asked to rank the same set of drivers in order of priority an even greater varied response was captured:

<table>
<thead>
<tr>
<th>DRIVERS</th>
<th>IATA</th>
<th>Food and Trees for Africa*</th>
<th>ASATA</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Environment - “it’s the right thing to do”</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Legislative Compliance</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Cost Reduction</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Marketing (Customer driven)</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 11 Interview responses - Corporate strategic drivers, stakeholders
*Perception of where the airline industry’s priorities are currently situated

Here, it can be seen that IATA and SAA have the same highest ranking priority. This was identified during the interview process when the SAA representative indicated that the airline had “aggressively adopted” the recommendations of IATA’s four pillar environmental policy as a means to reducing emissions, as described in section 2.3.

Food and Trees for Africa, an organisation that provides offsetting to multiple organisations across a wide variety of industries, commented that the aviation sector in general appears to be marketing driven, and that the industry’s environmental policies do not give necessarily give precedence to the environment itself. This thought was echoed during the interviews of a former head of strategy for an international airline and a pilot of one of the major domestic airlines. Both individuals believed cost reduction initiatives that helped deliver better profitability would always rank first and that the environmental driver would rank last.

The specific initiatives that airlines can undertake as part of an emissions reduction strategy, in line with IATA’s four pillars approach, were discussed with each of the airline’s representatives. The airline’s identified which of the initiatives are currently underway:
**CURRENT INITIATIVES**

<table>
<thead>
<tr>
<th></th>
<th>SAA</th>
<th>Mango</th>
<th>Kulula</th>
<th>1Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Operations</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Infrastructure</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon Offsetting</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Table 12 Interview responses - Current initiatives*

**Technological initiatives:** SAA and Mango stated that the biggest impact on emissions could be achieved through more efficient planes; hence, both of the airlines had ongoing initiatives as part of their environmental strategies to upgrade their flights to the latest, more efficient aeroplanes available. At the time of writing, 1Time were in the process of upgrading their capital allocation with regards to fleet maintenance and expanding their fleet.

**Operational initiatives:** SAA provided the greatest detail with regards to reducing emissions through improved ground operations. Examples included the use of auxiliary power units, new procedures in take offs and landings and the use of towing where possible. Mango and Kulula indicated that changes to staff procedures and awareness in and around staff offices were some of the initiatives undertaken.

**Infrastructural initiatives:** SAA indicated that some infrastructural projects had been undertaken, specifically for their international flights. An example cited was the change from flight corridors to point-to-point flights.

**Carbon offsetting initiatives:** None of the airlines offered such a service at the time of writing. Kulula, through Trees and Food for Africa, offered an offsetting option prior to 2010 through their Project Green initiative. This service was discontinued by Kulula during the course of 2010 while the organisation’s environmental and marketing strategies were under consideration. The airlines provided a wide range of reasons for not currently offering carbon offsetting - these ranged from lack of transparency in the offsetting market (1Time and SAA), a desire to include Corporate Social Investment projects in lieu of offsetting projects (Mango and Kulula) and the overall desire to use...
South African offsetting projects as opposed to overseas based projects. None of the airlines gave an indication of the potential prices of a carbon credits that were being pursued. Apart from Mango, who would continue with their Green Fee initiative, the other three airlines all expressed a desire to offer carbon offsetting to their customers in the near to medium term.

![Table 13 Interview responses - Proposed initiatives](image)

Of the airlines pursuing carbon offsetting options, SAA and 1Time saw the need to create a strong link between the air miles travelled, the amount of CO\(_2\) emitted and the cost of the offset charged to passengers. Transparency and governance were top of mind concerns and hence a barrier to implementation for these two particular airlines. Kulula indicated that governance and the protection of customer’s trust is an important factor in developing carbon offsetting options. To that end the airline is investigating the use of a trust to administer the proceeds of carbon offsetting contributions.

Both Kulula and Mango believed that any form of economic contributions by passengers towards emissions reductions should incorporate a Corporate Social Investment aspect, with Mango placing greater emphasis on this in comparison to the other airlines. It is important to note that Mango, in the form of their current Green Fee, do not subscribe to carbon offsetting, nor is there a link between air miles travelled and tonnes of CO\(_2\) emitted – it is instead an economic contribution towards environmental projects.

A potential blind spot in terms of offering carbon offsetting to airline passengers exists in the part of the value chain controlled by travel agents and corporate booking agents. It is important to note that the interface between travel agents and the airline’s ticketing processes are different to the internet booking interfaces that individual customers see.
When interviewed, travel agents and bookers raised the fact that the current method of booking tickets through the Amadeus and Galileo ticketing systems do not display the option of “ticking the box for carbon offsets”. The immediate observation is that the reason for not seeing this option is that none of the domestic airlines offer carbon offsetting and the functionality would therefore not be displayed – however, travel agents did note that the Kulula option in the past did not seem to appear on the Galileo and Amadeus systems. When asked, the airlines indicated that changes to their internet pages and back office systems to accommodate offsetting should be relatively easy to achieve. This area requires further exploration, as suggested in section 6, as the risk is that an important sales channel would limit the ability of airlines to offer carbon setting to all of their prospective customers.

The airlines communicate changes to their environmental strategies predominantly through their website home pages. Analysis of the content of the communication taking place has been described in section 4.1. It is worth noting that none of the airlines have marketed their environmental strategies to the same extent as Trees and Food for Africa, whose billboards are prominently displayed in South Africa’s busiest airports O.R. Tambo and Cape Town International.
5 RESEARCH CONCLUSIONS

5.1 Specific Findings

In the design of this research a series of specific questions were posed in section 2.2, here the intention is to review these questions in light of the themes that have emerged from all three areas of research. Where new areas of inquiry have opened up these will be mentioned and referred to in section 6.

Question: What are the corporate strategic drivers behind a firm’s approach to reducing their carbon emissions?

Literature identified four strategic drivers that describe an array of choices available when addressing emissions, namely: environmental reasons, legislation compliance, cost reduction and marketing based drivers. These drivers were confirmed by the representatives of the airlines during the interview process. However, an emergent theme was that the uptake of the strategic drivers differs according to the priorities and
needs of the individual airlines at specific points in time. An example of a potential shift in the prioritisation of the drivers was cited by the 1Time representative who mentioned that changes to legislation in the future will require a reprioritisation of their current strategic drivers of environmental policy.

Two of the airlines, Mango and Kulula, indicated that Corporate Social Investment (CSI) could be considered to be another strategic driver of environmental policy. Although CSI is not directly related to environmental strategy it is oftentimes developed by the same departments within organisations, such as the marketing or strategy function. CSI type projects in the South African corporate environment are seen to be of value as the projects help address historical imbalances created during the apartheid era while complying with changes in the political and legislative arena (Fig, 2005; Habib & Nyar, 2008) particularly those dealing with Black Economic Empowerment policies (Hamann, 2009). Future research should be done on how CSI drives environmental strategy within aviation and how strongly this potential driver impacts on the other four described to date.

**Question:** What activities have airlines and airline fleet operators undertaken in order to reduce their emissions?

As members of IATA, the airlines have access to the organisation’s intellectual property centred on their Four Pillar Strategy (see section 2.3) to reducing carbon emissions. The strategy outlines technological, operational, infrastructural and economic measures that can be undertaken by an airline in order to lower emissions. Similar to the corporate strategic drivers, airlines have adopted varying degrees of uptake of these emission reduction initiatives. The specific initiatives have been described in section 4.3.3.

Most notable is the fact that none of the airlines offer carbon offsetting as an economic measure to ‘plug the gap’ between emissions reduction initiatives and achieving carbon neutral growth. While SAA have implemented initiatives in three of the four pillars the other airlines have lagged behind in their uptake of the Four Pillar Strategy. One reason noted by both Kulula and 1Time is that SAA and Mango have greater access to capital and can therefore make (comparatively) easier technological upgrades to their respective fleets.
**Question:** Are these activities decided on within a strategic framework in order to maintain or increase competitive advantage?

This research indicates that the emission reduction activities described above are linked to the corporate strategic drivers decided on by each of the airlines. In this sense, yes, strategic frameworks appear to dictate the type and degree of implementation of emission reduction activities. The clearest link between strategy and activity can be seen in SAA’s adoption of a cost reduction strategy with regards to environmental policy – which in turn drives the company’s uptake of IATA’s four pillar emission reduction activities, barring carbon offsetting. SAA’s ability to develop and articulate their cost reduction strategy has translated into a particular set of fuel saving activities.

Each of the airlines indicated that due to the industry’s incredibly competitive nature environmental strategy needs to enhance the firm’s competitive position. One particular insight, repeated by several participants, is that emission reduction initiatives are cost saving measures that improve profitability, whereas carbon offsetting is at times viewed by the industry as a cost to the airline and passengers. Hence the sector’s reluctance to implement carbon offsetting without fully understanding the impact to a company’s competitive positioning.

**Question:** Of the airlines and fleets operating in the South African airspace, which of these offer some form of carbon offsetting and why is it being offered?

As can be seen in table 12, none of the airlines currently offer carbon offsetting. Kulula, prior to 2010 offered the service through Food and Trees for Africa as part of their Project Green. As mentioned in section 4.3.3, SAA, Kulula and 1Time are in the process of developing carbon offsetting services, tailored to their current strategic needs, for 2011 and beyond.

**Question:** How well is the carbon offset market understood by the airlines and consumers (i.e. airline passenger) of the offsets in terms of the origin, mechanism, final destination and reliability of an emission offset?
The passenger survey area of research was undertaken to specifically address this question. As could be seen in section 4.2.2, 91% of passengers surveyed did not know if their airline offered carbon offsetting of flights. Three of the eighty one participants (3.7%) indicated that they thought they had paid R2.50, R10 and R30 respectively to have their flights offset, this is an example of how little is currently understood by the public with regards to carbon offsetting in aviation. In general, passengers of domestic South African airlines have little understanding of what carbon offsetting is and how the mechanism works. The airline themselves have different views and understandings of the carbon offsetting market and the mechanisms behind the trading of carbon credits.

In general, there is a somewhat circumspect view of the carbon credit industry due to the perceived lack of transparency and governance. SAA, Kulula and 1Time indicated that they will be dedicating company resource into investigating effective governance methods when implementing carbon offsetting in the future.

If airlines do decide to offer carbon offsetting to their customers a need will arise to educate the general public on the benefits of using such a service. Currently, as measured in the content analysis of publically available data, domestic airlines scored poorly for any mention of carbon offsetting initiatives with a cluster mean score of 0.2 out of a maximum of 3, whereas overseas based airlines and organisation’s had a mean cluster score of 2.67 for their description of carbon offsetting initiatives. An opportunity exists to aggressively market and shape the South African public’s perceptions with regards to carbon offsetting, a space which is currently not being utilised by any of the domestic airlines.

**Question:** *Do airline passengers desire carbon offsets when travelling on airlines?*

72% of all participants in the survey indicated favourably that they would make use of carbon offsetting if their airline of choice offered the service to them. This potential high uptake excluded those 12% of passengers who answered ‘maybe’ who would possibly make use of the service depending on the price of the offset and the governance of the transaction process. In general, the concept of making a monetary contribution towards an environmental initiative such as carbon offsetting was well received by the flying public surveyed.
5.2 General Conclusions

This study has aimed to create an understanding of the current state of environmental strategies through domestic South African airlines approaches to emission reductions, carbon offsetting and the communication of those initiatives to the general public. The research conducted and findings developed aim to contribute to the body of literature centred on understanding the corporate strategic responses to climate change specifically within the context of the South African aviation industry.

One of the emergent themes that repeated itself throughout the findings of this research is that a gap exists between airlines developing their respective strategies and being able to communicate those said strategies to the South African public. Internationally based airlines such as British Airways and Singapore Air have more detailed and better articulated environmental policies, as measured through their higher scored averages for all indicators in the content analysis section of this report. The implication is that South African aviation firms run the risk of becoming increasingly isolated with regards to their environmental policies in comparison to foreign base firms, which in turn could lead to a loss of competitive position – this is especially true if changes in environmental legislation affect the competitive landscape.

No two companies in the study have adopted the same corporate strategic drivers with regards to environment policy; similarly, none of the airlines have implemented the same emission reduction initiatives. This indicates that a divergent set of strategies and thinking exists within the domestic aviation sector. This divergence is evident in the companies different attitudes regarding the use of economic measures to ‘plug the gap’ between emissions and carbon neutral growth: none of the airlines currently offer carbon offsetting to their passengers, some of the airlines are considering offering the service in the future and the potential reasons for offering the service differ from one airline to the next. Organisations and individuals that form part of the value chain in the aviation industry also have widely differing views on strategic priorities with regards to environmental policy. Again, this is perhaps an indication of not only different strategy development but also poorly communicated strategy, both externally and internally.
In general, South African domestic airlines, when viewed in the light of Kolk & Pinkse's (2004) defensive-opportunistic-offensive continuum have responded to climate change mostly in a defensive manner. Moreover, all of the domestic carriers have chosen to respond to these environmental changes through internal innovation, with SAA leading the way, while those opting for compensation based schemes have addressed the problem with little in the way of transparency and clear linkages between air miles flown and the Rand / Dollar value of the tonnes of CO$_2$ emitted. Kulula and Mango, through their respective Project Green and Green Fee initiatives have begun forays into developing the opportunities that exist when addressing concerns regarding climate change. However, far greater opportunities can be exploited, resulting in greater market share and increased revenue for those firms that decide to go on the offensive within the climate change arena.

Lastly, passengers have little understanding of what carbon offsetting options are available to them. More importantly, a large portion of participants in the study indicated a willingness to purchase carbon offsets of flights, an insight that airlines would do well to make use of within the highly competitive landscape.

A summarised set of findings found below, shows the three areas investigated. Improvement could potentially take place in the interactions between these three entities:

- Domestic airlines have little environmental content on display
- Disclosure of environmental policies is not a priority for domestic airlines

![Figure 8 Summary of findings](image)

- Passengers are unaware of what offsetting initiatives are available
- Passengers, if offered, would mostly make use of carbon offsetting

- Airline management should make better use of communication channels
- Different strategies have been adopted by domestic airlines
- Strategies are currently in a state of flux, all of the airlines have indicated changes are being made to environmental policies
5.3 Recommendations for Airlines

It is in the opinion of this researcher that domestic airlines have a number of potential opportunities with regards to environmental strategy development and the communication thereof:

*Align environmental strategy with emission reduction initiatives.*

- It is possible to implement emission reduction initiatives that help deliver against an overall environmental target and within an overall strategic framework, provided that an environmental target has been set and articulated to the rest of the organisation.

- IATA has provided a clear and action orientated strategy towards carbon neutral growth, airlines would do well to make use of the organisation’s services.

*Close the gap between the domestic laggards and the international leaders with regard to environmental policy disclosure.*

- Content detailing the specific environmental initiatives embarked on by each of the domestic airlines should be made available to the public.

- The use of supplemental environmental reports could be used to emphasise the new policies and communicate changes to existing policies.

- Websites would do well to follow a ‘hierarchy of information’ with environmental reports given greater priority in order to make the best use of communication channels.

*Offer carbon offsetting, customers indicate a willingness to purchase credits.*

- Preliminary investigation indicates that customers would make use of the service.

- A competitive advantage could be achieved by those airlines that fulfil this need.
6 FUTURE RESEARCH DIRECTIONS

As identified earlier in the study, elements of the research have uncovered areas that could potentially be studied further or in greater detail, these are:

- An expanded passenger survey targeting price sensitivities with regards to carbon offsets would increase airline’s understanding of uptake of the service.

- Investigate the systems and processes that travel agents and bookers use during the transaction process. Can the Amadeus and Galileo ticket booking systems support carbon offsetting (i.e. will travel agents be able to offer the service to customers?)

- Investigate the use of a ‘Corporate Social Investment’ driver as part of a company’s environmental strategic framework in light of the changing legislative and political landscape.
7 BIBLIOGRAPHY


## Appendix 9.1 Standards in the Voluntary Carbon Markets

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Co-Benefits Req’d?</th>
<th>Registry</th>
<th>Geographic Scope</th>
<th>Total Projects Registered</th>
<th>Total VERs Issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Carbon Registry Standard</td>
<td>Certification program for offsets, and an emissions reporting registry</td>
<td>No</td>
<td>Registry incorporated</td>
<td>Global</td>
<td>23</td>
<td>30.3MtCO₂e ERTs issued</td>
</tr>
<tr>
<td>CarbonFix</td>
<td>Certification program for forestry offset projects</td>
<td>Yes</td>
<td>Registry incorporated with Markit</td>
<td>International</td>
<td>1</td>
<td>0.23MtCO₂e</td>
</tr>
<tr>
<td>Chicago Climate Exchange Offset Program</td>
<td>Internal system for offset credits verified to CCK standards</td>
<td>No</td>
<td>Registry incorporated with trading platform</td>
<td>International</td>
<td>323</td>
<td>82.2MtCO₂e</td>
</tr>
<tr>
<td>Climate Action Reserve</td>
<td>Registration and verification program for offsets and a registry</td>
<td>No</td>
<td>Registry incorporated; powered by APX</td>
<td>US and Mexico currently, Canada soon</td>
<td>25</td>
<td>2.3 MtCO₂e issued; 0.5 MtCO₂e retired</td>
</tr>
<tr>
<td>Climate, Community &amp; Biodiversity Standard</td>
<td>Validation &amp; verification program for land-based offset projects</td>
<td>Yes</td>
<td>Projects on website; and a CCB label can be added to VCs on VCS registries when verified</td>
<td>International</td>
<td>20</td>
<td>VERs not issued</td>
</tr>
<tr>
<td>EPA Climate Leadership Offset Guidance</td>
<td>Guidance for companies on voluntary offset use</td>
<td>No</td>
<td>No</td>
<td>International</td>
<td>4 approved projects</td>
<td>None</td>
</tr>
<tr>
<td>GE/AES Greenhouse Gas Standard</td>
<td>Certification program for offsets and project developers</td>
<td>No</td>
<td>Yes</td>
<td>US; Canada soon</td>
<td>0.4MtCO₂e</td>
<td></td>
</tr>
<tr>
<td>Gold Standard</td>
<td>Certification for offset projects &amp; carbon credits</td>
<td>Yes; powered by APX</td>
<td>International</td>
<td>311</td>
<td>2.2MtCO₂e / 1.1MtCO₂e retired</td>
<td></td>
</tr>
<tr>
<td>Green-e Climate</td>
<td>Certification program for offset retailers</td>
<td>No</td>
<td>Registry incorporated</td>
<td>International</td>
<td>23</td>
<td>168,125 MtCO₂e</td>
</tr>
<tr>
<td>ISO 14064</td>
<td>Certification program emissions reporting, offset projects, and carbon credits</td>
<td>No</td>
<td>No</td>
<td>International</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Plan Vivo</td>
<td>Validation and verification program for forestry and agro forestry PES projects</td>
<td>Yes</td>
<td>Markit</td>
<td>International</td>
<td>4</td>
<td>0.75MtCO₂e issued and retired</td>
</tr>
<tr>
<td>Quality Assurance Scheme for Carbon Offsetting</td>
<td>U.K. government certification program for offset retailers</td>
<td>No</td>
<td>Not Applicable</td>
<td>International</td>
<td>None</td>
<td>9 retailers certified</td>
</tr>
<tr>
<td>SOCIALCARBON Standard</td>
<td>Validation program for offset projects</td>
<td>Yes</td>
<td>Markit registry</td>
<td>South America &amp; Portugal</td>
<td>33</td>
<td>1.4MtCO₂e issued; 0.09 MtCO₂e retired</td>
</tr>
<tr>
<td>VER+</td>
<td>Certification program for offset projects and carbon neutral products</td>
<td>No</td>
<td>TÜV SÜD BlueRegistry</td>
<td>International</td>
<td>32</td>
<td>3.7MtCO₂e</td>
</tr>
<tr>
<td>Voluntary Carbon Standard</td>
<td>Certification for offset project &amp; carbon credits</td>
<td>No</td>
<td>Project Database; Registries provided by Markit, APX, and Caisse des Dépots</td>
<td>International</td>
<td>386 (345 public + 41 private) validated and registered</td>
<td>30.1MtCO₂e</td>
</tr>
<tr>
<td>J-VER</td>
<td>Verification and certification scheme for offset projects</td>
<td>No</td>
<td>J-VER</td>
<td>Japan</td>
<td>3</td>
<td>10,777tCO₂e</td>
</tr>
</tbody>
</table>

## Appendix 9.2 EU ETS Aviation Implementation Timelines and Summary

<table>
<thead>
<tr>
<th><strong>Final agreement (October 2008)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Timing</strong></td>
</tr>
<tr>
<td>2012: inclusion of all flights arriving at and departing from EU airports</td>
</tr>
<tr>
<td><strong>Level of emissions cap</strong></td>
</tr>
</tbody>
</table>
| 2012: 97 percent of average 2004-9 emissions  
2013: 95 percent of 2004-6 emissions |
| **Auctioning**                    |
| 2012: harmonised level of 15 percent auctioning  
2013: auctioning level for 2013 onwards to be negotiated in the wider EU ETS review negotiations. No legally binding hypothecation clause |
| **Free allocation criteria**      |
| Great circle distance plus 90km (fixed). Operators may choose to apply (i) actual weight (ii) standard weight or (iii) default passenger weight of 160kg |
| **Special reserve**               |
| Creation of a reserve for new entrants and fast-growing airlines from within the cap. 3 percent of the total capped allowances for that phase. Allocated to new operators and those whose activity data shows an increase of more than 10 percent per annum |
| **Open trading scheme, Access to Certified Emissions Reductions (CERs) & Emission Reduction Units (ERUs)** |
| Open trading scheme but with the removal of the clause that allows convertibility between Assigned Amounts (AAs) and EU Allowance Units (EUAs)  
2012: 15 percent access to CERs and ERUs  
2013+: to be confirmed as part of ETS review negotiations |
| **Notable exemptions**            |
| Weight: certified 5.7t maximum take off mass threshold  
Heads of State exemption restricted to non-EU  
Exemption for Public Service Obligations where they are either on specific routes between outermost regions or where capacity offered does not exceed 30,000 seats per year  
Activity threshold exemption for commercial air operators who operate at a frequency lower than 243 flights per period into, out of or within the EU for three consecutive four-month periods, or with an emissions threshold of less than 10,000 TCO2 a year |

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68

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Appendix 9.3 Airline interview example questionnaire

**Airline Management Questionnaire – Environmental Responsibility**

*Interview Number:*

1. **Airline / Organisation**

2. Does this airline operate locally, internationally or both

3. What regional or sector affiliations do you belong to?

4. Are you a member of IATA? (Yes / No)

5. Does your airline have an Environmental Responsibility Programme?

6. Does this include an emissions reduction target, if so what is it?

7. How will this target be met?

8. Is there (or will there be) any regional or sector collaboration between yourself and other airlines when addressing emissions reductions?

9. Are there specific emission reductions targeting:
   - Technology initiatives
   - Operations initiatives
   - Infrastructure initiatives
   - Offsetting initiatives

10. Does your airline subscribe to a Carbon Neutral Growth (CNG) initiative and how will this affect your Environmental Responsibility Policy?

11. Does your airline offer carbon offsetting for passengers? (Yes / No)

12. If so, why?
13. If not, why?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

14. If flights can be offset, what is the origin of the offset (CER / VER / Type, name, project)?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

15. What is the price of the offset offered to your passengers? (Per tonne CO2, airline mile, local, international)
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

16. What is the strategic reasoning for offering carbon offsets?
   Environmental Responsibility
   Legislation compliance
   Cost reduction initiative
   Marketing (customer demand)

17. Who are your main stakeholders with regards to environmental responsibility?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

18. How are customers and ticket holders engaged, in what manner do you communicate with them?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

19. Does government and regulation play a role in your decision making process with regards to Environmental Policy?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________

20. How is senior management measured on environmental responsibility policy effectiveness?
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
Appendix 9.4 Airline passenger survey questionnaire

Surveys were conducted at O.R. Tambo International airport, permission was granted from ACSA in terms of accessing airline passengers. The surveys each took approximately 2-3 minutes and were conducted near the check-in counters for local flights.

MBA Thesis Research
Researcher: Trevor Watson
Contact Details: 072 400 4834
Email: wtstre002@gsb.uct.ac.za

Survey Number: ________

Airline Passenger Questionnaire
(All supplied information is confidential in line with UCT’s Ethics Committee)

1. Which airline are you flying with? _________
2. Is this flight local or international? _________
3. Are you a frequent flyer? (Yes / No) _________
4. How many flights have you taken in the past 12 months (including this one)?
   1
   2 - 10
   10 - 25
   25 - 50
   +50
5. What is the reason for your flight? (Business / Holiday) _________
6. What is your current age?
   <18
   18 – 29
   30 – 39
   40 – 49
   50 – 60
   60+
7. Do you know if your airline offers carbon offsetting for your flight? (Yes / No)
8. Has your airline given you a choice to offset this flight? (Yes / No)
9. Have you paid to have the emissions of this flight offset? (Yes / No)
10. If so, why? (For the environment / I’m not paying for it / I’m not sure why)

_________________________________________________________________

11. How much has it cost to offset the flight?
12. If your airline did offer the option of offsetting your flight would you do so (Yes / No)
### Appendix 9.5 Content Analysis Data Input

#### COMPANY CHARACTERISTICS

| Name                  | Sector   | Year of annual report | Operations (local, national, regional, global) | Revenue (R m's - unless stated) | Carbon Disclosure Project (CDP) participation | IATA participation | Member of IATA | Annual Report | CDBH - TX & Bank | Website | Social Responsibility | Environmental Awareness  (climate change) | Legislation compliance | Cost reduction initiatives | Marketing campaigns | Technology initiatives | Operations initiatives | Infrastructure initiatives | Offsetting initiatives | Business leadership |
|-----------------------|----------|-----------------------|-----------------------------------------------|----------------------------------|---------------------------------------------|-------------------|----------------|--------------|----------------|-------------------|---------|---------------------|------------------------|----------------------|------------------------|------------------|----------------------|----------------------|----------------------|---------------------|-------------------|
| SAA                   | Airline  | 08/09                 | Global                                        | 20,123                           | No                                          | Yes               | 1.00           | 0.00         | 1.00           | 0.00               | 0.00   | 1.00                | 0.00                   | 0.00                 | 0.00                   | 0.00               | 0.00                | 0.00                 | 1.00                 |
| Mango                 | Airline  | No AR                 | Local                                         | No info                           | Yes                                          | No                | 0.00           | 2.00         | 1.00           | 0.00               | 0.00   | 1.00                | 0.00                   | 0.00                 | 0.00                   | 0.00               | 0.00                | 0.00                 | 1.00                 |
| Comair - Kulula       | Airline  | 08/09                 | Regional                                      | 3,048                            | Yes                                          | Yes               | 1.00           | 0.00         | 1.00           | 0.00               | 0.00   | 0.00                | 0.00                   | 1.00                 | 0.00                   | 0.00               | 0.00                | 0.00                 | 1.00                 |
| BA                    | Airline  | 09/10                 | Global                                        | GBP 7,599                         | No                                           | Yes               | 1.00           | 0.00         | 1.00           | 1.00               | 0.00   | 0.00                | 1.00                   | 2.00                 | 2.00                   | 1.00               | 0.00                | 1.00                 | 1.00                 |
| TTime                 | Airline  | 08/09                 | Regional                                      | 1,280                            | No                                           | Yes               | 1.00           | 0.00         | 1.00           | 0.00               | 0.00   | 0.00                | 1.00                   | 0.00                 | 0.00                   | 0.00               | 0.00                | 0.00                 | 1.00                 |
| IATA                  | Airline Association | 09 Global | n/a | No | n/a | 2.00 | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 |
| ASATA                 | Travel Agents Association | 09 | Local | n/a | No | Yes | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| Singapore Airlines    | Airline  | 09/10                 | Global                                        | USD 12,707                        | Yes                                          | Yes               | 2.00           | 0.00         | 2.00           | 2.00               | 2.00   | 2.00                | 3.00                   | 3.00                 | 0.00                   | 1.00               | 2.00                | 2.00                 | 2.00                 | 2.00                 | 2.00             | 2.00 |
### Appendix 9.6 Content Analysis Cluster Analysis Output

#### Clusters

<table>
<thead>
<tr>
<th>Cluster</th>
<th>1 (%)</th>
<th>2 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size</strong></td>
<td>62.5%</td>
<td>37.5%</td>
</tr>
</tbody>
</table>

#### Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiatives01</td>
<td>6 (69.9%)</td>
<td>3 (15.9%)</td>
</tr>
<tr>
<td>Initiatives02</td>
<td>6 (69.9%)</td>
<td>3 (15.9%)</td>
</tr>
<tr>
<td>Reporting01</td>
<td>6 (69.9%)</td>
<td>3 (15.9%)</td>
</tr>
<tr>
<td>Reporting02</td>
<td>1 (10.0%)</td>
<td>2 (85.7%)</td>
</tr>
<tr>
<td>Strategy02</td>
<td>0 (0.0%)</td>
<td>3 (100.0%)</td>
</tr>
<tr>
<td>Strategy03</td>
<td>0 (0.0%)</td>
<td>3 (100.0%)</td>
</tr>
<tr>
<td>Strategy04</td>
<td>0 (0.0%)</td>
<td>3 (100.0%)</td>
</tr>
<tr>
<td>Strategy05</td>
<td>0 (0.0%)</td>
<td>3 (100.0%)</td>
</tr>
<tr>
<td>Strategy06</td>
<td>0 (0.0%)</td>
<td>3 (100.0%)</td>
</tr>
<tr>
<td>Strategy07</td>
<td>0 (0.0%)</td>
<td>3 (100.0%)</td>
</tr>
<tr>
<td>Initiatives03</td>
<td>0 (0.0%)</td>
<td>3 (100.0%)</td>
</tr>
<tr>
<td>Initiatives04</td>
<td>0 (0.0%)</td>
<td>3 (100.0%)</td>
</tr>
<tr>
<td>Reporting03</td>
<td>0 (0.0%)</td>
<td>3 (100.0%)</td>
</tr>
<tr>
<td>Strategy01</td>
<td>6 (69.9%)</td>
<td>3 (69.9%)</td>
</tr>
<tr>
<td>Leadership01</td>
<td>6 (69.9%)</td>
<td>3 (69.9%)</td>
</tr>
<tr>
<td>Leadership02</td>
<td>2 (66.7%)</td>
<td>3 (66.7%)</td>
</tr>
<tr>
<td>Strategy08</td>
<td>3 (100.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Strategy09</td>
<td>3 (100.0%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Strategy10</td>
<td>3 (100.0%)</td>
<td>0 (0.0%)</td>
</tr>
</tbody>
</table>

#### Cluster Sizes

- Size of Smallest Cluster: 3 (37.5%)
- Size of Largest Cluster: 5 (62.5%)
- Ratio of Sizes: Largest Cluster to Smallest Cluster = 1.67
Appendix 9.7 Content Analysis K-Means Analysis Output

### Iteration History

<table>
<thead>
<tr>
<th>Iteration</th>
<th>Change in Cluster Centres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>1.876</td>
</tr>
<tr>
<td>2</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Convergence achieved due to no or small change in cluster centres. The maximum absolute coordinate change for any centre is .000. The current iteration is 2. The minimum distance between initial centres is 10.247.

### Final Cluster Centres

<table>
<thead>
<tr>
<th>Cluster</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting001</td>
<td>.60</td>
<td>2.00</td>
</tr>
<tr>
<td>Reporting002</td>
<td>.60</td>
<td>3.00</td>
</tr>
<tr>
<td>Reporting003</td>
<td>1.00</td>
<td>2.67</td>
</tr>
<tr>
<td>Strategy001</td>
<td>.40</td>
<td>2.67</td>
</tr>
<tr>
<td>Strategy002</td>
<td>.00</td>
<td>2.33</td>
</tr>
<tr>
<td>Strategy003</td>
<td>.20</td>
<td>3.00</td>
</tr>
<tr>
<td>Strategy004</td>
<td>.20</td>
<td>3.00</td>
</tr>
<tr>
<td>Strategy005</td>
<td>.40</td>
<td>1.00</td>
</tr>
<tr>
<td>Strategy006</td>
<td>.80</td>
<td>2.67</td>
</tr>
<tr>
<td>Strategy007</td>
<td>.00</td>
<td>1.33</td>
</tr>
<tr>
<td>Strategy008</td>
<td>.00</td>
<td>2.33</td>
</tr>
<tr>
<td>Strategy009</td>
<td>.60</td>
<td>2.00</td>
</tr>
<tr>
<td>Initiatives001</td>
<td>.60</td>
<td>3.00</td>
</tr>
<tr>
<td>Initiatives002</td>
<td>.20</td>
<td>3.00</td>
</tr>
<tr>
<td>Initiatives003</td>
<td>.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Initiatives004</td>
<td>.20</td>
<td>2.67</td>
</tr>
<tr>
<td>Leadership001</td>
<td>.40</td>
<td>1.67</td>
</tr>
<tr>
<td>Leadership002</td>
<td>1.00</td>
<td>2.00</td>
</tr>
</tbody>
</table>

### Validity Test – Cronbach’s Alpha

### Reliability Statistics

<table>
<thead>
<tr>
<th>Cronbach’s Alpha</th>
<th>N of Items</th>
</tr>
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<tbody>
<tr>
<td>.981</td>
<td>18</td>
</tr>
</tbody>
</table>
# Appendix 9.8 Passenger Survey Results

<table>
<thead>
<tr>
<th></th>
<th>SAA</th>
<th>1Time</th>
<th>Kulula</th>
<th>Mango</th>
<th>BA</th>
<th>Total = 81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of passengers</td>
<td>24</td>
<td>20</td>
<td>17</td>
<td>12</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>(n = 81 total)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>81</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flight destination</th>
<th>As a % of each airline’s respondents</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>96% 100% 100% 100% 100%</td>
<td>99%</td>
</tr>
<tr>
<td>International</td>
<td>4% 0% 0% 0% 0%</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>100% 100% 100% 100% 100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequent Flyer</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63%</td>
<td>37%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>35%</td>
<td>65%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>53%</td>
<td>47%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>33%</td>
<td>67%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>37%</td>
<td>63%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>47%</td>
<td>53%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reason for flight</th>
<th>Both</th>
<th>Business</th>
<th>Holiday</th>
<th>Neither</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>21%</td>
<td>50%</td>
<td>25%</td>
<td>4%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>15%</td>
<td>65%</td>
<td>20%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>29%</td>
<td>29%</td>
<td>42%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>25%</td>
<td>42%</td>
<td>33%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>63%</td>
<td>12%</td>
<td>25%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>26%</td>
<td>44%</td>
<td>28%</td>
<td>1%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age of passengers</th>
<th>18 – 29</th>
<th>30 – 39</th>
<th>40 – 49</th>
<th>50 – 60</th>
<th>60+</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13%</td>
<td>17%</td>
<td>37%</td>
<td>17%</td>
<td>17%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>15%</td>
<td>45%</td>
<td>25%</td>
<td>15%</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>24%</td>
<td>0%</td>
<td>35%</td>
<td>24%</td>
<td>17%</td>
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<td>21%</td>
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</table>
Do you know if your airline offers carbon offsetting for your flight?

<table>
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<th>No</th>
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</thead>
<tbody>
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Has your airline given you a choice to offset this flight?

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<tr>
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</table>

Have you paid to offset the emissions of this flight?

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<tr>
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<td>100%</td>
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</table>

If your airline did offer you the choice to offset this flight, would you?

<table>
<thead>
<tr>
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<th>6%</th>
<th>33%</th>
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</tr>
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<tbody>
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